SEATTLE PUBLIC UTILITIES
SEPA ENVIRONMENTAL CHECKLIST

This SEPA environmental review has been conducted in accord with the Washington State Environmental Policy Act (SEPA) (Revised Code of Washington Chapter 43.21C), State SEPA regulations [Washington Administrative Code (WAC) Chapter 197-11], and the City of Seattle SEPA ordinance [Seattle Municipal Code (SMC) Chapter 25.05].

A. BACKGROUND

A1. Name of proposed project:

Combined Sewer Overflow (CSO) Outfall 150 Rehabilitation Project

A2. Name of applicant:

Seattle Public Utilities

A3. Address and phone number of applicant and contact person:

Jerry Waldron, Project Manager
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Seattle, WA 98124-4018
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A4. Date checklist prepared:

September 4, 2013

A5. Agency requesting checklist:

Seattle Public Utilities (SPU)

A6. Proposed timing or schedule (including phasing, if applicable):

All work will be completed between October 1, 2014 and April 15, 2015, within an agency-approved in-water construction window. SPU's goal is to complete the work prior to December 31, 2013 if possible.

A7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

SPU has no plans for future additions or expansions related to the proposed project. SPU is preparing a CSO Long-Term Control Plan that may recommend one or more combined sewage storage projects to reduce the frequency and volume of CSOs from this outfall. Any such combined sewage storage projects would be designed and constructed after the Long-Term Control Plan is approved in 2015.

A8. List any environmental information you know about that has been prepared, or would be prepared, directly related to this proposal.

Herrera Environmental Consultants. 2006. Outfall Evaluation Report. Summary Report and Condition Assessment and Criticality Analysis: Findings and Recommendations. SPU,

Project Management and Engineering Division. 2012 (March). Final Technical Memorandum, CSO Outfall Rehabilitation Options Analysis: Conditions Assessment. Memorandum.

Historical Research Associates, Inc. (HRA). 2013 (April). Cultural Resources Inventory for the Combined Sewer Overflow (CSO) Outfall 150 Replacement Project, City of Seattle, King County, Washington.

SPU, Geotechnical Engineering Section. 2013a (April). CSO 150 Subsurface Soil and Sediment Sampling Data Summary. Technical Memorandum.

SPU, Geotechnical Engineering Section. 2013b (April). Geotechnical Report, CSO 150 Outfall Rehabilitation Project, Seattle, Washington.

SPU, Project Management and Engineering Division. 2013c (June 17). C313042 CSO 150 Replacement Project Basis of Design.

SPU, Project Management and Engineering Division. 2013d (July). CSO 150 Outfall Rehabilitation Project (C313042) Small Project Construction Stormwater Control Narrative (also known as the Construction Stormwater and Erosion Control Report).

SPU, Project Management and Engineering Division. 2013e (July). CSO 150 Outfall Rehabilitation Project (C313042) Drainage Report: Stormwater Technical Information Report.

A9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

SPU is not aware of other applications or approvals that would directly affect the property covered by this proposal.

A10. List any government approvals or permits that would be needed for your proposal, if known.

- Environmentally Critical Areas provisions compliance—City of Seattle, SPU
- Street Improvement Permit (SIP)—City of Seattle, Department of Transportation (SDOT)
- Street Use Permit—SDOT
- Tree Protection provisions compliance— SDOT
- Shoreline Substantial Development Permit and/or Conditional Use Permit—City of Seattle Department of Planning and Development (DPD)
- King County Waste Discharge Permit

- Clean Water Act (CWA) Section 401 Water Quality Certification—Washington Department of Ecology [linked to CWA Section 404 permit]
- Hydraulic Project Approval—Washington Department of Fish and Wildlife (WDFW)
- Construction Stormwater General Permit—Washington Department of Ecology
- Clean Water Act (CWA) Section 404 Nationwide Permit—US Army Corps of Engineers
- National Historic and Preservation Act Section 106 compliance—Washington State Department of Archaeological and Historic Preservation (DAHP) [linked to CWA Section 404 permit]
- Endangered Species Act (ESA) compliance—US Fish and Wildlife Service and/or National Marine Fisheries Service [linked to CWA Section 404 permit]
- Magnuson-Stevens Fishery Conservation and Management Act compliance (Salmon Essential Fish Habitat)—National Marine Fisheries Service [linked to CWA Section 404 permit]

A11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The City of Seattle's (City's) wastewater collection system includes separate, partially separated, and combined systems. In the areas of the City where there are separate systems, stormwater runoff flows to a storm drainage system, while sewage and industrial wastewaters are conveyed through sewers to regional wastewater treatment facilities owned and operated by King County. In the partially separated areas of the City, storm drain separation projects were built during the 1960s and 1970s to divert street runoff to the storm drainage system while allowing rooftop and other private property drainage to flow into the sewers. In the combined areas of the City, sewage, industrial wastewater, and stormwater runoff are conveyed in combined sewers to the King County wastewater treatment facilities.

During storm events, the quantity of stormwater runoff flowing into the collection system sometimes exceeds the capacities of the partially separated and combined sewer systems. When this happens, the system overflows at combined sewer overflow (CSO) outfall structures designed for this purpose. There are currently 87 outfalls in the City of Seattle where CSOs can occur.

SPU's CSO Outfall Rehabilitation Program was initiated to rehabilitate these outfalls as necessary. Subsequently, the State of Washington Department of Ecology included requirements to rehabilitate specific CSO outfalls in SPU's CSO System NPDES Permit (No. WA0031682) issued on October 27, 2010 and modified on September 13, 2012. Outfall Rehabilitation Program staff conducted condition assessments and analyzed options for rehabilitating seven outfalls, including three that must be rehabilitated by December 31, 2014 and four that must be rehabilitated by December 31, 2015. CSO Outfall 150 is among the outfalls that must be rehabilitated by December 31, 2014. This Environmental Checklist analyzes environmental effects of the proposed rehabilitation project at CSO Outfall 150.

The tributary area to CSO Outfall 150 includes approximately 400 acres in the eastern portion of Ballard. The tributary area extends from Northwest 85th Street south to Northwest Market Street and from 16th Avenue Northwest west to 22nd Avenue Northwest.

Combined sewage from the tributary area flows to an overflow structure located in maintenance hole (MH) 011-184. When flows in that structure reach the top of the overflow weir, overflows start to occur. Downstream of the overflow structure, CSO flows are divided into two separate pipes that discharge to Salmon Bay in the Lake Washington Ship Canal in two adjacent but separate outfalls: CSO Outfall 150and CSO Outfall 151. Both outfalls are located in the Ballard neighborhood at the south end of 24th Avenue Northwest, just south of its intersection with Northwest 54th Street and situated entirely within the improved right-of-way for 24th Avenue Northwest (Attachments A, B, and C).

CSO Outfall 150 was originally designed and installed in 1935 as a submerged 30 inch diameter wood stave pipe emerging from the shoreline below the surface of the Ship Canal. The wood stave pipe was mounted on saddle-mount wooden braces affixed to the pilings of a public pier located at the south end of 24th Avenue Northwest. The outfall originally extended under that pier out into the water to a point approximately 63 feet from the Ship Canal's ordinary high water mark (OHWM) elevation of 18.60 feet above sea level (NAVD88).

Since 1935, approximately 53 feet of the original wood stave pipe has deteriorated and disarticulated, falling away from its mounts. Less than 10 feet of the original submerged portion of the wood stave pipe remains in place beneath the pier. The wooden pier was also installed in 1935 and is therefore of an age significantly beyond its assumed approximate 40 year design life. CSO Outfall 150 still functions to convey CSOs from the overflow structure located in MH 011-184 to the Ship Canal, but it now discharges at the shoreline in shallow water. CSO Outfall 150 is an active overflow location; during the years 2008 – 2012, the outfall overflowed an average of 22 times per year discharging an average of 2.7 million gallons of combined sewage per year.

The proposed project would rehabilitate CSO Outfall 150 by replacing the existing maintenance hole just upstream of the shoreline (MH 011-239) and then installing a replacement outfall comprised of approximately 50 feet of 30 inch diameter epoxy-coated ductile iron pipe and approximately 110 feet of 30 inch diameter high-density polyethylene (HDPE) outfall pipe. Construction would use open-trench methods on land and a piling-supported mounting system in the water. The new outfall would be installed along the west side of the pier's pile supports. As determined by geotechnical explorations, a loose, unconsolidated layer of sediment, greater than 7 feet thick, underlies the new pipeline's alignment within the Ship Canal. Approximately 70 feet of the 30 inch HDPE pipe would be supported just above this sediment layer by piling-pair mounts of concrete-filled, 8 inch rectangular, concrete-filled steel tubing driven to a depth sufficient to be bedded in competent sediment. The existing wood stave pipe would be capped and abandoned in place per City of Seattle standards.

The new outfall pipe would be aligned slightly to the west of the original wood stave pipe alignment and between the two piers that are currently located at the outfall site (Attachment C), one of which (the eastern pier) is owned by SDOT and the other of which is a privately owned pier east of the Pacific Fishermen Shipyard.

Construction staging would be located within approximately 3,000 square feet of an informal parking area within the right-of-way along 24th Avenue Northwest. The project would also replace an existing 2 foot tall concrete retaining wall at the Salmon Bay/Ship Canal shoreline with a new rock facing and crushed basalt revetment surface placed on a slope of approximately 1:7 (rise: run) to protect the new pipeline from the wave action of passing ship traffic.

Once constructed, the pipeline may need to be cleaned and inspected in the future. For purposes of evaluating environmental impacts of that activity, SPU estimates that inspection and cleaning would not occur more frequently than once every 5 years over the remaining lifespan of the pipe (estimated to be 60 years). Cleaning would be conducted by land-based "vactor" equipment using the nearest principal upstream structure accessible by land. Pipe contents would be jetted into the Ship Canal, with turbidity controls if required. Following cleaning, the pipe would be inspected by closed-circuit television camera (CCTV) to document its condition and serviceability. CCTV inspections would be conducted by land-based equipment using the nearest principal upstream maintenance hole structure accessible by land.

A12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project is in the Ballard neighborhood in the City of Seattle (zip code 98107). CSO Outfall 150 is located south of the intersection of 24th Avenue Northwest and Northwest Market Street in the designated Shoreline Street End and right-of-way of 24th Avenue Northwest (southwest quarter of Section 11, Township 25N, Range 3E; 47° 40' 1.1"' N; 122° 23' 16.5"W). The project would be situated entirely within the improved street right-of-way for 24th Avenue Northwest (Attachments A, B, and C). There is no street address for this project. The project is located in the Cedar/Sammamish Water Resource Inventory Area (WRIA 8).

B. ENVIRONMENTAL ELEMENTS

B1. Earth

a. General description of the site: *[Check the applicable boxes]*

☒ Flat ☐ Rolling ☐ Hilly ☐ Steep Slopes ☐ Mountainous
☒ Other: Sloping, submersed

b. What is the steepest slope on the site (approximate percent slope)?

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay. The landward area of the shoreline is flat. The bedlands of the Ship Canal have a slope between 10 and 12 percent.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay. Post-glacial tideflat deposits accumulated within Salmon Bay before the creation of the Hiram M. Chittenden (Ballard) Locks in 1917. Tideflat deposits typically consist of silt, sand and organic sediment that is deposited on coastal benches and inland bays. The deposit is very loose and soft to normally consolidated, and typically contains shells and wood. Lacustrine deposits have amassed since the construction of the Ballard Locks located west of the project site. This unit typically consists of unconsolidated, poorly sorted silts, clays, sands and organic sediments. Shell fragments are observed within the deposit, and are likely due to the unique nature of the fresh water and salt water environment created by the locks. Along the shoreline, tideflat and lacustrine deposits have been covered by fill for commercial building and roadway construction. Fill is generally highly variable material obtained from nearby sources and often includes wood and garbage. The bedlands of the Ship Canal in the project location are comprised of very soft, unconsolidated siltaceous material.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe:

There are no indications or history of unstable soils in the project location.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate the source of fill.

Pipe construction would require excavation of up to an estimated 1,000 cubic yards of soil and sediment. That excavation would be backfilled with the new pipe, maintenance hole structures and approximately 500 cubic yards of aggregate and other clean, inert materials. All imported material would be provided by a State-licensed and SPU-approved purveyor of such materials.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe:

Excavation could result in erosion, in particular stormwater runoff from stockpiling of excavated materials. In-water construction activity (such as and pile driving) could result in turbidity.

Periodic outfall cleaning also will be required, most likely using high pressure water to jet out any accumulated material no more than once every 5 years over the next 60 years. Cleaning may cause limited bedland scouring and turbidity at the discharge end of the outfall. The volume of sediment that would be removed from the outfall over this period is estimated to be no more than 10% of the submerged outfall volume, or 2 cubic yards.

g. About what percent of the site would be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Most of the upland portion of the project location is covered with impervious surface (asphalt and compacted gravel). The proposed project would replace and repair all demolished and damaged paved surfaces in-kind, and would not add additional impervious surfaces. The project would also replace an existing 2 foot tall concrete

wall at the Salmon Bay shoreline with a new rock facing and a 1:7 (rise:run) revetment surface of crushed basalt (quarry spalls). That revetment is not considered an impervious surface.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

SPU 2013e provides a summary of the project's stormwater management goals and describes how construction stormwater would be controlled through the application of the 18 best management practices (BMPs) identified in the City of Seattle's Stormwater Code [SMC 22.800 through 22.808 and Director's Rule 2009-004 SPU/16-2009 DPD] and Construction Stormwater Control Technical Requirements Manual (Volume 2). The project would prepare and implement a CSECP to meet the requirements of SMC 22.800, and would also use the City of Seattle Standard Plans and Specifications for Municipal Construction. Erodible material stockpiles would be covered with impervious barriers for protection from rain. A turbidity curtain would be used to manage turbid water created by in-water construction. No turbidity or erosion controls would be used during periodic cleaning of the outfall unless required.

B2. Air

a. What types of emissions to the air would result from the proposal [*e.g.*, dust, automobile, odors, industrial wood smoke, greenhouse gases (GHG)] during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Construction activities have the potential to create temporary fugitive dust emissions from demolition, materials handling, and earth-moving activities. Also, mobile and stationary equipment would be used to construct and maintain the proposed project, thus generating emissions due to the combustion of gasoline and diesel fuels (such as oxides of nitrogen, carbon monoxide, particulate matter and smoke, uncombusted hydrocarbons, hydrogen sulfide, carbon dioxide, and water vapor). Emissions related to construction and maintenance are expected to be minimal, localized, and temporary.

This project would generate carbon dioxide and other greenhouse gas (GHG) emissions in three ways: materials usage (embodied); construction activity; and maintenance activity. Total GHG emissions for the project are estimated to be 164.2 metric tons of carbon dioxide emission (MTCO2e). Note that this includes the estimated embodied GHG emissions from the asphalt, concrete, and ductile iron pipe used in this project, but does not include estimates for the HDPE pipe because no embodied carbon values have been published for HDPE pipe. GHG emission assumptions and calculations are shown in Attachment D. One metric ton is equal to 2,205 pounds.

This project would generate approximately 42.8 MTCO2e of GHG emissions by replacing approximately 400 square feet of asphalt and concrete, installing 3 pre-cast concrete maintenance holes, and installing approximately 50 feet of 30 inch diameter ductile iron pipe. This project would also generate approximately 121 MTCO2e of GHG emissions during the estimated 50 working day construction period through the operation of diesel- and gasoline-powered equipment and to transport materials, equipment, and workers to and from the site. Estimates provided here are based on daily vehicle operation times for the estimated project duration (50 working days); actual times may be less.

The project would also generate GHG emissions during cleaning, inspection, and other maintenance activities over the outfall's estimated remaining 60 year lifespan. For purposes of estimating GHG emissions, the project is estimated to generate a total of two vehicle round-trips once every five years for maintenance (to inspect and clean the pipe). The total GHG emission generated from maintenance is estimated to be 0.4 MTCO2e.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

There are no known off-site sources of emissions that may affect this proposal.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

During construction, impacts to air quality would be reduced and controlled through implementation of standard federal, state, and local emission control criteria and City of Seattle construction practices. These would include requiring contractors to use best available control technologies, proper vehicle and engine maintenance, and minimizing vehicle and equipment idling.

B3. Water

a. Surface:

(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If so, describe type and provide names. If appropriate, state what stream or river or water body it flows into.

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay.

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If so, please describe, and attach available plans.

Project construction would require work below the ordinary high water mark (OHWM) of the Lake Washington Ship Canal and Salmon Bay, as described in the next section.

Periodic cleaning of the outfall may also be required, most likely using high pressure water to jet out any accumulated material no more than once every 5 years over the next 60 years. Cleaning may cause limited bedland scouring and turbidity at the discharge end of the outfall.

(3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands, and indicate the area of the site that would be affected. Indicate the source of fill material.

Construction would require excavation of up to approximately 1,000 cubic yards of soil and sediment. Approximately 60 cubic yards of that total would be excavated from below the OHWM of Salmon Bay. Excavation would be accomplished using land-based excavators. Sheet piling and a temporary trench box would be used to shore the excavated area. In addition, two pairs of concrete-filled, rectangular steel tubing pilings would be driven by barge-based

equipment approximately 25 feet deep into the bedlands of Salmon Bay. Once the trench is excavated and the piers are driven, the new pipe segments and utility structures would be installed. The overall construction effort is expected to be conducted "in the wet" using pre-cast utility structures and pre-assembled pipe sections lowered into position for final assembly by divers. The 30 inch diameter HDPE pipe would be assembled on land and then slid into the trench and placed atop and then fastened to the piling-pair mounts. The excavation would then be backfilled using up to approximately 500 cubic yards of aggregate and other clean, inert materials. The project would also replace an existing 2 foot tall concrete wall (bulkhead) at the Salmon Bay shoreline with a rock facing and a 1:7 (rise:run) revetment surface of crushed basalt (quarry spalls). All imported material would be provided by a State-licensed and SPU-approved purveyor of such materials.

(4) Will the proposal require surface water withdrawals or diversions? If so, give general description, purpose, and approximate quantities if known.

Dechlorinated potable water would be used to flush the outfall pipe as part of project construction and during subsequent periodic cleaning (jetting). Volumes required for flushing are estimated to be 100% of the submerged outfall volume, or approximately 4050 gallons .

(5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Project construction and maintenance would require work below the OHWM of the Lake Washington Ship Canal and Salmon Bay.

(6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

The proposed project would rehabilitate existing CSO Outfall 150, which discharges combined sewage to Salmon Bay during storm events. The proposed project would not alter the volume or characteristics of any combined sewage discharges. Periodic outfall cleaning likely would discharge sediments from the pipe to Salmon Bay. The proposed project would not produce or discharge any additional waste materials to surface waters.

b. Ground:

(1) Will ground water be withdrawn, or would water be discharged to ground water? If so, give general description, purpose, and approximate quantities if known.

No ground water would be withdrawn, discharged, or surcharged as a result of this project.

(2) Describe waste material that would be discharged into the ground from septic tanks or other sources, if any (*e.g.*, domestic sewage; industrial, containing the following chemicals…; agricultural, *etc.*). Describe the general size of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

No waste material would be discharged to ground water for this project.

c. Water Runoff (including storm water):

(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where would this water flow? Would this water flow into other waters? If so, describe.

Most of the upland portion of the project location is covered with impervious surface but no existing storm drainage conveyance system collects surface water. Currently, stormwater on the project location surface-flows directly to Salmon Bay. The proposed project would replace and repair in-kind all demolished and damaged paved surfaces, but would not add additional impervious surfaces. Post-construction, stormwater flow paths would be the same as the current pathways. Project construction and maintenance also would require work below the OHWM of the Lake Washington Ship Canal and Salmon Bay.

(2) Could waste materials enter ground or surface waters? If so, generally describe.

This project would not generate waste materials that could enter groundwater or surface waters.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

BMPs identified in the City of Seattle's Stormwater Code (SMC 22.800 through 22.808 and Director's Rule 2009-004 SPU/16-2009 DPD) and Construction Stormwater Control Technical Requirements Manual (Volume 2) would be used to manage turbidity in Salmon Bay. The potable water used for periodic cleaning (jetting) would be dechlorinated. No turbidity controls would be used during periodic cleaning unless required.

SPU 2013e provides a summary of the project's stormwater management goals and describes how construction stormwater would be controlled through the application of the 18 best management practices (BMPs) identified in the City of Seattle's Stormwater Code [SMC 22.800 through 22.808 and Director's Rule 2009-004 SPU/16-2009 DPD] and Construction Stormwater Control Technical Requirements Manual (Volume 2). The project would prepare and implement a CSECP to meet the requirements of SMC 22.800, and would also use the City of Seattle Standard Plans and Specifications for Municipal Construction. All excavated soils from the project will be temporarily impounded within impervious lined, bermed stockpiles covered with impervious barriers for protection from rain. A turbidity curtain spanning the entire water column would be used to manage turbid water created by in-water construction. No turbidity controls would be used during periodic cleaning (jetting) unless required.

B4. Plants

a. Types of vegetation found on the site: *[check the applicable boxes]*

- ☒ Deciduous trees: ☐ Alder ☐ Maple ☒ Aspen ☐ Other:
- ☐ Evergreen trees: ☐ Fir ☐ Cedar ☐ Pine ☐ Other:
- ☐ Shrubs:
- ☐ Grass
- ☐ Pasture
- ☐ Crop or grain
- ☐ Wet soil plants: ☐ Cattail ☐ Buttercup ☐ Bulrush ☐ Skunk cabbage ☐ Other:
- ☐ Water plants: ☐ water lily ☐ eelgrass ☐ milfoil ☒ Other:
- ☐ Other types of vegetation:

b. What kind and amount of vegetation would be removed or altered?

Most of the upland portion of the project location is covered with impervious surface and is not vegetated. A small island of vegetation located within the street right-of-way and in the project location contains one aspen (*Populus tremuloides*) (8 inches in diameter at breast height) and various herbaceous weeds. The aspen is not considered an Exceptional Tree. Exceptional Trees have significant value due to their size and species (as defined in DPD's Director's Rule 16-2008) and that have unique historical, ecological, or aesthetic value. There is evidence that a community group annually installs ornamental plants and other non-tree species within this small vegetation island. Currently, project construction anticipates avoiding any damage to this vegetation. The bedlands of Salmon Bay are not vegetated in the project location.

c. List threatened or endangered species known to be on or near the site.

According to a review of the Washington Department of Natural Resources (WDNR) Natural Heritage Program's document called "Sections that Contain Natural Heritage Features, Current as of March 1, 2013" (accessed at www.dnr.wa.gov), there are no documented occurrences of sensitive, threatened, or endangered plant species in this Section. No federally listed endangered or threatened plant species or State-listed sensitive plant species are known to occur within the municipal limits of the City of Seattle. The project location has been intensively disturbed by development and redevelopment over the last 140 years. Portions of the site have been excavated, filled, paved, or occupied by built structures and roads. There is no habitat for threatened or endangered plants.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

No impacts to vegetation are anticipated. The existing vegetation island would be temporarily fenced-off from construction. However, if the aspen tree is damaged or needs to be removed, replacement trees may be required by City of Seattle Tree Protection provisions, including Executive Order 03-05 (2005; Clerk File #307611) directing City departments to replace every tree removed from City property with two new trees. Such replacement would be determined in consultation with SDOT.

B5. Animals

a. Birds and animals that have been observed on or near the site or are known to be on or near the site: *[check the applicable boxes]*

Birds:	☒ Hawk	☒ Heron	☒ Eagle	☒ Songbirds
☒ Other: crow, pigeon, gull				
Mammals:	☐ Deer	☐ Bear	☐ Elk	☐ Beaver
☐ Other:				
Fish:	☐ Bass	☒ Salmon	☒ Trout	☐ Herring
☐ Shellfish	☒ Other: Numerous other species typical of City of Seattle freshwater lake and shoreline areas.			

b. List any threatened or endangered species known to be on or near the site:

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay. Endangered Species Act listed species known to use Lake Washington and the Lake Washington Ship Canal are Chinook salmon (*Oncorhynchus tshawytscha*, Threatened Puget Sound), steelhead trout (*O. mykiss*, Threatened Puget Sound), and bull trout (*Salvelinus confluentus*, Threatened Puget Sound).

A check of the Washington Department of Fish and Wildlife's "Priority Habitat Species on the Web" database on August 7, 2013 indicates the project location is habitat for the fish species mentioned above in addition to coho salmon (*O. kisutch*), sockeye salmon (*O. nerka*), and coastal resident trout (*O. clarki*). The project location is known to be (but not mapped as being) within the habitat of bald eagle (*Haliaeetus leucocephalus*) and great blue heron (*Ardea herodias*)—priority species in Washington.

c. Is the site part of a migration route? If so, explain.

While the project location is not part of a specific known migration route, Seattle is located within the migratory route of many bird species and is part of the Pacific Flyway, a major north-south route of travel for migratory birds in the Americas extending from Alaska to Patagonia. The project location is located in and along the Lake Washington Ship Canal, another important migration route for many animal species.

d. Proposed measures to preserve or enhance wildlife, if any:

The project would minimize disturbance areas associated with excavation. If required as a condition of project permitting, in-water work would be conducted within an agency-approved in-water construction window (probably October 1 to April 15) to protect fish. This project would also use BMPs identified in the City of Seattle's Stormwater Code (SMC 22.800 through 22.808 and Director's Rule 2009-004 SPU/16-2009 DPD) and Construction Stormwater Control Technical Requirements Manual (Volume 2) to generally protect fish and wildlife and manage turbidity. For example, equipment to be used for construction activity would be cleaned and inspected before it arrives at the project site to avoid and minimize potential for fuel or lubricant leaks. A turbidity curtain would be used to manage turbid water created by in-water construction. No turbidity controls would be used during periodic cleaning (jetting) unless deemed necessary by the City of Seattle. The potable water used for jetting would be dechlorinated.

B6 Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) would be used to meet the completed project's energy needs? Describe whether it would be used for heating, manufacturing, *etc.*

The completed project would not require any supplementary energy to operate.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

The project does not involve building structures or planting vegetation that would block access to the sun for adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

There are no conservation features or proposed measures to reduce or control energy impacts.

B7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe:

Materials likely to be present during construction, operation, and maintenance would include gasoline and diesel fuels, hydraulic fluids, oils, lubricants, and other chemical products. A spill of one of these chemicals could potentially occur during construction, operation, and/or maintenance as a result of either equipment failure or worker error.

Samples of bedland sediment and shoreline soils have tested positive for various contaminants, including polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (TPHs), polychlorinated biphenyls (PCBs), and metals (arsenic, mercury, lead, and cadmium). TPHs, PAHs, and metals are present at concentrations that exceed Washington's Model Toxics Control Act Method A soil clean-up levels and the Environmental Protection Agency's Regional Screening Levels. Shoreline soils from which these samples were taken would be exposed during project construction.

(1) Describe special emergency services that might be required.

Possible fire or medic services could be required during project construction, as well as possibly during maintenance of the completed project. However, the completed project would not demand higher levels of special emergency services that already exist at the project location. Typical emergency services required for medical emergencies are provided by the Seattle Fire Department. SPU and/or SPU's contractor(s) are responsible for site security during construction. The Seattle Police Department would provide security services related to criminal and nuisance activity both during construction and for the completed project.

(2) Proposed measures to reduce or control environmental health hazards, if any:

Due to the detection of contaminants in nearby soil and sediment samples, excavated soils and sediments, and decanted water collected during soil stockpiling may require special handling and disposal in accordance with federal, state and local regulatory requirements. Sampling and analysis activities would be conducted by a qualified contractor(s) and/or City staff. All imported materials (such as aggregate used for backfill) would be clean and obtained from authorized, pre-approved sources.

A Spill Prevention Control and Countermeasures Plan would be developed to control and manage spills during construction. Any soils contaminated by spills would be excavated and disposed of in a manner consistent with the level of contamination, in accordance with federal, state and local regulatory requirements, by a qualified contractor(s) and/or City staff. During construction, SPU or its Contractor would use BMPs identified in the City of Seattle's Stormwater Code (SMC 22.800 through 22.808 and Director's Rule 2009-004

SPU/16-2009 DPD) and Construction Stormwater Control Technical Requirements Manual (Volume 2) to reduce or control environmental health hazards. Equipment would be inspected for leaking hoses, mechanical joints, and hydraulic pistons. Temporary control measures for both erosion and hazardous material spills would be installed to minimize access pathways to Puget Sound in the event of a spill or leak. Hazardous material spill response materials would be available on the construction site for the duration of the construction work. As required by the Washington Department of Labor and Industries (WAC 296-843), a Health and Safety Plan would be prepared by SPU's contractor before work commences. The plan would address proper employee training, use of protective equipment, contingency planning, and secondary containment of hazardous material. It would identify measures to ensure construction worker safety, outline emergency medical procedures, and reporting requirements. The project location would be closed to public access for the duration of construction.

b. Noise

(1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Noises that exist in the area would not affect the project.

(2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Noise and vibration levels in the vicinity of construction would temporarily increase during construction. Noise and heavy vibration are expected to result from the driving of sheet piles (for shoring or creating a coffer dam) and rectangular steel tube piling installation. Noise and medium vibration are expected to result from medium-sized track hoes, dump trucks, discharges of materials from dump trucks onto staging areas, and track hoe-mounted pavement breakers. Noise and low vibration are expected to result from hand-operated compaction equipment such as jumping jacks or plate compactors and diesel-powered pumps for dewatering.

Short-term noise from construction equipment would be limited to the allowable maximum levels of City of Seattle's Noise Control Ordinance (SMC Chapter 25.08). Per SMC 25.08, elevated noise from construction equipment would be allowed only between the hours of 7 am and 10 pm weekdays, and between 9 am and 10 pm on weekends and legal holidays. For this project, construction typically would take place between 7 am to 6 pm on weekdays, except for emergencies that may occur before or after those times. The completed project would not contribute noise or vibration beyond that which already exists related to existing site uses and maintenance.

(3) Proposed measures to reduce or control noise impacts, if any:

Construction equipment would be muffled in accordance with the applicable laws. SMC Chapter 25.08 would be enforced while the project is being constructed and during operations, except for emergencies.

B8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay. Adjacent property uses are commercial and industrial. A large industrial shipyard is located adjacent to and west of the project. A former restaurant and its parking lots are located adjacent to and east of the project location. The restaurant has been closed for many years. The end of 24th Avenue Northwest is a designated Shoreline Street End. A vegetated island adjacent to the outfall alignment is used by a community group that annually installs herbaceous, ornamental plants. The existing eastern pier is owned by SDOT and is the pier under which the current CSO 150 Outfall was attached.

b. Has the site been used for agriculture? If so, describe.

The site has never been used for agricultural purposes.

c. Describe any structures on the site.

Two boat docks (one public and one private) are located on or immediately adjacent to the project location. An abandoned marine railway is in the project location.

d. Will any structures be demolished? If so, what?

The abandoned marine railway at the project site may be destroyed by project construction.

e. What is the current zoning classification of the site?

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay. The landward portion of the project location is zoned General Industrial (IG1/U65).

f. What is the current comprehensive plan designation of the site?

The comprehensive plan designation of the landward portion of the project location is zoned industrial.

g. If applicable, what is the current shoreline master program designation of the site?

The project is located in the Conservancy/Recreation and Urban Industrial Shoreline Management districts of the Lake Washington Ship Canal.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay. Salmon Bay is an environmentally sensitive area.

i. Approximately how many people would reside or work in the completed project?

No people would reside or work in the completed project because the project location is an improved street right-of-way.

j. Approximately how many people would the completed project displace?

No people would be displaced by the project.

k. Proposed measures to avoid or reduce displacement impacts, if any:

No mitigation measures are proposed because there are no adverse impacts related to displacement.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The project is consistent with current land uses and plans. SPU would self-exempt the project from applicable aspects of the City of Seattle Environmentally Critical Area provisions, as allowed by SMC 25.09.045, but would still comply with the general development standards for projects located in environmentally critical areas and the specific development standards applicable in the affected environmentally critical areas.

B9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

The project would not construct any housing units.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

The project would not remove any housing units.

c. Proposed measures to reduce or control housing impacts, if any:

No measures are proposed because there would be no housing impacts.

B10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas? What is the principal exterior building material(s) proposed?

No building structures or other above-ground structures are proposed for this project.

b. What views in the immediate vicinity would be altered or obstructed?

Whereas the original outfall pipe was located under the existing public dock, the replacement pipe would be located immediately west of that dock. As a result, non-buried sections of the pipe would be visible to pedestrians and boaters using the dock and adjacent shoreline. Placards and mooring warning channelization will be installed to notify the public of the CSO Outfall.

c. Proposed measures to reduce or control aesthetic impacts, if any:

No measures are proposed to reduce or control aesthetic impacts.

B11. Light and Glare

a. What type of light or glare would the proposal produce? What time of day would it mainly occur?

The project would be constructed during daylight hours. The completed project would not produce glare.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

The completed project would not produce glare.

c. What existing off-site sources of light or glare may affect your proposal?

There are no existing off-site sources of light and glare that would affect the proposal.

d. Proposed measures to reduce or control light and glare impacts, if any:

Because neither the completed project nor its construction would produce glare, no mitigation measures are being proposed.

B12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

The project is located at a designated shoreline street end (24th Avenue Northwest), which is the land portion of a street segment that provides the public with visual and/or physical access to a body of water and its shoreline, or could provide such access if improved. Shoreline street ends are intended to improve public access and enjoyment of the shoreline, protect views and enhance shoreline habitat, encourage community stewardship, and support the maritime industry. The project location currently allows public pedestrian access to the Salmon Bay shoreline. The public dock (owned by SDOT) in the project location is used by pedestrians, fishermen, and boaters. Both recreational boaters and the adjacent industrial shipyard use the public dock for vessel moorage.

b. Would the proposed project displace any existing recreational uses? If so, describe.

Project construction would close vehicle, vessel, and pedestrian access to the public pier and shoreline street end for up to 2.5 consecutive months (50 working days). The completed project would not change current vehicular or pedestrian access to this shoreline street end or affect the landward portion of the street segment. However, whereas the original outfall pipe was located under the existing public dock, the replacement pipe would be located immediately west of that dock. As a result, non-buried, submerged sections of the pipe would occasionally become visible to pedestrians and boaters using the dock and adjacent shoreline due to regulated fluctuations of the Ship Canal water surface elevation. Placement of the new pipeline in this location would require a permanent mooring prohibition on approximately 100 feet of the west side of that 271 foot public dock which equates to approximately 18% of the existing pier moorage capacity. The existing moorage is limited to only 2 hours which is enforced by the Harbor Patrol. Other 2-hour public moorages for recreational craft are located at Union Bay (Belvoir Place) and Lake Union (Fairview,

Lake Union Park, and Terry Pettus). Private moorages within Salmon Bay are located at Ballard Mill Marina and Nickerson Marina. Warning placards would be mounted on the shoreline and on the existing dock's pilings along that entire section.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The project would also replace an existing 2 foot tall concrete wall (bulkhead) at the Salmon Bay shoreline with a rock facing and a 1:7 (rise:run) revetment surface of crushed basalt (quarry spalls). That new surface would allow easier access for pedestrians and more convenient and safer access for launching small personal watercraft.

B13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

Historical Research Associates, Inc. (HRA 2013) analyzed the potential for encountering archaeological resources. They also conducted an architectural inventory and evaluation of built above-ground resources 50 years old or older within their recommended Area of Potential Effects (APE) at the south terminus of 24th Avenue Northwest where it ends at Salmon Bay. No previously identified archaeological resources were located within the recommended APE. HRA determined that because the proposed excavation would occur only in previously disturbed areas, the project does not have potential to adversely affect archaeological resources.

HRA's intensive architectural inventory and evaluation considered twelve historic buildings, structures, or objects within the recommended APE and assessed their eligibility for listing in the National Register of Historic Places, Washington Heritage Register, and Seattle Landmark Register. HRA recommended that none of the resources evaluated in the recommended APE appear to meet the eligibility criteria for any of these registers—including the abandoned marine railway that may be damaged or destroyed by the project. Therefore, HRA concluded the project would not have an adverse effect on any historic property.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

No landmarks or evidence of historic, archaeological, scientific, or cultural importance are known to be near the project location. Further, the project's location on previously disturbed sediments suggests that excavation and other ground disturbance associated with the project would not have potential to adversely affect archaeological or cultural resources.

c. Proposed measures to reduce or control impacts, if any:

No landmarks or evidence of historic, archaeological, scientific, or cultural importance are known to be near the project location. Further, the project's location on previously disturbed sediments suggests that excavation and other ground disturbance associated with the project would have little chance of encountering undisturbed archaeological or cultural materials. However, should evidence of cultural artifacts or human remains, either historic or prehistoric, be encountered

during such excavation, work in that area would be suspended and the find would be examined and documented by the professional archaeologist. Decisions regarding appropriate mitigation and further action would be made at that time.

B14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

The project is located in the designated shoreline street end of 24th Avenue Northwest, a public street accessed by local arterials Northwest Market Street and Shilshole Avenue Northwest. The project location is in an industrial area where essentially all vehicle traffic in the project location is related to the adjacent industrial shipyard. The contractor will coordinate with local businesses to ensure their access to business entrances adjacent to the shoreline.

b. Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

The project location is not served by public transportation. The closest transit stops are located on Northwest Market Street, which is used by Metro bus routes 29, 44, and 62. The nearest stops are within 0.25 miles of the project location. These bus routes or access to their bus stops would not be affected by construction of the proposed project.

c. How many parking spaces would be unavailable during project construction? How many spaces would the completed project have? How many would the project eliminate?

The project anticipates staging construction vehicles, equipment, and materials in approximately 3,000 square feet of an informal parking area on the east side of 24th Avenue Northwest. The specific location will be finalized by the construction contractor. Up to 10 informal parking spaces would be temporarily eliminated by the project for up to 2.5 consecutive months (50 working days). No new parking spaces would be created by the project and no parking spaces would be permanently eliminated.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

The project does not require the construction of any new roads or street or improvements to existing roads or streets.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The project is located adjacent to, along, under, and on the bedlands of the Lake Washington Ship Canal on the shoreline of Salmon Bay. The Ship Canal and Salmon Bay are important to regional water transportation. Project construction would use a barge and an associated vessel to drive four 8 inch diameter concrete-filled rectangular steel tubing piles and assist with other construction needs. The barge will be anchored between the existing piers and outside the Ship Canal's navigable waters. The completed project would not use water, rail, or air transportation.

The proposed project would not change current public access to this shoreline street end or affect the landward portion of the street segment. However, whereas the original outfall pipe was located under the existing public dock, the replacement pipe would be located immediately west of that dock. The placement of the new pipeline in this location would require a permanent mooring prohibition on approximately 100 feet of the west side of that 271 foot public dock. Warning placards would be mounted on the shoreline and on the existing dock's pilings along that entire section.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Project construction would generate approximately 322 vehicle round-trips due to workers and materials being transported to and from the project location during the total 50 working day construction period. Most of those trips would occur during business hours (between 7 am and 6 pm) on weekdays (Mondays through Fridays). The completed project would generate an estimated 24 vehicle round trips (an estimated 2 vehicle round-trips every 5 years) related to the routine maintenance and inspection of the outfall over the outfall's 60 year lifespan.

g. Proposed measures to reduce or control transportation impacts, if any:

The project would coordinate closely with the adjacent industrial shipyard to enable access to the shipyard through the temporarily fenced project work enclosure.

B15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

The project would not create increased need for public services.

b. Proposed measures to reduce or control direct impacts on public services, if any.

During construction, the project would be required at all times to accommodate emergency access for buildings accessed via affected streets. Emergency access would comply with relevant policies administered by SDOT as part of the Street Use permitting process. The completed project is not expected to create an increased need for public services.

B16. Utilities

a. Check utilities available at the site, if any: *[check the applicable boxes]*

☒ Electricity ☒ Natural gas ☒ Water ☒ Refuse service
☒ Telephone ☒ Sanitary sewer ☐ Septic system
☒ Other: Fiber/Cable

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

☒ **None**

No new utilities are being proposed and no utilities would need to be relocated. Thus, no interruptions of utilities or services are anticipated as a result of project construction or the completed project. However, inadvertent damage to underground utilities could occur during construction. While such incidents do not occur frequently, they could temporarily affect services to customers served by the affected utility while emergency repairs are made.

Because this is a CSO outfall, the project would be required to manage flows during storm events. Construction would occur, to the extent possible, during those times of the year when the chances of a large storm event are least likely. However, the project design anticipates this need by incorporating a temporary bypass to allow CSO events as needed during construction.

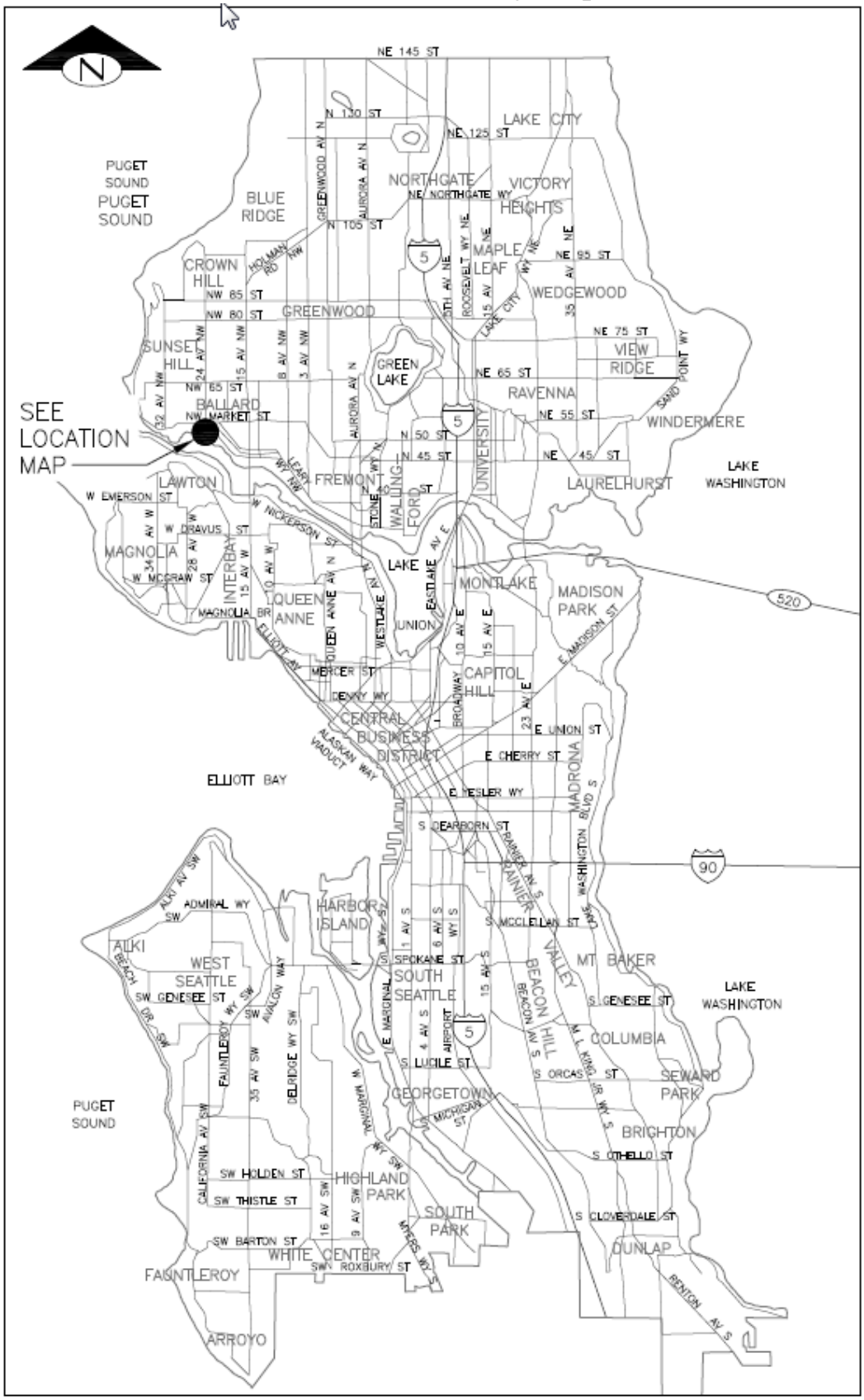
C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

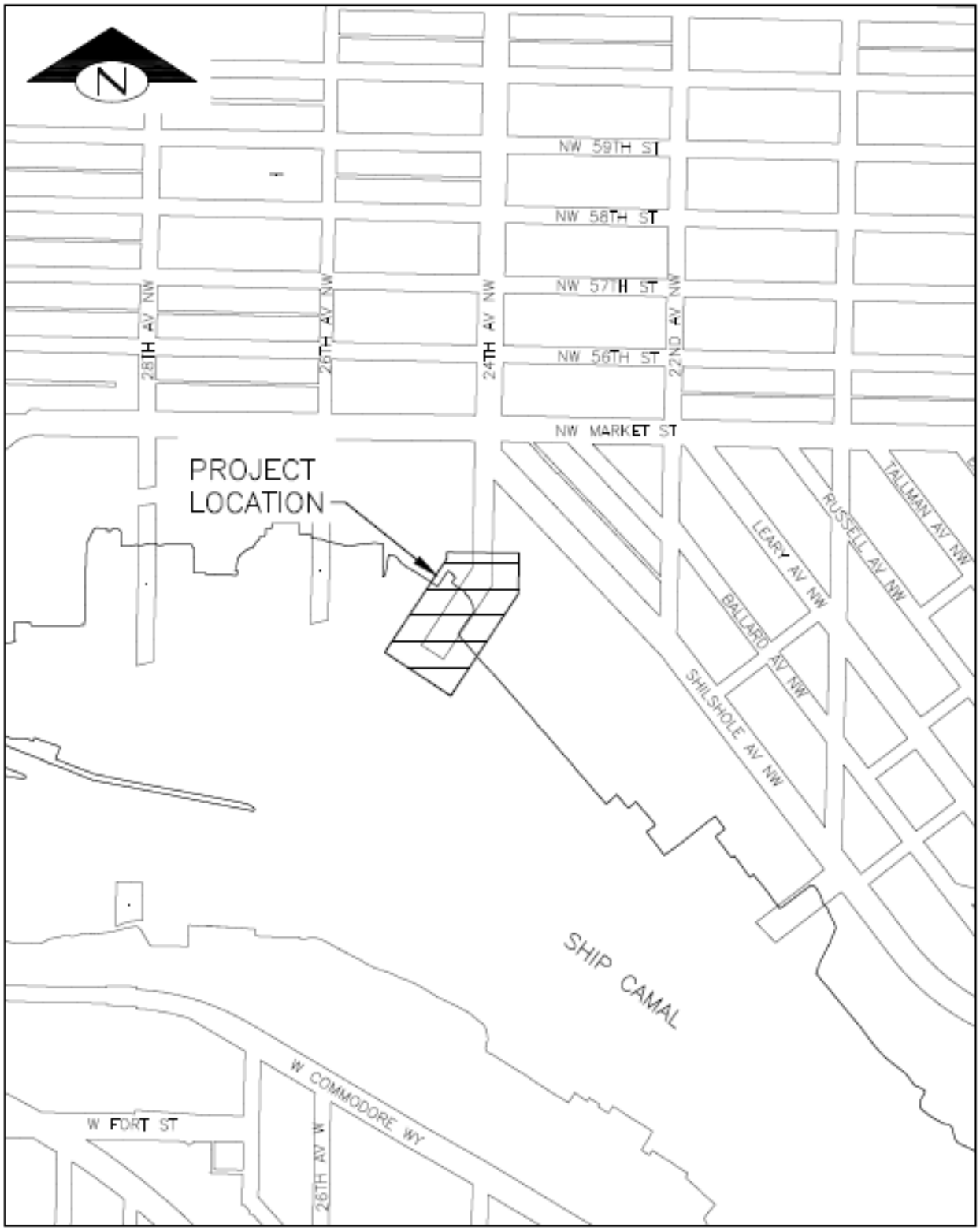
Signature: Jerry R. Waldron Date: 9/4/13

Jerry Waldron, Project Manager

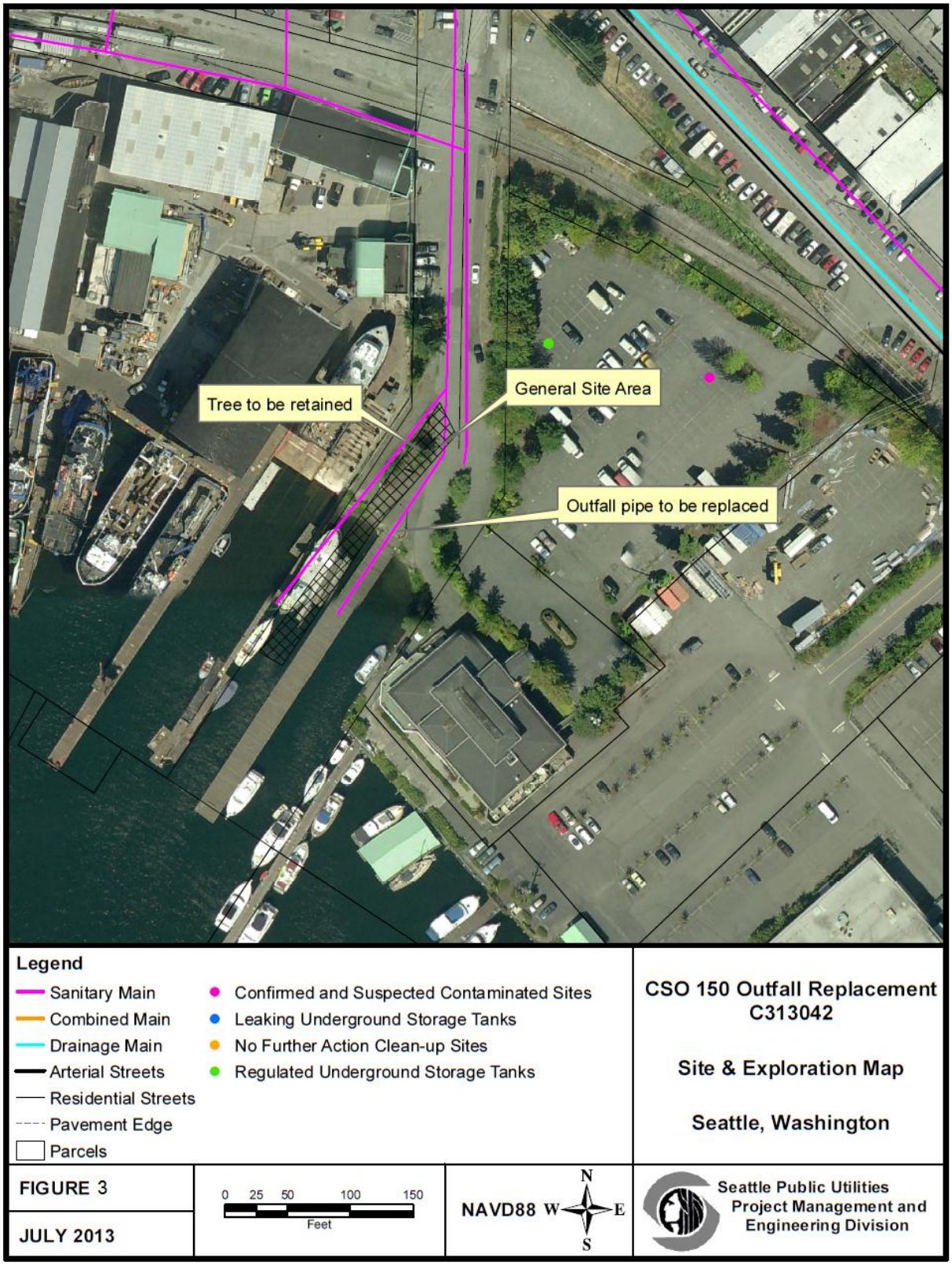
Attachment A: Vicinity Map



Attachment B: Location Map



Attachment C: Aerial Photograph



Attachment D: Greenhouse Gas Emissions Worksheet

Section I: Buildings						
			Emissions Per Unit or Per Thousand Square Feet ($MTCO_2e$)			
Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet	Embodied	Energy	Transportation	**Lifespan Emissions ($MTCO_2e$)**
Single-Family Home	0		98	672	792	**0**
Multi-Family Unit in Large Building	0		33	357	766	**0**
Multi-Family Unit in Small Building	0		54	681	766	**0**
Mobile Home	0		41	475	709	**0**
Education		0.0	39	646	361	**0**
Food Sales		0.0	39	1,541	282	**0**
Food Service		0.0	39	1,994	561	**0**
Health Care Inpatient		0.0	39	1,938	582	**0**
Health Care Outpatient		0.0	39	737	571	**0**
Lodging		0.0	39	777	117	**0**
Retail (Other than Mall)		0.0	39	577	247	**0**
Office		0.0	39	723	588	**0**
Public Assembly		0.0	39	733	150	**0**
Public Order and Safety		0.0	39	899	374	**0**
Religious Worship		0.0	39	339	129	**0**
Service		0.0	39	599	266	**0**
Warehouse and Storage		0.0	39	352	181	**0**
Other		0.0	39	1,278	257	**0**
Vacant		0.0	39	162	47	**0**
					TOTAL Section I Buildings	**0**

Section II: Pavement						
						Emissions ($MTCO_2e$)
Concrete/Asphalt (50 $MTCO_2e$/1,000 sq ft of pavement, 6 inches thick)*		400 square feet of replacement concrete/asphalt pavement, 6 inches thick;				**20**
Concrete/Asphalt (50 $MTCO_2e$/1,000 sq ft of pavement, 6 inches thick)*		6 cubic yards concrete (estimated; for three pre-cast utility structures)				**16**
1.91 kg CO2/kg and assuming 71 kg per foot of length for 30 inch diameter, 0.49 inch thick, ductile iron pipe		50 feet of 30 inch diameter ductile iron pipe				**6.8**
					TOTAL Section II Pavement	**42.8**

*King County SEPA GHG emissions Worksheet Bulletin 26, Version 1.7, December 26, 2007

Section III: Construction	
(See detailed calculations below)	**Emissions ($MTCO_2e$)**
TOTAL Section III Construction	**121**

Section IV: Maintenance	
(See detailed calculations below)	**Emissions ($MTCO_2e$)**
TOTAL Section IV Maintenance	**0.4**

TOTAL GREENHOUSE GAS (GHG) EMISSIONS FOR PROJECT ($MTCO_2e$)	164.2

Section III Construction Details

Construction: Diesel

Equipment	Diesel (gallons)	Assumptions
Excavator/Track-hoe (1)	1,800	40 days x 5 hours/day x 9 gallons/hour
Flatbed Truck (1)	40	10 days x 1 round/trip/day x 20 mile round trip ÷ 5 mpg
Asphalt Paver (1)	12	1 day x 4 hours/day x 3 gallons/hour
Work Vessel/Barge/Pile-driver (15 tons heavy fuel/day)	7,740	2 days x 3,870 gallons/day (includes travel to/from project location))
Transfer Dump Truck (17 cy capacity) (1)	180	60 round trips x 15-mile round-trip ÷ 5 mpg
Subtotal Diesel Gallons	9,772	
GHG Emissions in lbs CO_2e	259,447	At 26.55 lbs CO_2e per gallon of diesel
GHG Emissions in metric tons CO_2e	118	1,000 lbs = 0.45359237 metric tons

Construction: Gasoline

Equipment	Gasoline (gallons)	Assumptions
Pick-up Trucks (5)	125	50 workdays x 5 trucks x 1 round-trip/day x 10 miles/round-trip ÷ 20 mpg
6 inch pump (for dewatering) (1)	140	7 days (24 hours/day) x 20 gallons/day x 1 pump
Subtotal Gasoline Gallons	265	
GHG Emissions in lbs CO_2e	6,440	At 24.3 lbs CO_2e per gallon of gasoline
GHG Emissions in metric tons CO_2e	3	1,000 lbs = 0.45359237 metric tons

Construction Summary

Activity	CO_2e in pounds	CO_2e in metric tons
Diesel	259,447	118
Gasoline	6,440	3
Total for Construction	265,887	**121**

Section IV Long-Term Maintenance Details

Maintenance: Diesel

Equipment	Diesel (gallons)	Assumptions
Vactor Truck (pipe cleaning)	24	1 round-trip/event x 12 events (every 5 years for 60 years) x 10 miles/round-trip ÷ 5 mpg
Subtotal Diesel Gallons	24	
GHG Emissions in lbs CO_2e	637	At 26.55 lbs CO_2e per gallon of diesel
GHG Emissions in metric tons CO_2e	0.3	1,000 lbs = 0.45359237 metric tons

Maintenance: Gasoline

Equipment	Gasoline (gallons)	Assumptions
Pick-up Truck	12	1 workday/event x 12 events (every 5 years for 60 years) x 1 round-trip/event x 20 miles/round-trip ÷ 20 mpg
Subtotal Gasoline Gallons	12	
GHG Emissions in lbs CO_2e	292	At 24.3 lbs CO_2e per gallon of gasoline
GHG Emissions in metric tons CO_2e	0.1	1,000 lbs = 0.45359237 metric tons

Maintenance Summary

Activity	CO_2e in pounds	CO_2e in metric tons
Diesel	637	0.3
Gasoline	292	0.1
Total Operations and Maintenance	929	**0.4**