

**Draft Interim Action Work Plan
South State Street Manufactured Gas Plant
Cleanup Site
Bellingham, Washington**

June 7, 2017

Prepared for

City of Bellingham
Bellingham, Washington



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South State Street Manufactured Gas Plant Cleanup Site
Bellingham, Washington**

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Date: June 7, 2017
Project No.: 0015015.090
File path: P:\015\015\090\R\Interim Action Work Plan\Revised IA WP\SSSMGP IAWP.docx
Project Coordinator: ljc/jrc



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LIST OF ABBREVIATIONS AND ACRONYMS

BE	biological evaluation
CGS.....	Coastal Geologic Services
City.....	City of Bellingham
CQA	construction quality assurance
Ecology.....	Washington State Department of Ecology
EFH.....	Essential Fish Habitat
ESA	Endangered Species Act
ft.....	feet
HASP.....	health and safety plan
HPA	Hydraulic Project Approval
JARPA	Joint Aquatic Resources Permit Application
MGP	manufactured gas plant
MLLW	mean lower low water
MTCA.....	Model Toxics Control Act
NE.....	no effect
NLAA	not likely to adversely affect
PAHs.....	polycyclic aromatic hydrocarbons
PSE	Puget Sound Energy
RCW	Revised Code of Washington
RI/FS.....	remedial investigation/feasibility study
SEPA.....	State Environmental Policy Act
SHPO	State Historic Preservation Officer
Site	South State Street Manufactured Gas Plant cleanup site
SSSMGP	South State Street Manufactured Gas Plant
USACE.....	US Army Corps of Engineers
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife

1.0 INTRODUCTION

This document presents the work plan for a proposed interim action within the South State Street Manufactured Gas Plant (SSSMGP) cleanup site (Site) located in Bellingham, Washington as shown on Figure 1. A remedial investigation and feasibility study (RI/FS) is being conducted under an Agreed Order (Number 7655, as amended) between the City of Bellingham (City), Puget Sound Energy (PSE), and the Washington State Department of Ecology (Ecology) (Document No. 7655, Ecology 2010). The RI/FS will lead to a final cleanup action in accordance with the Model Toxics Control Act (MTCA) regulations.

A storm event in February 2017 has led to shoreline conditions at the Site that require the City and PSE to undertake an interim action prior to the final Site remedy. Previous environmental investigations have identified the presence of contaminated soil at the Site. If future storm events cause additional erosion of the shoreline or failure of the public pier, those events could result in migration of contaminated soil to Bellingham Bay. The City and PSE plan to conduct an interim action to prevent potential exposure and migration of contaminated media. The interim action will repair shoreline erosion, stabilize a concrete bulkhead wall, and remove the public pier wood piles and decking that have been damaged by storms. The limits of the interim action are shown on Figure 2.

The interim action will be implemented prior to selecting the final cleanup action for the Site and will not prevent the selection or implementation of other reasonable alternatives for the final cleanup action (see Washington Administrative Code [WAC] 173-340-430(3)(b)). Prior to implementation of the interim action, design basis calculations and construction plans will be presented to Ecology for review and approval.

2.0 BACKGROUND INFORMATION

This section presents a description of the Site (Section 2.1), a summary of historical and current uses of the Site (Section 2.2), a description of the geologic and hydrogeologic setting (Section 2.3), and a description of existing shoreline protection (Section 2.4).

2.1 Site Description

The interim action work area is located within the north end of Boulevard Park, as shown in Figure 2. This area of the park is a low-lying, flat area that can become flooded with high tides and storm surges. Riprap along the west side of the Site was originally placed along the shoreline to protect it from erosion. However, the higher elevation portions of the riprap at the interface with the grassed upland has washed away and exposed the underlying fill soils—some of which may be contaminated. The public pier on the north end has been damaged and is failing. The underlying concrete bulkhead wall, which serves as the landward connection point for the public pier, is also cracking and showing signs of failure. The City has fenced off the eroded shoreline and pier and posted warning signs to prevent public access to those areas.

2.2 Historical and Current Site Use

Prior to development of the park, the Site was used as a lumber mill, a manufactured gas plant (MGP) that manufactured gas from coal, and a railroad alignment. In 1975, the City acquired most of the MGP property for use as a park (Griffin 2007). In early 1979, the City Parks and Recreation Department began development of the park, including construction of trails, parking lots, restrooms, and a picnic shelter. The redevelopment of the Site also included placement of fill with grading, landscaping, and shoreline improvements (e.g., erosion control). Since 1980, the Site has been used solely as a public park.

2.3 Geology and Hydrogeology

The Site geology consists of sandstone and carbonaceous shale bedrock (Chuckanut Formation) overlaid by varying thicknesses of glacial marine drift, wood debris, and fill material consisting of granular fill, demolition debris, and other debris. Shallow groundwater is present beneath most of the upland portion of the Site. This unit is discontinuous in areas; typically observed in the wood and fill material units above the bedrock. Regionally, deeper hydrogeologic units may be present in and below the Bellingham Drift/Chuckanut Formation.

2.4 Shoreline Protection

The existing conditions along the shoreline at the Site generally consist of a level low-bank approximately 9 to 11 feet (ft) above mean lower low water (MLLW). The upland area along most of the shoreline is vegetated with grass and the bank slope is armored with rock (cobbles and boulders ranging from about 12 to 18 inches in diameter). A portion of the north-facing shoreline consists of a

timber pile-supported timber wharf with a concrete bulkhead. Shoreline directly to the south of the Site is improved with recently engineered and built shoreline protection.

The City completed a shoreline restoration project to the south of the Site (between the Woods Coffee Shop and near the Site boundary) in 2012. That restoration generally included excavation of riprap and concrete materials, and the installation of beach nourishment and drift sills.

The primary erosional force along the Site's shoreline is wind and wave action. The predominant winds for Bellingham Bay are from the south-southwest, which provide the Site with a degree of protection because of the sheltered headlands to the south (Coast and Harbor Engineering 2010). However, the outer shoreline of the Site does experience a moderate amount of erosional stress, including periodic flooding during extreme high tides.

A storm, which produced relatively high winds, surf, and precipitation, occurred on February 10, 2017 and resulted in bank erosion and damage to the existing public pier. The storm caused shoreline erosion and damaged the existing concrete bulkhead adjacent to the pier on the upland side. The damage was evidenced by visible settlement and cracking in the concrete bulkhead, and sinkholes or eroded channels behind the bulkhead.

3.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Several environmental investigations have been conducted at the Site that will be summarized in the RI report. Some of these reports can be accessed on the Site's web page at: <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=4606>. The RI report is currently in progress, but studies to date have confirmed that historical activities resulted in Site contamination. Polycyclic aromatic hydrocarbons (PAHs) are the primary constituents of concern along the shoreline that needs repair.

4.0 INTERIM ACTION

This section presents the evaluation and selection of the interim action proposed for the Site to address the eroding shoreline and failing bulkhead/pier to prevent public exposure and potential migration of contaminated materials to Bellingham Bay. The purpose of the interim action is to protect human health and the environment, and more specifically, to provide adequate protection for direct human contact and environmental receptors in the adjacent marine surface water and sediment.

4.1 Basis for Interim Action

MTCA distinguishes an interim action from a cleanup action in that an interim action only partially addresses the cleanup of a Site and achieves one of the following purposes (WAC 173-340-430[1]):

- Is technically necessary to reduce the threat to human health and the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance (WAC 173-340-430(1)(a))
- Corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed (WAC 173-340-430(1)(b))
- Is needed to complete a site hazard assessment, RI/FS, or design a cleanup action (WAC 173-340-430(1)(c)).

Under MTCA (WAC 173-340-430(2)), an interim action may:

- Achieve cleanup standards for a portion of the Site;
- Provide a partial cleanup (clean up hazardous substances from all or part of the Site, but not achieve cleanup standards); or
- Provide a partial cleanup and not achieve cleanup standards, but provide information on how to achieve cleanup standards.

The proposed interim action is necessary to effectively contain contamination in the shoreline area of the Site and allow proper implementation of the complete RI/FS process. The proposed interim action meets the requirements of MTCA described above by reducing the threat to human health and the environment through eliminating or substantially reducing one or more pathways for exposure to a hazardous substance, as well as correcting a problem that may become substantially worse if remedial action is delayed. The interim action will contain potentially contaminated soil that might otherwise be released to marine surface water and sediment, but it is not anticipated to achieve cleanup standards (to be determined during the RI/FS).

4.2 Purpose of the Interim Action

The purpose of the interim action is to repair approximately 450 linear feet of storm-damaged shoreline that is eroding, remove approximately 3,500 square feet of wooden pier and associated treated wooden piles, and stabilize the concrete bulkhead wall that supports the pier. Most of the

bulkhead, pier, piling, and wood decking has shifted and bowed, and the top of the bulkhead is rotated outward toward the water. This interim action is critical to preventing 1) human exposure to potentially contaminated upland soil, and 2) the release of contamination to sediment in Bellingham Bay. The interim action will stabilize the shoreline temporarily to facilitate completion of the ongoing RI/FS and the final remedy/cleanup action to address Site contamination.

4.3 Evaluation of Interim Action Alternatives

The following three interim action alternatives were developed and evaluated as potential options for mitigating the eroding shoreline and failing public pier:

- Alternative 1 – No action/monitoring conditions.
- Alternative 2 – Interim shoreline stabilization.
- Alternative 3 – Long-term shoreline stabilization.

MTCA requires that an interim action plan present the alternative interim actions considered and an explanation of why the proposed alternative was selected (WAC 173-340-430(7)(b)(ii)). The following sections describe the alternatives considered for the interim action and the basis for selecting the proposed interim action.

4.3.1 Alternative 1 – No Action/Monitoring Conditions

Alternative 1 includes maintaining the status quo and delaying repair until the RI/FS process is complete and the long-term shoreline stabilization can be implemented with the cleanup action for the Site. The shoreline would be monitored to document any deterioration in conditions.

In the absence of immediate action to stabilize the shoreline and bulkhead wall, it is expected that future storm events will result in further erosion that may cause migration of potentially contaminated soil from the uplands to the marine environment. Additionally, although public visitors to the park are restrained from the area of erosion with a temporary fence, some visitors could disregard the warning signs and come into contact with potentially contaminated soils.

The failing wooden pier is also currently a public injury hazard for park visitors. Wave action could further damage the wooden pier, and dislodged wood or partially-submerged wooden piles could become a boating hazard.

4.3.2 Alternative 2 – Interim Shoreline Stabilization

This alternative includes conducting an interim shoreline stabilization action to provide protective measures during the time required to complete the MTCA RI/FS process. Interim shoreline stabilization measures would include placement of rock along the shoreline and bulkhead wall, and the demolition and removal of the wooden pier and piles. Coastal Geologic Services (CGS) has previously developed coastal models and designed the shoreline protection system for Boulevard

Park; that shoreline protection system was partially constructed in 2013. The interim shoreline stabilization—which is now needed in an area north of the previous shoreline improvements—will be designed consistent with the wave modeling performed for the previous project. The interim shoreline stabilization is expected to include:

- Preparing the exposed soil surface along the shoreline to receive additional rock by carefully moving incidental riprap to the existing riprap armor.
- Minimally excavating the exposed soil may be required for the riprap foundation (excavation will be avoided if possible; if minimal excavation is required all excavated soil will be containerized for off-site disposal).
- Placing a separation geotextile over the exposed soil.
- Placing appropriately-sized rock (as determined from wave action modeling) on the separation geotextile and filling in the gap formed by erosion to a height established by the design.
- Deploying a silt curtain around the pier demolition area.
- Over-water demolishing the public pier wood decking.
- Removing treated timber piles by first trying vibratory removal with direct pull; if removal is not possible or the pile breaks and cannot be grabbed, removing an approximate 3-ft diameter area of sediment around each pile and cutting the timber approximately 2 ft below the mudline (EPA 2016, WDNR 2017). Slight modifications to this approach may be employed to prevent contaminant re-suspension. If so, these adjustments will be discussed with Ecology and their approval requested prior to construction.
- Piles left remaining will have locations documented.
- Placing appropriately-sized rock against the water side of the bulkhead wall and backfilling voids on the upland side of the wall with rock.
- Disposing of demolition wood, debris, and excavated soil at a permitted landfill.
- All shoreline work shall be in the dry when tidal waters are at a lower elevation.
- Pile removal will be in-the-dry or during low-water conditions.

The interim shoreline stabilization is not anticipated to function as a permanent or long-term stabilization, and thus will require observation and possible ongoing maintenance to continue providing protection until a long-term cleanup solution is identified and implemented for the Site as part of the final remedy.

Engineering and timing controls would be used to minimize environmental impacts. This includes timing work with the tidal cycles so that work occurs above the tide, minimizing excavation, using silt-curtains to control turbidity, and using absorptive boom as needed to protect surface water quality. Work may also be limited by a regulatory fish window. Water quality monitoring would be conducted during construction to verify environmental controls are sufficient. This alternative would require the north end of the park to be temporarily closed for construction. For pile removal, the US Environmental Protection Agency's "*Best Management Practices for Piling Removal and Placement*

in Washington State” will be followed, including the recommendations for work in contaminated sediment. As noted above, additional precautions may be taken to prevent contaminant resuspension, in coordination with Ecology.

4.3.3 Alternative 3 – Long-Term Shoreline Stabilization

The long-term shoreline stabilization solution would include placement of larger rock, keyed into the soil and sediment to provide anchoring and resistance to further erosion forces. This alternative would require a significant design effort and would include removal of the failing concrete bulkhead. The ongoing RI/FS process has not evaluated cleanup options, but the final remedy will address contamination present in soil and marine sediment along the same shoreline that currently requires erosion protection. Implementation of the long-term shoreline stabilization solution could introduce engineering or financial constraints that would render otherwise viable environmental cleanup alternatives—yet to be identified and evaluated in the RI/FS process—impracticable for implementation. The risk of constraining an effective evaluation and selection of the final remedy for the SSSMGP Site under the MTCA regulation is unacceptable to the City, PSE, and Ecology; therefore, implementation of the long-term shoreline stabilization prior to implementation of the final remedy for the SSSMGP Site is rejected.

To adequately protect the shoreline, and to reduce the potential for contaminant migration through erosion, the shoreline must be stabilized prior to the onset of the normal autumn storm season in October 2017. That schedule provides insufficient time to complete the RI/FS process prior to designing the repair; therefore, postponing shoreline stabilization until implementation of the final environmental remedy for the Site is not practicable.

4.3.4 Selection of the Preferred Alternative

Alternative 2 was selected as the preferred approach to stabilizing the shoreline to temporarily prevent further erosion of the shoreline and migration of contamination. This selection is supported by the following:

- **Permanence and effectiveness of the remedy**
 - Alternative 1 relies greatly on storms to be of only minor significance in the coming years, and is anticipated to not be a permanent or effective approach.
 - Alternative 2 provides a remedy that can be implemented by October 2017, prior to the onset of the normal autumn storm season, and can be maintained as needed if additional protection is warranted. The simplicity of this option makes it compatible with or readily incorporated into the anticipated future cleanup of the Site.
 - Alternative 3 is anticipated to be permanent, but may be incompatible with implementation of final Site cleanup plans.
- **Potential environmental impacts during implementation**
 - No action (Alternative 1) would result in exacerbated environmental impacts.

- Alternative 2 requires a very limited amount of excavation in shallow soils.
- Alternative 3 would require excavating and disturbing soil that has the potential to adversely affect marine surface water quality.
- Excavation associated with Alternative 3 would generate substantial volumes of potentially contaminated soil, and possibly groundwater, which would require appropriate handling, management, transportation, and disposal. The added complexity and cost of material handling and disposal activities is not required to implement Alternative 2.
- **Potential impacts to long-term Site use**
 - Alternative 1 would require the exposed areas to continue to be fenced off until final cleanup of the Site is constructed.
 - Alternative 2 would require the exposed areas to continue to be fenced off until construction is complete; anticipated in autumn 2017.
 - Alternative 3 would require the area to be closed for a longer period of time for design and construction; likely until later in 2018.
- **Potential to preclude future remedial action**
 - Alternative 1 would have the least impact to future remedial action.
 - Alternative 2 would likely be incorporated into the future remedial action by moving and or/reusing riprap.
 - The implementation of Alternative 3 prior to final Site cleanup design may limit or significantly increase the cost to implement future remedial action.
- **Cost**
 - Alternative 1 would be the least costly to implement; however it is not sufficiently protective of the public and environment.
 - Alternative 2 is specifically designed to be the least-costly interim solution to provide shoreline stabilization until final cleanup can be designed and implemented.
 - Alternative 3 would require more modeling, design, demolition, earthwork, and more material than Alternative 2, and thus would be the most expensive alternative. Furthermore, the engineered condition of the shoreline reconstructed for long-term stabilization purposes is expected to significantly increase the costs associated with at least some of the cleanup action alternatives that will be evaluated in the RI/FS process.

Alternative 2 is selected as the preferred alternative based on meeting the need to protect the shoreline to prevent exposure to or migration of contamination while allowing for the RI/FS process to be completed.

4.4 Interim Action Timing

The City intends to complete interim shoreline stabilization as soon as possible after August 1, 2017, which is the beginning of the allowable in-water construction period (fish window) to protect

salmonids. Design of the solution and permitting is underway and the City will need some time to select a construction contractor. Construction is anticipated to start in September 2017 and be completed by mid- to late October 2017.

4.5 Compliance Monitoring

Compliance monitoring will be conducted to assure the effectiveness of the interim action. MTCA requires compliance monitoring for all cleanup actions, including interim actions, as described in WAC 173-340-410. Compliance monitoring is required to be conducted for the following three purposes, which are discussed further in the following sections:

- **Protection monitoring** to confirm that human health and the environment are adequately protected during construction, operation, and maintenance associated with the cleanup action
- **Performance monitoring** to confirm that the cleanup action has attained cleanup standards and any other performance standards
- **Confirmational monitoring** to confirm the long-term effectiveness of the cleanup action once the cleanup standards and other performance standards have been attained.

4.5.1 Protection Monitoring

Protection monitoring addresses worker health and safety for activities related to construction activities during the interim action, as well as protection of the general public, if conditions are encountered that indicate that workers or the general public could be exposed to hazardous substances. It is not anticipated that hazardous substances will be encountered during the interim action, so implementation of protection monitoring will occur only if unanticipated conditions are encountered.

Worker health and safety will be addressed through a project health and safety plan (HASP), if required. The requirements for a project HASP will be included in the project construction documents, and the contractor will prepare the HASP if conditions are encountered that suggest construction workers may come into contact with hazardous substances. The HASP would address potential physical and chemical hazards associated with Site activities consistent with the requirements of WAC 173-340-810, and field monitoring to confirm that potential exposure to chemical hazards does not exceed health-based limits.

Anticipated potential physical hazards include working in proximity to heavy equipment, heat stress or cold stress, and vehicular traffic. Anticipated potential chemical hazards include exposure to Site contaminants through various exposure pathways (i.e., direct contact, inhalation, and ingestion). Because the interim action includes only limited excavation from depths not anticipated to contain hazardous substances at concentrations of concern, chemical exposure is unlikely to be an issue. Therefore, screening of work zone vapor conditions and soil quality will initially be conducted using visual and olfactory screening by an environmental professional.

4.5.2 Performance Monitoring

Performance monitoring typically consists of testing samples of affected media (soil, groundwater, sediment) to determine whether the cleanup action has achieved cleanup standards. However, this interim action does not include actions intended to achieve a final numerical standard (i.e., cleanup level) for any affected media. Therefore, performance monitoring will consist primarily of construction quality assurance (CQA) monitoring to confirm that the interim action is implemented in conformance with the interim action design drawings and specifications. CQA monitoring will include physical testing and construction observations.

Excavated soil will be stored at the Site in covered containers until waste profiling is complete. Existing data for chemical concentrations in soil from sampling locations nearest the shoreline will be used to characterize the soil for disposal as contaminated materials. Existing data will not be used to designate materials as clean for the purposes of disposal. Soil management procedures, including handling, storage, and best management practices to prevent migration of the soil away from the managed area will be addressed in the design documents and implemented by the contractor during construction activities. All soil will be disposed of at an appropriate offsite disposal facility based on the disposal profile, and in accordance with Washington State regulations.

4.5.3 Confirmation Monitoring

Confirmation monitoring will be conducted to confirm the long-term effectiveness of the interim action. Confirmation monitoring will consist of a final inspection of the repair as part of CQA monitoring and periodic visual inspection of the repaired bulkhead to confirm that it continues to adequately shore the upland soils after installation.

5.0 APPLICABLE, RELEVANT, AND APPROPRIATE REGULATORY REQUIREMENTS

This interim action will be conducted by the City and PSE under an amendment to Agreed Order (No. DE 7655) with Ecology. Agreed Order No. 7655 requires identification of the permits or specific federal, state, or local requirements that the agency has determined are applicable and that are known at the time of entry of the Order. The interim action is exempt from the procedural requirements of Chapters 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 Revised Code of Washington (RCW). And, in accordance with WAC 173-340-710(9)(b)(vii) and (c), the interim action is exempt from any laws requiring or authorizing local government permits or approvals, but must still comply with the substantive requirements of such permits or approvals. Agreed Order DE 7655 also requires the exempt permits or approvals and the applicable substantive requirements of those permits or approvals, as they are known at the time of entry of the Order, to be identified.

The following are considered either potentially applicable permits or substantive requirements that may be “legally applicable” or “relevant and appropriate” under WAC 173-340-710(2) to the proposed interim action identified in Section VII of the Agreed Order. Final determination of legally applicable or relevant and appropriate requirements will be made by Ecology as part of its review of this interim action plan.

5.1 State Environmental Policy Act

Compliance with the State Environmental Policy Act (SEPA), Chapter 43.21C RCW, will be achieved by conducting SEPA review in accordance with applicable regulatory requirements, including WAC 197-11-268, and Ecology guidance as presented in Ecology Policy 130A (Ecology 2004). Ecology will act as the SEPA lead agency and coordinate the SEPA review.

5.2 Hydraulic Project Approval

Any work that will use, divert, obstruct, or change the bed or flow of state waters must do so under the terms of Hydraulic Project Approval (HPA) issued by the Washington Department of Fish and Wildlife (WDFW). WDFW HPA is administered under RCW 77.55 and rules set forth in WAC 220-110. The City will prepare and submit a Joint Aquatic Resources Permit Application (JARPA) for the interim action. This JARPA must be suitable for the WDFW’s HPA (contents of the JARPA will be transferred to the online application), City shoreline permitting, and US Army Corps of Engineers (USACE) Section 404 (for work below mean higher high water)/Section 10 (for work below mean high water) permitting. The JARPA will include project-specific information including listing of adjacent property owners. This task includes preparation of figures for the JARPA, which will also be suitable for submittal to the reviewing agencies. As part of the JARPA, a Biological Evaluation (BE) will be prepared for selected species listed as threatened or endangered in the action area under the Endangered Species Act (ESA) as well as an Essential Fish Habitat (EFH) evaluation pursuant to the Magnuson-Stevens Act for the project. An updated species lists will be obtained from agency websites, request

site-specific species and habitat information from the WDFW Priority Habitats and Species on the Web, and review information from the Washington Natural Heritage Program. The report will establish the project action area, which incorporates the furthest extent of both aquatic and terrestrial impacts. Appropriate environmental baseline information and species history will be summarized in the BE. A determination of “no effect” (NE) or “may effect, not likely to adversely affect” (NLAA) is anticipated. The project is not expected to impact EFH.

5.3 Nationwide Permit

Work related to the preferred interim action may occur below mean high water so the need for a Section 10 permit is anticipated. Due to the proximity to navigable waters, the USACE will be consulted to obtain coverage under a Nationwide 38 permit for the proposed interim cleanup action.

Federal permitting may also initiate Section 106 consultation between the USACE and State Historic Preservation Officer (SHPO) under the National Historic Preservation Act.

6.0 INTEGRATION WITH FINAL CLEANUP ACTION AND FUTURE LAND USE

The interim action may be integrated into the final Site cleanup action that will be completed following finalization and Ecology approval of the Site RI/FS and Cleanup Action Plan for the Site. It is anticipated that the final cleanup action will be implemented within the next 3 to 4 years.

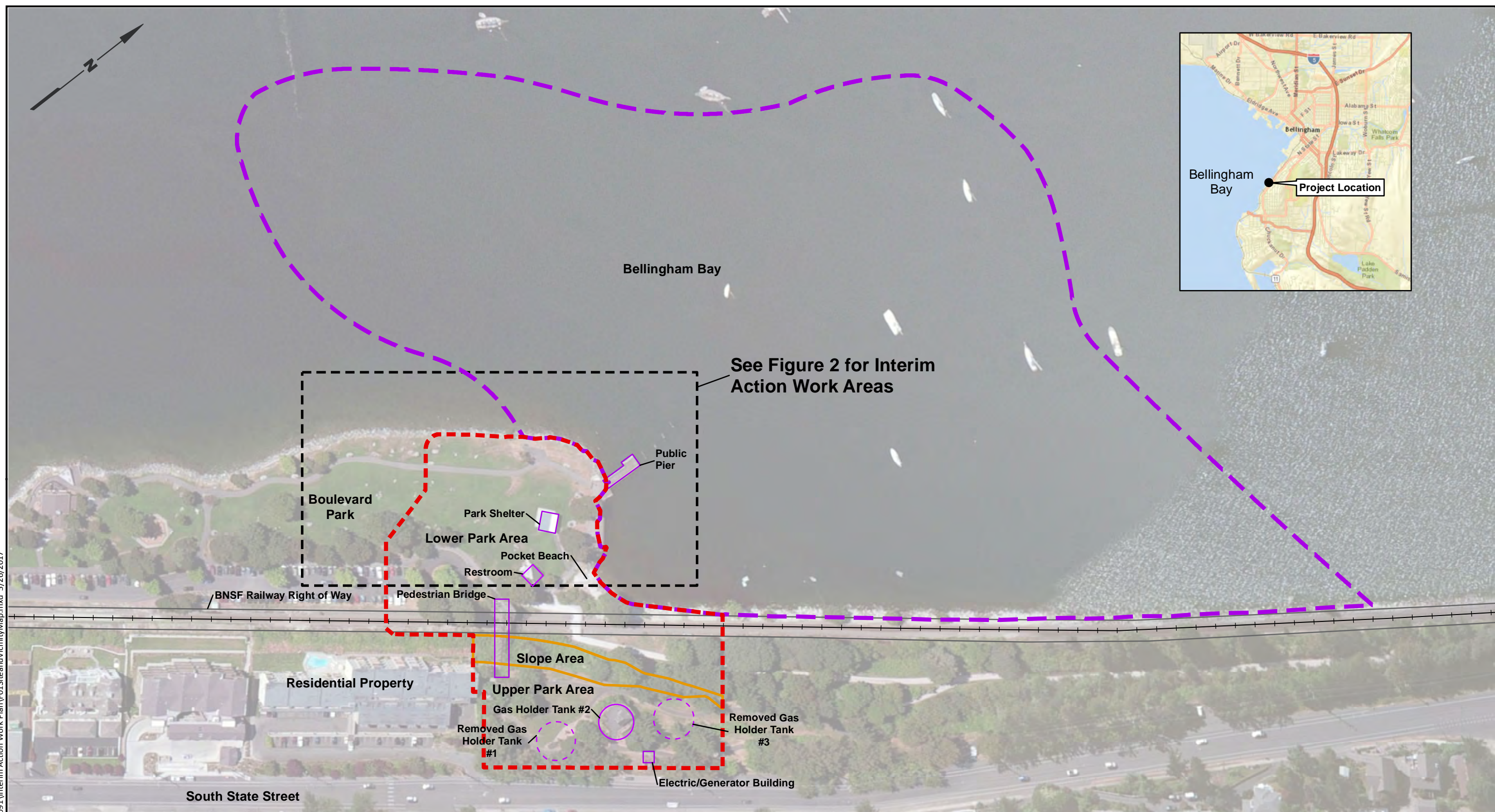
7.0 USE OF THIS REPORT

As an exhibit to First Amendment to Agreed Order No. DE 7655, this report will become an integral and enforceable part of that Agreed Order, administered by the Washington State Department of Ecology. This Interim Action Work Plan has been prepared for the use of the City of Bellingham, Puget Sound Energy, and the Washington State Department of Ecology for specific application to the South State Street Manufactured Gas Plant cleanup site. None of the information, conclusions, and recommendations included in this document can be used for any other project without the express written consent of Landau Associates, Inc. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

8.0 REFERENCES

- Coast and Harbor Engineering. 2010. Technical Memorandum, Coastal Engineering Analysis and Assistance with Design Boulevard Park Gravel Beach, Bellingham, Washington: Erosion and Sediment Transport Evaluation. Prepared for the Port of Bellingham, Washington. Prepared by Coast and Harbor Engineering, Edmonds, Washington.
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Bellingham Bay

See Figure 2 for Interim Action Work Areas

Boulevard Park

Lower Park Area

Pocket Beach

Restroom

Public Pier

BNSF Railway Right of Way

Pedestrian Bridge

Slope Area

Residential Property

Upper Park Area

Gas Holder Tank #2

Removed Gas Holder Tank #1

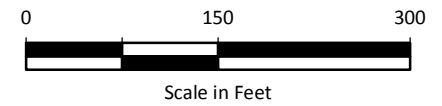
Removed Gas Holder Tank #3

Electric/Generator Building

South State Street

- Legend**
- Existing Site Structures
 - Former Gas Holder Tanks
 - Upland Site Boundary
 - Marine Site Boundary

- Notes**
1. Horizontal Datum: NAD 83 (HARN), U.S. Survey Feet.
 2. Vertical Datum: Mean Lower Low Water (MLLW), Feet.
 3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Data Sources: BergerABAM, 2010; Steele and Assoc, 2011; Esri World Imagery.

South State Street
 Manufactured Gas Plant
 Interim Action Work Plan
 Bellingham, Washington

Site and Vicinity Map

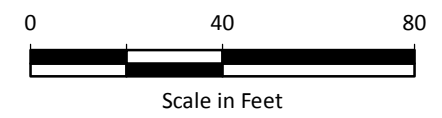
Figure
1



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- Legend**
- ▭ Concrete Bulkhead Wall Stabilization
 - ▭ Shoreline Erosion Repair (Approximate)
 - ▭ Wooden Deck and Piles Removal

Note
 1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Data Source: Google Earth.

South State Street Manufactured Gas Plant Interim Action Work Plan Bellingham, Washington	Interim Action Work Areas	Figure 2
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