Fall 2017

Environmental Impact Assessment: Waypoint Park

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Environmental Impact Assessment for

Waypoint Park

Whatcom Waterway Park Beach Project

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Prepared for: Dr. Tamara Laninga
Environmental Studies (ENVS) 493; Fall 2017
Huxley College of the Environment -- Western Washington University

Environmental Impact Assessment: Waypoint Park

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Course: Environmental Studies (ENVS) 493

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Environmental Impact Assessment

Huxley College of the Environment

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December 8th, 2017

Letter to Concerned Citizen

November 8, 2017

Dear Concerned Citizens,

As part of a class project, our team conducted an Environmental Impact Assessment (EIA) analyzing impacts from the Waypoint Park project, which involves reconstructing the Whatcom Waterway shoreline and building a public park along the waterfront. Our investigation was guided by our professor, Dr. Tammi Laninga, with expertise and site tours given by the Port of Bellingham's Director of Environmental Programs, Brian Gouran. The analysis focused on impacts within the vicinity of the project site (i.e., Downtown Waterfront District, Whatcom Waterway).

The City of Bellingham (COB) Parks and Recreation Department is developing Waypoint Park along the Whatcom Waterway, with help from the Port of Bellingham (POB). The COB plans on constructing a beach area, along with open space, pedestrian and bike pathways, a play structure, and public art. The main goal of the park is to provide public access and recreation opportunities and improve ecological function at this currently inaccessible site.

Excavation, grading, shoreline stabilization, vegetative planting, implementation of new beach soils, and creation of recreation opportunities will beneficially impact the natural and built environment with proper mitigation techniques. This EIA examines the proposed project's impacts and identifies low impact development (LID) mitigation measures, and a no action alternative as a result of the construction of this waterfront park.

We thank you for your interest in the impacts of restoring the shoreline and constructing Waypoint Park.

Sincerely,

The Waypoint Park Environmental Assessment Team

Fact Sheet

Title
Waypoint Park: Whatcom Waterway Park Beach Project

Description of project
The COB plans to develop a park along the Whatcom Waterway called Waypoint Park. The park will include the creation of a beach area, native vegetation, open lawn spaces, pedestrian walkways, a play structure and an Acid Ball art piece from the former Georgia Pacific pulp and tissue mill. Waypoint Park will serve to improve shoreline ecological functions, provide public access and recreation opportunities along the waterfront and connect the waterfront to the central business district (CBD) of downtown Bellingham. The park is part of the Waterfront District Subarea Plan (SAP) approved by the Bellingham City Council in December 2013.

Location
The project site is located on the east shore of the Whatcom Waterway, by the intersection of Central Avenue and Roeder Avenue, alongside the Central Avenue Pier.

Legal description of the location
Township: 38 North
Range: 2 East
Section: SE ¼ of section 25
Latitude: 48.7512 North
Longitude: -122.4851 West
Shoreline: Marine reach #6

Proposers
City of Bellingham
Parks Recreation Department
210 Lottie Street
Bellingham, WA 98225

Port of Bellingham
1801 Roeder Avenue
Bellingham, WA 98225

Lead agencies
Washington State Department of Ecology
1440 10th Street #102
Bellingham, WA 98225

City of Bellingham
210 Lottie Street
Bellingham, WA 98225

Permits

Local permits

COB Shoreline Substantial Development Permit

- In accordance with COB Shoreline Master Program (SMP)
- To meet the requirements of Shoreline Mixed Use designation

COB Fill and Grade Permit

- In accordance with COB Grading Ordinance
- Standards and requirements used in construction plans and specifications

COB Construction Stormwater Permit

- In accordance with COB Stormwater Management Ordinance

COB Critical Area Ordinance

- Site contains erosion and landslide hazards
- Occurs along range of seismic hazards
- Geologic Hazards Assessment required

Public works permit, electrical permit, building permit

State/ Federal permits

- Department of Ecology NPDES Waste Discharge Permit
- Department of Ecology Clean Water Act Section 401 Water Quality Certification
- Department of Ecology Coastal Zone Management Certification
- Department of Fish and Wildlife Hydraulic Project Approval
- Department of Natural Resources Aquatic Use Authorization
- Army Corps of Engineers Clean Water Act Section 404 Permit
- Army Corps of Engineers Joint Aquatic Resources Permit Application

Contributors

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Kamalani Brun: *Leader, Light and Glare, Historic and Cultural Preservation, Executive Summary, References*
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Acknowledgments
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Brian Gouran, Port of Bellingham

Issue date
December 8, 2017

Public presentation time and date
Port of Bellingham Conference Center
December 13, 2017
3:00- 5:00 pm

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Glossary of Terms, Acronyms & Abbreviations

Acid Ball
Former GP infrastructure, serving as art piece for Waypoint Park

Aeration Stabilization Basin (ASB)
On site stormwater is treated in the Aeration Stabilization Basin (ASB), located across the Whatcom Waterway from the park site. Stormwater is pumped underwater through a pump house located near the GP Wharf

Air Quality Index (AQI)
Air quality is determined by an Air Quality Index to indicate air pollution levels and associated health effects. The AQI scale ranges from 0 to 500, with higher levels associated with more significant health impacts.

Bellingham Municipal Code (BMC)
Regulations for the City of Bellingham

Best Management Practices (BMP)

Bulkhead
A retaining wall found along shorelines meant to minimize erosion

Central Business District (CBD)

City of Bellingham (COB)

Clean Air Act of 1970 (CAA)
Federal legislation passed to regulate air pollution and limit emissions from point and mobile sources in the United States. Implemented by the EPA, and monitored and enforced by regional air agencies.

Clean-Up Action Plan (CUAP)
A plan prepared by Ecology to address the Pulp and Tissue Mill RAU contamination. Involved contaminated sediment removal, import of clean topsoils and capping the remaining contamination

Contaminated Materials Management Plan (CMMP)
Plan issued by Ecology for dealing with contaminated sediment and soils in the RAU

Contaminants of Potential Concern (COPC)

Creosote
A chemical derived from oil that is commonly used for preserving wood. It is associated with health risks and is determined by the EPA as a probable carcinogen.

Crime Prevention Through Environmental Design (CPTED)
Deterring crime with environmental design

Critical Areas (CA)
Designation of environmentally sensitive natural resources through the Growth Management Act

Cubic Yards (CY)

dBA
Stands for A- weighted decibels. Refers to a measurement of sound volume in decibel values.

Department of Ecology (DOE or Ecology)
The primary agency responsible for environmental regulation in the state of Washington

Department of Natural Resources (DNR)
Statewide agency responsible for the management and inventory of natural resources

Department of Transportation (DOT)

Diesel Particulate Filters
Emission control technology

Dioxins
A known carcinogen that is produced in the production of chlorinated organic compounds

Eelgrass
Also called Zostera marina, eelgrass is an aquatic plant that serves as a habitat in marine environments and grows in beds or meadows along the ocean floor

Endangered species
A list of species classified by the Endangered Species Act as threatened or in danger of extinction

Environmental Impact Assessment (EIA)
An EIA is required for major actions or projects that will have significant environmental impacts. To decide whether a project or action will significantly impact the quality of the environment, a threshold determination must be made. A threshold determination is made after completing the SEPA checklist and evaluating the probable impacts of the proposed project or action; the determination does not evaluate whether the benefits outweigh the adverse impacts of the project. If the threshold determination is a Determination of Significance an EIA is required

Environmental Cap
A layer of soil and concrete that shields contamination from reaching groundwater or other sources. According to the CUAP, it must consist of 3 inches of a hard cap (concrete, asphalt) or 24 inches of a soil cap with a separation layer to identify contaminated soil from clean import soil

Environmental Designation for Noise Abatement (EDNA)
Maximum permissible noise levels based on land uses, established in the Washington Administrative Code (WAC)

Environmental Protection Agency (EPA)

Estuary
A transition between freshwater and saltwater environments, usually where rivers meet the sea. Home to a diverse number of plants and animals due to the unique environmental conditions of salinity, land and freshwater.

Fish and Wildlife Service (FWS)
Federal agency responsible for fish, wildlife and habitats

Georgia Pacific (GP)
Former industry that operated a Pulp and Tissue Mill located on project site that left behind gross contamination of toxic and hazardous material

Grading
Construction used to create a level foundation or desired slope

Ground fault circuit interpreter
A device that cuts off the electric power circuit when an unexpected path of current flow has been detected

Gross Contamination
Excessive amounts of toxic or hazardous materials

Historic Preservation Office (HPO)

Hydraulic Project Approval (HPA)
Any construction or work that will impact state waters requires a HPA. Issued by the WDFW.

Hydrocarbons
A compound of hydrogen and carbon, commonly found in petroleum and natural gas and associated with many health effects

Inadvertent Discovery Protocol
Protocol for when encountering archaeological material

LED
Light-Emitting Diode, light bulbs that use less energy that other types of light bulbs

Liquefaction
Saturated soil loses shape or form when stress is applied

Low Impact Development (LID)
A design strategy that uses natural features for conservation and protection of water quality and aquatic habitat

Low pH
Low pH is associated with acidity, and can cause water contamination and leach heavy metals from piping. Metals also tend to be more toxic at lower pH

Large Woody Debris (LWD)

Mean Higher High Water (MHHW)
The area delineating freshwater and aquatic organisms, typically defined by the area of terrestrial habitat closest to the water.

Model Toxic Control Act (MTCA)
Washington law passed in 1988 that mandates cleanup standards for hazardous waste. Funded through a tax on the sale of hazardous substances and implemented by Ecology.

National Ambient Air Quality Standards (NAAQS)
The Clean Air Act requires the EPA to establish National Ambient Air Quality Standards for pollutants that may harm public health and safety

National Pollution Discharge Elimination System (NPDES)
Through the Clean Water Act, the National Pollution Discharge Elimination System regulates point sources of pollution into waters of the United States

National Oceanic and Atmospheric Administration (NOAA)

Nephelometric Turbidity Unit (NTU)
A measurement of turbidity in water

Northwest Clean Air Agency (NWCAA)
The Northwest Clean Air Agency is the agency responsible for monitoring and enforcing the Clean Air Act in the Whatcom, Skagit and Island counties

Ordinary High Water Mark (OHWM)
The shoreline elevation where water is typically at its maximum, indicated by a mark of eroded shoreline.

Pacific Migratory Flyway
A north/south path for migratory birds extending from Alaska to Patagonia

Particulate Matter (PM)

Port of Bellingham (POB)

Remedial Action Units (RAU)
Two distinct contamination areas within the former GP West site. To facilitate the speed and cost of cleanup, Ecology and the POB divided the site into two Remedial Action Units (RAU)-- the Pulp and Tissue Mill RAU and the Chlor-Alkali RAU

Richter Scale
The Richter Scale used to rate the magnitude of an earthquake, in order to quantify the size and strength

Riprap
Angular rock used as armor structure along the shoreline

Rock jetties
A shore stabilization structure that act as a barrier for erosion

Salmonids
A family of fish including Salmon, Trout, Char, ect.

Sea Level Rise (SLR)
An increase in volume of the world's oceans due to the warming of the atmosphere

Shoreline Management Plan (SMP)
Under the Shoreline Management Act, cities and counties need to create and implement a Shoreline Management Plan to balance public access and shoreline protection

Spill Prevention, Control and Countermeasures (SPCC)
Includes regulations and standards for preventing and responding to spills into waterways

Square feet (SF)

State Environmental Policy Act (SEPA)

Sub-Area District Plan (SAP)
Waterfront district plan created by the Port of Bellingham and City of Bellingham Public Partnership

Submerged Aquatic Vegetation (SAV)

Temporary Erosion and Sediment Control (TESC)

Terrestrial
Relating to the land

Total Maximum Daily Load (TMDL)
Total maximum daily load, refers to a program within the Clean Water Act that establishes the maximum amount of a pollutant that can be present in water while still meeting water quality standards

Turbidity
Cloudiness in the water due to suspended sediment

US Army Corps of Engineers (USACE)
Federal agency within the Department of Defense responsible for public engineering projects and issuing permits for Section 404 CWA permit involving work in wetlands, streams and waters of the U.S.

United States Geological Survey (USGS)

Volatile Organic Compounds (VOC's)
Chemical compounds emitted by various liquids and solids. Found in many household products, and commonly affect indoor air quality

Washington Administrative Code (WAC)
Rules and regulations for the state of Washington

Washington State Department of Fish and Wildlife (WDFW)

Washington State Department of Transportation (WSDOT)

Waypoint Park (WPP)

Whatcom Transit Authority (WTA)

Whatcom Waterway Park Shoreline Master Program Consistency Report (WWPSMPCR)

Executive Summary

The COB plans to develop a park along the Whatcom Waterway called Waypoint Park (WPP). The project site is located in by the Georgia Pacific (GP) Pulp/Tissue Mill Remedial Action Unit (RAU) and just south of the Granary building and Central Avenue Pier. The COB and the POB developed a Waterfront District SAP, which plans to revitalize the waterfront by providing public access and connecting it downtown Bellingham and the community at large. The Pulp and Tissue Mill RAU recently underwent an environmental cleanup project, and the upland project site has been capped. The site currently consists of asphalt pavement and large concrete foundations, and is restricted for public access (*Figure 1*).

The objectives of the park include restoring the shoreline, while providing recreation and access to the waterway for the public. The work along the shoreline involves the removal of existing bulkheads, the construction and expansion of a public intertidal beach area, and introduction of new beach soils and vegetation to improve the aquatic habitat. Upland work of the project will occur within the Pulp and Tissue Mill RAU, and will include grading the site and introducing clean topsoil, native vegetation, and open lawn areas. In addition, pedestrian pathways and a children's play area will be constructed. The park will feature an artifact from the former GP mill, an acid ball that will serve as an art piece in the west corner of the park (*Figure 2*).

Many of the significant adverse impacts of the project will occur throughout the construction phase, but will have little to no lasting long term impact on the environment. These short term impacts include construction noise, habitat displacement, decreased water quality and exposed contamination.
The long-term impacts of the park will significantly benefit the environment, as the existing site is currently 45,750 square feet of impervious surfaces, treated bulkheads disrupting ecological functionality of the shoreline, and no public accessibility or vegetation (GeoEngineers, 2017). With park construction, the COB plans to improve shoreline ecological functions and processes, introduce native vegetation, improve connectivity with the downtown area, and provide opportunities for recreation. Although there are positive long term benefits from the park construction, there is always room for improvement. This EIA provides additional mitigation measures not currently proposed by the COB that are expected to further reduce the adverse impacts of the construction process and improve the overall sustainability of WPP. In addition, this EIA examines the existing conditions of the site, the proposed impacts and mitigation of the project, and the impacts of pursuing a no action alternative in regards to the construction of WPP.

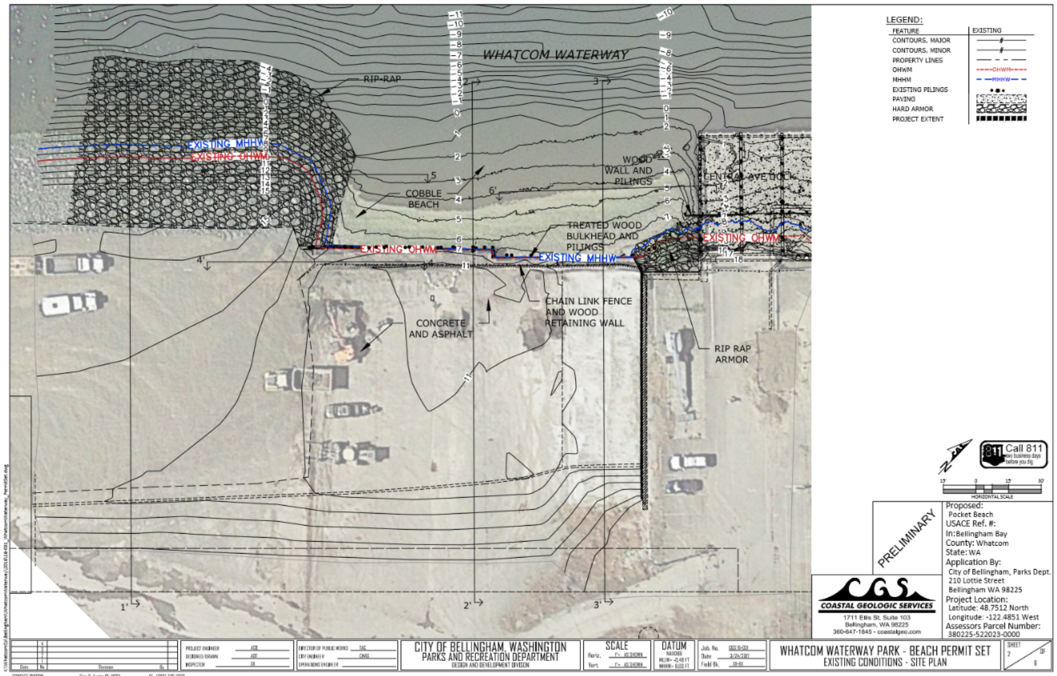


Figure 1: Existing Whatcom Waterway Channel and beachfront access.
Source: Coastal Geological Services, 2017

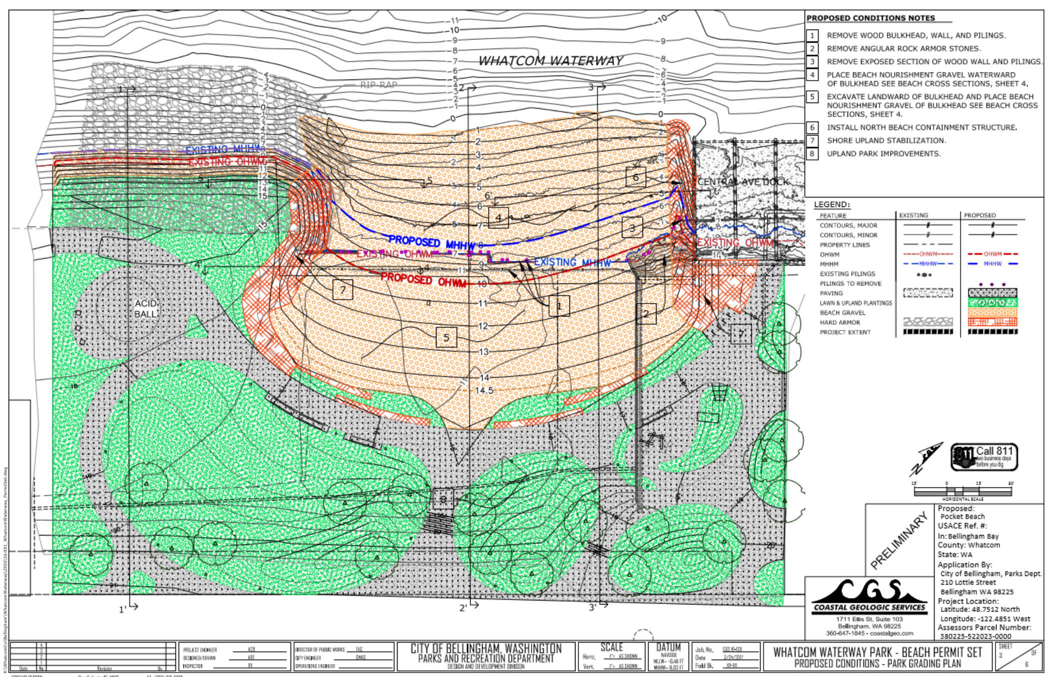


Figure 2: Proposed conditions of site
Source: Coastal Geological Services, 2017

Section 1: Project Overview

1.1 History and Background of the Site

Waypoint Park (WPP) is proposed along Bellingham Bay, in the Northern Puget Sound basin (Cultural resources assessment). Bellingham Bay, along with the surrounding landscapes, streams and rivers provide abundant natural resources in the area (Northwest Archaeological Association, 2007). Prior to European settlement, Native American peoples inhabited the waterfront and lived off the resources provided by the area, mainly salmonids, shellfish, and edible plants. Nooksack and Lummi tribes used the Bay to establish communities and a marine based economy as a way of livelihood (NW Archaeological Association, 2007).

After coal was discovered in the area, settlement along the Bay occurred rapidly. Whatcom Waterway provided a channel for ships and sailing vessels to access the waterfront and shallow dredging activities occurred (Anchor QEA, 2017). Around the 1850's, saw and timber mills were the first industries to develop along the waterfront and used energy from Whatcom Falls. In 1881, the Whatcom Wharf was constructed to accommodate increased shipping and allow vessels to come closer to the estuary (Artifacts Consulting, 2007). Additionally, the Great Northern Railroad was built in 1891 with the tracks constructed over the existing tidal flats (NW Archaeological Association, 2007) (Figure 3).

In 1902 the US Army Corps of Engineers (USACE) dredged the Whatcom Waterway 12 ft deep and 200 ft wide (Anchor QEA, 2017). The dredged channel of Whatcom Creek allowed increased shipments and drew larger industries to the waterfront, in replacement of smaller businesses (NW Archaeological Association, 2007). Piers and massive, newly filled wharfs, provided foundations for new railroads and rail lines, and provided incentives for the construction of additional industries along the waterfront (NW Archaeological Association, 2007).

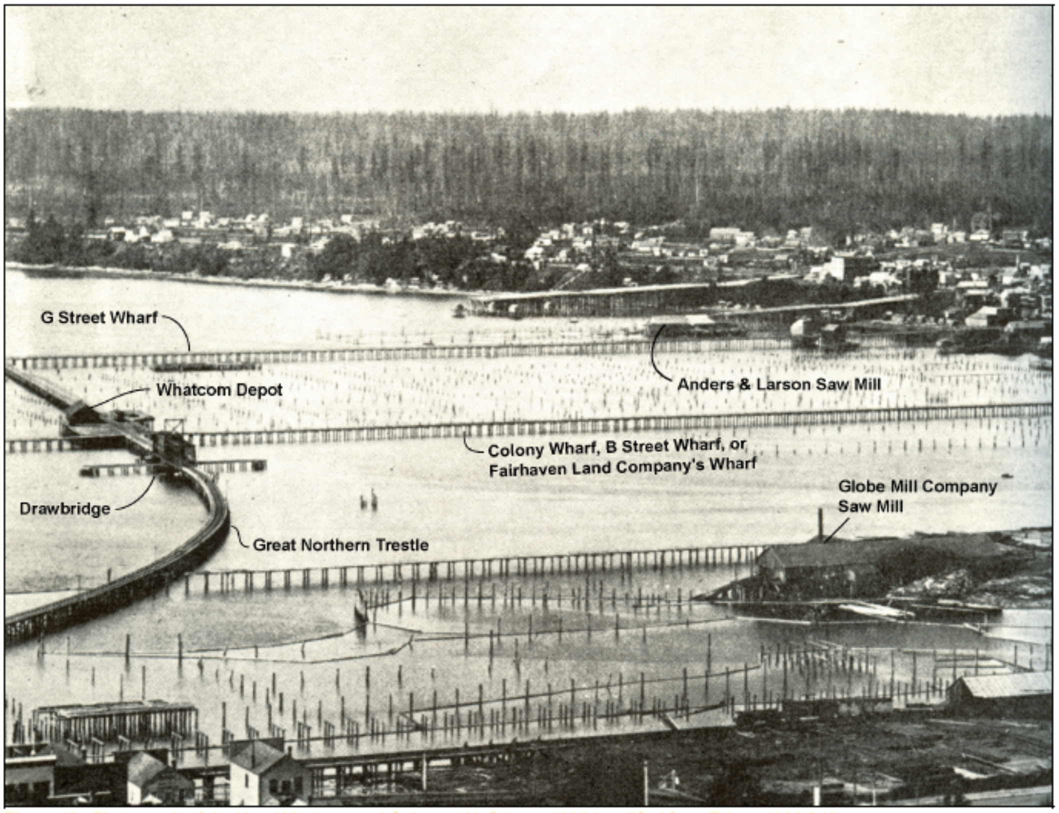


Figure 3: Waterfront and tide flat conditions 1895
Source: Northwest Archaeological Association, 2007

Pacific American Fisheries, and Puget Sound Sawmills and Timber housed at one point the largest salmon cannery and shingle mill in the world, creating a booming economy based on fisheries and timber (Hogan, 2015). The Puget Sound Pulp and Timber company began operating along Whatcom Waterway in 1925, and was sold to Georgia Pacific Corporation in 1963 (NW Archaeological Association, 2007). GP began paper and tissue manufacturing on the waterfront and dramatically expanded over the following 30 years, taking over the south Whatcom Creek waterfront (Artifacts Consulting, 2007). Additional authorized dredging between 1961 and 1969 increased the channel depth to 18 ft below the Mean Low Water mark (MLLW) and the surrounding Waterway to a depth of 30 ft (Anchor QEA, 2017).

In 1965, GP also began operating a chlorine plant on the site and from 1965 to 1971, GP discharged wastewater with mercury directly into the Whatcom Waterway. Concerns about the quality of the Whatcom Waterway created the need for a treatment facility (Artifacts Consulting, 2007). In response, the ASB treatment facility and underground wastewater pipelines were constructed in 1979 after 12 ft of dredging (Anchor QEA, 2017). GP closed their pulp mill in 2001, and officially shut down operations in 2007.

In 2005 the POB acquired the 137 acres of waterfront property from BP in exchange for taking on the responsibility of the vast environmental cleanup (Department of Ecology, 2016). Since GP officially shut down operations in 2007, the site has remained vacant, with brownfield conditions left behind. Large portions of the Waterfront District, in total 237 acres, contain gross contamination including hydrocarbons, arsenic, cadmium, lead, nickel, mercury, copper and methane gas (Department of Ecology, 2016). Due to the contaminants present, the clean-up must be addressed under the Washington State Model Toxics Control Act (MTCA), enforced by the Department of Ecology (DOE) (GeoEngineers, 2017). Investigations of the former GP West site found contamination in two distinct areas. To facilitate the speed and cost of cleanup, Ecology and the POB divided the site into two Remedial Action Units (RAU) - the Pulp and Tissue Mill RAU and the Chlor-Alkali RAU (Department of Ecology, 2014). Clean up actions in 2001 and 2003 removed some of the contaminated soils and materials on the Whatcom Waterway (Department of Ecology, 2014). A Cleanup Action Plan (CUAP) was prepared by Ecology and includes plans to further clean up the waterfront. In 2016, the POB and Ecology completed Phase 1 of the CUAP in the Tissue Mill RAU and Whatcom Waterway which included removing highly contaminated sediment and capping the remaining contaminated material with soil and pavement (GeoEngineers, 2017).

Figure 4: Remedial Action Units aerial view within the former GP West site
Source: POB and COB Bellingham Public Partnership, 2013

The GP West site is one of many other clean-up sites along Bellingham Bay and the central waterfront (Dept of Ecology, 2016) as part of a Comprehensive Strategy project plan for the Bay to improve the health of Bellingham Bay (Department of Ecology, 2016). The City of Bellingham (COB) and the POB joined together to create a "Waterfront District" to revitalize the waterfront (Port of Bellingham and City of Bellingham Public Partnership, 2013). The Waterfront District vision has been incorporated into a Waterfront District Subarea Plan, which plans on turning the 237 acres of the former GP West Site into a thriving neighborhood with mixed use development, public access to the water, restored shorelines and open spaces for recreation (Port of Bellingham and City of Bellingham Public Partnership, 2013). The Waterfront District vision includes a plan for WPP, built along Whatcom Waterway, next to the Granary building. The upland part of the WPP is within the Pulp and Tissue Mill RAU (GeoEngineering, 2017). The park itself is scheduled to begin construction winter of 2017, and plans to be open to the public as early as March 2018.

1.2 Actions Defined

Proposed Action

The proposed actions for the development of Waypoint Park include turning 1.67 acres of unoccupied land into a recreational, multi-use attraction within Bellingham's Waterfront District. The construction phase, which began November 2017, includes the removal of several bulkheads, concrete, asphalt, pavement, ripraps and a large amount of contaminated debris. Past GP facilities left sections of the development site and the entire shoreline grossly contaminated. Extensive shoreline dredging and a capping process was completed in order to make the development site habitable and ready for the construction phase. Actions following the cleanup of Whatcom Waterway and the surrounding areas included expanding the beach, restoring the shoreline to a more natural sloped grade, and installing public services and amenities. These recreational amenities include open lawn space, a public playground, public seating, and several pedestrian walkways connecting the newly developed Waterfront District to Bellingham's downtown core. Other project actions include the installation of the Acid Ball, an artistic display that encompasses Bellingham's history, and direct public access to the Whatcom Waterway channel (*Figure 5*).

Figure 5: Recreation and Open Space Plan for Waypoint Park.
Source: City of Bellingham, 2014

Mitigation

The City of Bellingham, the Port of Bellingham and Bellingham's Park and Recreation department have developed several mitigation strategies to help combat the adverse effects of WPP development near the shoreline. These strategies include LID and Best Management Practices (BMP); examples of these techniques include daily contaminated debris removal, on-site spill kits, off-site preparation of materials, and limiting construction activities on dry, windy days to decrease the overall exposure to dust and airborne particulate. This proposal includes construction between the Mean Higher High Water (MHHW) and the Ordinary High Water Mark (OHWM) as well. Due to the nature of the site itself, the anticipated out-of water construction schedule is late summer 2017, and the in-water construction phase is limited to the designated "fish window," which is August 1 to February 15. The goal of these mitigation efforts, put forth by the COB and related agencies, is to eliminate all adverse impacts from the proposed waterfront development.

Additional Mitigation

In addition to the mitigation strategies the COB provided, our team has compiled a list of additional mitigation efforts to further combat the negative, adverse effects that intense waterfront development entails. Additional mitigation efforts include: on-site solar energy collection to reduce to demand on Bellingham's electrical grid; "Thirsty Concrete," a more porous concrete that filters stormwater runoff; an alternative soil composition for the upland park area to promote ecological diversity; soft shoreline stabilization techniques; additional erosion control measures; improved gravel transition on the shoreline for greater fish habitat; and eliminating additional contaminants that arise during the construction phase.

No Action

If the proposed waterfront development via WPP were to fall through the result of this action would restrict overall public access, and leave the 1.67 acres of brownfield vacant and unoccupied. This would entail reverting back to a bulkhead shoreline, which has proven to provide no ecological functions and decreases habitat diversity. Additionally, no paved surfaces or pedestrian walkways would be constructed. Thus, the existing conditions for stormwater runoff would remain the same.

Section 2: The Natural Environment

The Washington State Environmental Policy Act (SEPA) requires an EIA for major projects or actions that will have significant environmental effects. The EIA must address natural and built environmental elements that will be impacted by the proposed project, and provide alternatives and mitigation measures (WAC 197-11-444). Elements of the environment may be combined, or left unaddressed if they will not be significantly impacted by the proposed project (WAC 197-11-444). Section 3, The Natural Environment, addresses earth, air, water, plants, animals. Section 4, The Built Environment, addresses environmental health, noise, land and shoreline use, light and glare, recreation, historic and cultural preservation, transportation, public services and utilities.

2.1 Earth

Existing Conditions

The site is currently graded gravel with little to no slope, adjacent to marine waterfront and abutted against Sehome Hill and the surrounding city landscape. The entire site may be subjected to earthquake shaking and should be considered to have a high seismic risk, with or without redevelopment.

Currently the site contains little to no slope with an abrupt drop off to the marine waterfront. The proposed action will increase this baseline from a 100% slope (drop off) to a maximum of 50%. Since the site resides on a gravel cap over residual contaminated fill, contaminants must be closely monitored. Although the site has been cleaned up, capped with gravel, and predesignated for city use in accordance with the Model Toxics Control Act (MTCA), there are still small amounts of toxic and destabilizing soils in the Whatcom Waterway. Contaminants of potential concern (COPC) that will remain in soil at concentrations exceeding MTCA unrestricted cleanup levels include:

- Petroleum Hydrocarbons
- Dioxins
- Low pH
- Cations (metals)
- Mercury

The entire site is constructed, and well away from the natural shoreline. As a result, erosion should be considered as geologic and hydrologic pressures act on the western banks of the site. This is most important for the proposed action on the waterway, where a sloped beach is to be created and where the tidal influence is the greatest. USGS maps show soils consistent with those in the Whatcom Urban Land Complex (*Table 1*).

Table 1: Existing soil constituents

Whatcom County Area, Washington (WA673)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
171	Urban land	38.1	80.0%
Totals for Area of Interest		**47.6**	**100.0%**

Source: United States Geological Survey, 2017

Proposed Action

The existing cap and gravel are considered impervious surfaces, the proposed action will drastically reduce the amount of impervious surfaces from 100% (45,750 ft^2) to 63% (29,125 ft^2), bringing in an estimated 1,985 cubic yards of topsoil for the upland park (GeoEngineers, 2017). Existing asphalt pavement within the entire park upland, and a large concrete foundation located near mill-northeast corner of the upland will be removed prior to construction of the new beach and upland park areas (*Figure 6*). These structures currently act as an environmental cap on the contaminated soil. Therefore, the upland park will be constructed to function as a new cap across the site. A three to five foot layer of soil with a specialized membrane separating previously contaminated soils from the new topsoil. The remaining surfaces will consist of concrete pathways and gravel walkways which, will be non-pollutant generating. The upland park area will be capped by a combination of imported clean soil, paved pathways, or structure foundations that meet the environmental cap requirements.

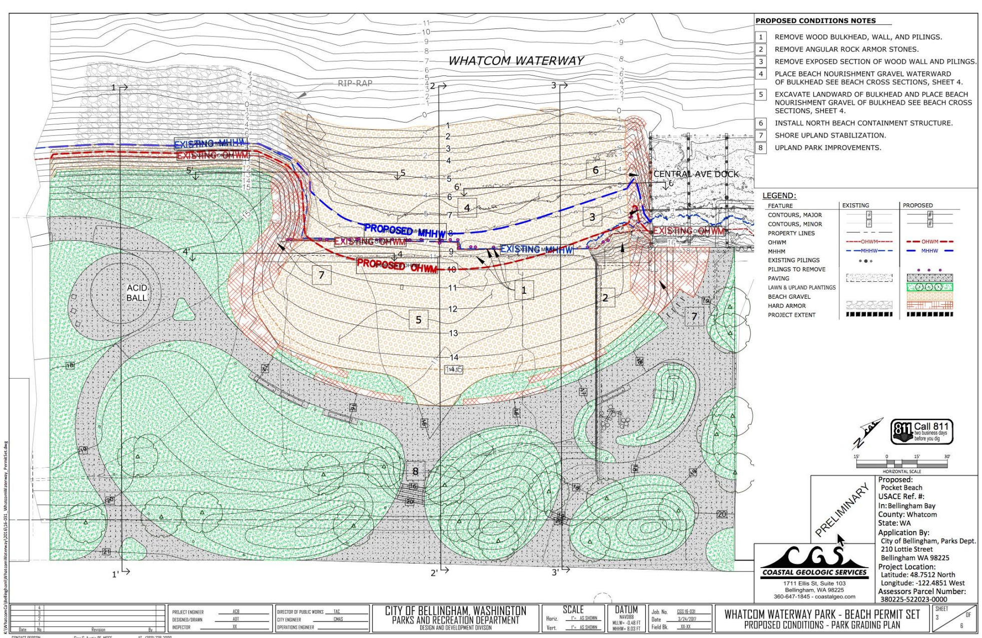


Figure 6: Infill and Soil Material
Source: City of Bellingham, Department of Parks and Recreation, 2017 B

Proposed Mitigation

Catchment areas or retaining walls will be constructed near the base of the areas held back by the bulkheads to temporarily retain surface debris that may slide down the slopes. The contractor will prepare a Spill Prevention, Control and Countermeasures (SPCC) Plan for this project. Any potential spills will be handled and disposed of in a manner that does not contaminate the surrounding area. An emergency spill containment kit will be located for pollution plan for all vehicles and storage. Waste storage areas must be prepared to address prevention and cleanup of accidental spills. To minimize debris, construction-related trash will be cleaned up daily. Waste materials, including any concrete, garbage as well as other debris must be removed from the project site in accordance with disposal regulations. Inspections of erosion control measures will be conducted daily during construction. The site has already been prepared for the construction of the park, so few things need to be done to mitigate the effects on site geology.

Additional Mitigation

Liquefaction is a potential risk that is associated with this region and the sandy loose soils that are present on the site. As a result, it is important to consider future earthquake activities with a magnitude of 7 on the Richter Scale. Increasing the compaction of surface layers using vibrations and driving pilings into the surrounding embankment could provide significant increases in the saturation of water in underlying soil layers (Nadeau, 2016). Dampening would also decrease air spaces within the soils reducing the probability of liquefaction during a severe earthquake event.

A more permeable surface soil blend, rich in woody debris is important to allow for the compaction of soil, while providing organisms such as fungi and plant roots places to grow. The woody topsoil will further create habitat as time progresses and once colonized, act as a filter for small amount of mineral and organic waste generated by precipitation, and park activities. All this without using fertilizers with less nitrogen/phosphorus content and decreasing the amount of runoff pollutants entering Whatcom Waterway.

Actions to mitigate geologic stress on the park could include increasing the geological stability of the site as well as the prevention of future erosion. This could include the addition of large rock jetties and additional materials to provide stabilization from erosion of the Whatcom Waterway channel. Since currents are likely to cause erosion for areas with slopes beyond 20%, armoring the shoreline and abutting deep soil layers with engineered concrete blocks that redirect the flow and steel pilings that reduce liquefaction should be considered for complete site stability (Nadeau, 2016).

No Action

Taking no action to restore the site for any function leaves it in an ecological as well as economical state of decay. Leave the existing non-permeable gravel surfaces approximating 45,750 ft^2 would result in future erosion of the Whatcom Waterway and possible erosion of the environmental cap covering environmental toxins. The proposal site would also be increasingly susceptible to geologic forces such as liquefaction and erosion.

2.2 Air

Existing Conditions

The Environmental Protection Agency regulates air quality through the Clean Air Act (CAA), by establishing National Ambient Air Quality Standards (NAAQS) for some of the most common air pollutants (EPA, 2017 C). The Washington DOE and the Northwest Clean Air Agency (NWCAA) enforce the CAA through NAAQS and ensure compliance of air quality standards (Department of Ecology, 2017 E). The six criteria air pollutant standards established under NAAQS, are monitored by the EPA, Ecology, and the NWCAA through a network of stations continuously measuring air quality (Department of Ecology, 2017 E).

The six criteria air pollutants regulated under NAAQS

- Ozone (O_3)
- Lead (Pb)
- Sulfur dioxide (SO_2)
- Nitrogen dioxide (NO_2)
- Carbon monoxide (CO)
- Particulate Matter 2.5 and 10 (PM 2.5, PM 10)

[Current NAAQS can be found in Appendix C]

Air quality is determined by an Air Quality Index (AQI) to indicate air pollution levels and associated health effects. AQI ranges from 0 to 500, with higher levels associated with more significant health impacts. Levels below 50 imply "Good" conditions, and little risk of health impacts. Levels from 51-100, considered "Moderate," still meet acceptable air quality, but may pose a moderate health risk for people sensitive to air pollution (EPA, 2016). AQI levels are then calculated for the six criteria air pollutants and reported daily by Ecology.

The monitoring station in Bellingham, located at 2412 Yew Street, is around 2.5 miles from the project site (Department of Ecology, 2017 A). Ozone, PM, and NO_2 are the criteria air pollutants of most concern in the Bellingham area. Throughout the months of August and September 2017, the monitoring station at Yew Street reported a range from 2 to 47 for PM (NWCAA, 2017 B). Ozone levels, also reported through the Yew St monitoring station, typically range from 0 to 12, and NO_2 ranges from 0 to 10 on a daily basis (Department of Ecology, 2017 B).

Ozone (EPA, 2017 B)

- Not emitted, but forms when NOx and Volatile Organic Compounds (VOCs) react with sunlight
- Pollutants come from sources such as power plants, industrial operations, vehicles, and industrial products
- Easily transported by wind

Particulate Matter (EPA, 2017 D)

- Measured in two sizes, PM 2.5 and PM 10
- Number refers to the size of the particle, in micrometers

- PM comes from many sources; both directly emitted and as a product of chemical reactions
- Directly emitted from wildfires, road dust, construction, roads
- Power plants, industrial operations, and vehicles create other sources of PM

Nitrogen Oxides (EPA, 2017 A)
- Main source from fuel burning; vehicles, power plants, industrial operations
- Can react to form acid rain and is source of nutrient pollution in waters

Proposed Action
The majority of the emissions from this project come from construction and transportation of materials and hazardous waste. After the project is complete, no adverse impacts to air quality are expected. In fact, due to the installation of native vegetation, and the restored shoreline, there may be reduced air pollutants within the project site.

Proposed construction activities that will generate emissions (GeoEngineers, 2017)
- Removal of asphalt pavement and concrete foundation within upland park
    - And transportation to offsite facility
- Removal of 156 ft long bulkhead, and 12 ft long bulkhead using Vibratory Hammer
    - Estimated 40-45 CY of wood, transported to Subtitle D landfill
- Grading and extension of new beach area by 70 ft
    - 650 CY of soil excavated
    - Material to stay on site, used for grading of upland park unless evidence of Gross Contamination
- Excavation of 95 CY of upland park soil for utility installation
- Grading of upland park, 4850 CY of material

Short term impacts on air quality from the project will come from the onsite emissions of the construction equipment, off site transportation of materials to the project site, and off site transportation of hazardous waste and contaminated soils to permit off site facilities (GeoEngineering, 2017). *Table 2* lists the equipment and machinery needed for construction of the project, while *Table 3* includes emissions of construction equipment.

Table 2: Construction Equipment and Machinery

Equipment to be Used	
Air Compressor	Delivery Trucks
Vibratory Hammer	Concrete Trucks
Excavator	Grader
Crane	Contractor Service Trucks
Dump Truck	Pipe Ramming/Jacking Machine
Backhoe Loader	Saw Cutting

Source*:* GeoEngineering, 2017

Table 3: Average Emissions from Construction Equipment

Assumptions for Combustible Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	1	100	8	90	72000
Diesel Dump Truck	2	300	8	90	432000
Diesel Excavator	1	300	8	15	36000
Diesel Hole Trenchers	1	175	8	15	21000
Diesel Bore/Drill Rigs	1	300	8	15	36000
Diesel Cement & Mortar Mixers	1	300	8	240	576000
Diesel Cranes	1	175	8	240	336000
Diesel Graders	1	300	8	90	216000
Diesel Tractors/Loaders/Backhoes	2	100	8	90	144000
Diesel Bull Dozers	1	300	8	90	216000
Diesel Front End Loaders	1	300	8	90	216000
Diesel Fork Lifts	2	100	8	90	144000
Diesel Generator Set	6	40	8	240	460800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

Source*:* Federal Management Emergency Agency, 2006

In addition to air quality impacts from construction and transportation related emissions, dust and debris, as well as odors should be taken into account. Odors from construction equipment, or from exposing contaminated soils may arise and negatively impact air quality. Dust and debris, produced from site preparation, grading, excavating, transportation, soil loading and unloading, and wind factors, will further negatively impact air quality. Given that the PM AQI levels in Bellingham reach close to 50 some days, this project could increase PM levels into the Moderate AQI category, associated with moderate health risks for people sensitive to air pollution (EPA, 2016).

Wind patterns will also influence emission, odor, and dust impacts on air quality and should be considered. Due to distance between the project site and the monitoring station at Yew St, and wind factors, potential air quality impacts from the project might not be accurately reported.

Proposed Mitigation (GeoEngineers, 2017)

The COB proposes the following mitigation measures to limit the project impacts on air quality

- All debris from construction cleaned up daily
- All waste materials transported off site
- Containment devices such as tarps and scaffolding used to contain debris and soil
- Silt fences set up around excavation areas to reduce erosion and debris
- Routine inspections of TESC performed daily

Additional Mitigation

In addition to the mitigation measures proposed by the COB, further action is recommended to reduce the air quality impacts of the project.

Equipment

The COB should consider Exhaust Emission Control Technologies on the construction equipment to reduce the impact on air quality and lower the project's generated emissions. Diesel Particulate Filters (DPF) can be installed onto equipment to reduce CO and PM emissions by up to 90% (EPA, 2007). Given the history of the site and gross contamination, limiting additional pollution in the project site is recommended. DPFs will also help to mitigate the possibility of the AQI level reaching Moderate, and limiting the amount of citizens exposed to increased levels of air pollution. As an alternative to installing DPFs, upg.rading engine parts can serve a similar function and depending on the original vehicle, can reduce emissions anywhere from 25 to 75% (EPA, 2007). Fuels associated with fewer emissions should be considered as an additional mitigation measure. Biodiesel or ultra-low Sulfur Diesel are recommended fuel strategies by the EPA (2007). Benefits of these alternative fuel strategies include reduced PM and CO emissions, and improved engine function (EPA, 2007). Maintenance repairs and equipment inspections should occur routinely in order to improve efficiency and limit air pollution (EPA, 2007).

Transportation

Limiting the transportation required for the construction of WPP can further mitigate emissions. Using local sources of topsoils, plants, beach gravel, and fill and grade material will limit the transportation related emissions from the project. Additionally, using the closest available waste facilities can further reduce the emissions from transportation. However waste material should be transported off site daily, regardless of emissions generated, so as to not further contaminate the air, water or soil.

Dust and debris

Construction vehicles should operate strictly on paved roads when possible to reduce dust and debris. Enforcement of slow speed limits can also help to limit dust and debris. Because the COB plans to work during periods of drier weather, (GeoEngineers, 2017) limiting construction on windy days could further assist in limiting dust and debris. Soils will be exposed throughout the excavation process (GeoEngineers, 2017). To prevent erosion and dust control, the use of bioseparation textiles are recommended in replacement of the non-woven geo-separation textiles. Placed on top of exposed soils, bioseparation textiles eliminate dust and debris during construction and also assist with seeding and filtration.

No Action

The impacts of the no action alternative leave the site inaccessible to the public, with 45,750 ft of impervious surface area. No construction or transportation would occur, and therefore no emissions would be generated.

2.3 Water

Existing Conditions

Whatcom Creek is adjacent to the proposed site and empties through the Whatcom Waterway and into Bellingham Bay. Some of the proposed beach lies within this delta and adjacent to these critical ordinance areas. Therefore certain water quality parameters are being thoroughly investigated as to identify any reactions to the system during and after construction. Whatcom Creek and its tributaries rarely meet all of the water quality criteria set by the state (Department of Ecology Bellingham Field Office, 2017).

Fecal Coliform Bacteria

Native to the digestive tracts of warm-blooded animals, fecal coliforms generally do not cause illnesses themselves, but is a good indication that other illness causing biota could be present within the system. Fecal Coliform levels were reported to be 112 (CFU/100 ml) within the Whatcom Waterway and does not meet the state standards for fecal coliform bacteria (*Figure 7*). The COB and DOE are now working cooperatively under a TMDL plan to reduce fecal coliform bacteria in Whatcom Creek (Hood, 2006).

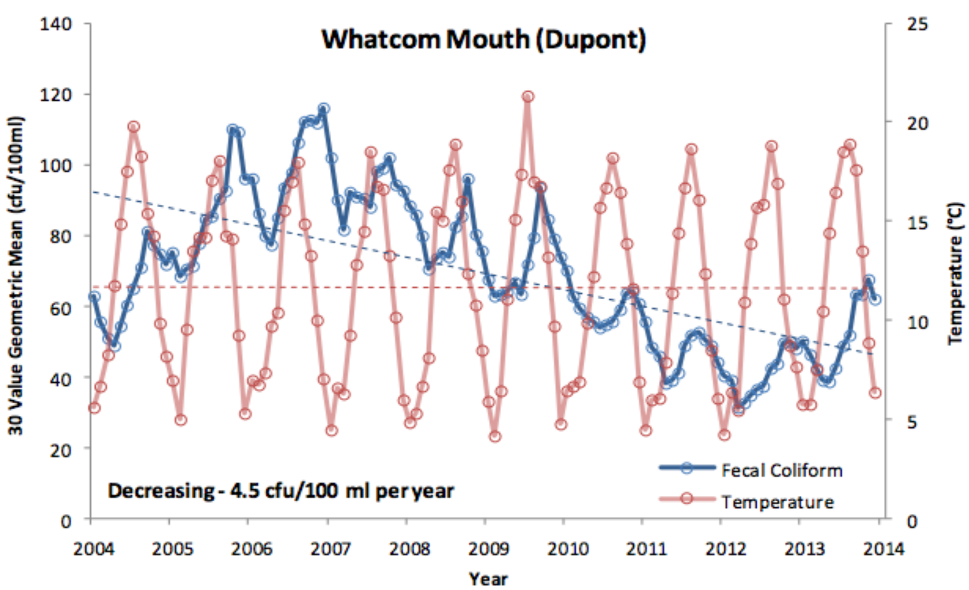


Figure 7: Fecal coliform bacteria as they relate to temperature at Whatcom Creek from 2004-2013. Source: Department of Ecology, State of Washington, 2017 A

Temperature

Temperature is important for many biological functions for both terrestrial and aquatic biota. Many of the PNW fish and aquatic invertebrates need cooler temperatures to survive and reproduce. Temperature is variable at different areas along the creek, but there has been an overall increase in the annual temperatures the last few years that start to threaten the biotic system (*Figure 8*).

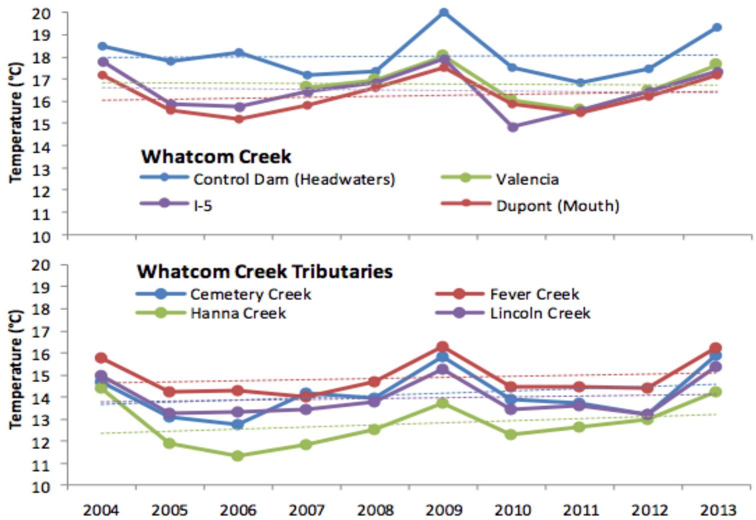


Figure 8: Whatcom Creek Annual Temperature Trends
Source: Department of Ecology Bellingham Field Office, 2006

Dissolved Oxygen

Organisms in streams need oxygen to survive. If the amount of oxygen dissolved in water. If dissolved oxygen becomes too low there may not enough oxygen to sustain aquatic life. Many of our native fish species need at least 7.5 mg of dissolved oxygen per liter. Whatcom creek has reported to have moderate problems with Dissolved oxygen with reports showing that the Creek often dips below the target ranges adopted by the DOE at 8 mg/L. Red lines indicate the lowest dissolved oxygen levels allowed by the different surface water classes (AA, A, and B) (*Figure 9*).

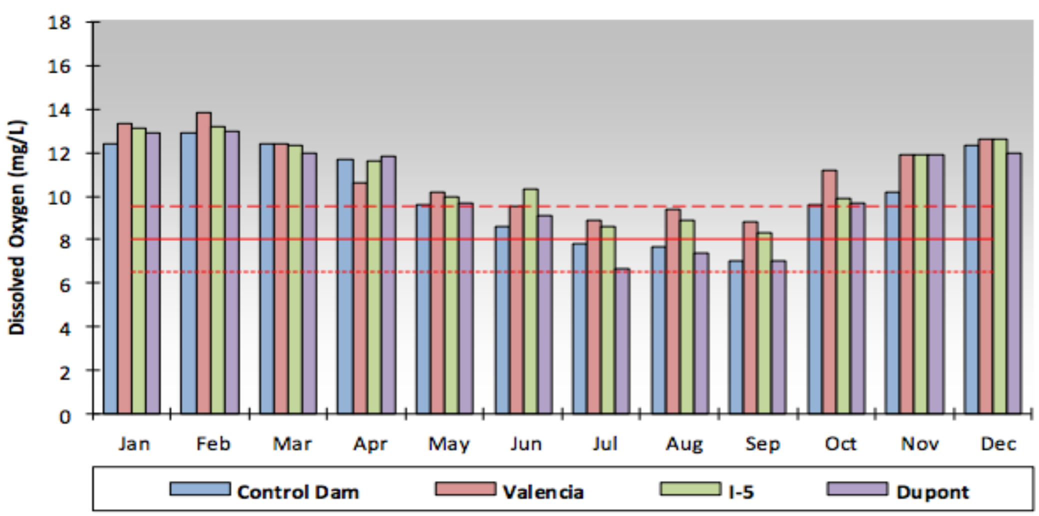


Figure 9: Average dissolved oxygen values for Whatcom Creek and its tributaries in 2013
Source: Department of Ecology Bellingham Field Office, 2006

Ph

Most living things in water need a pH that is close to neutral (around 7.0). Natural water usually has a pH between 6.5 and 8.0. Changes in pH, often an indication of pollutants, can seriously affect the health and diversity of aquatic life in streams. Whatcom Creek and its tributaries generally fall within the range prescribed by Ecology for all classes of freshwater bodies, 6.5 to 8.5 (Department of Ecology Bellingham Field Office, 2017).

Turbidity

The measurement of suspended materials in water. High turbidity is usually caused by an increase in insoluble particulate matter. This can be caused by streamside or bank erosion and can clog fish gills, suffocate living things, cover spawning beds, and destroy habitat. Salmon growth is reduced and gill tissue damaged after only 5 to 10 days of exposure to a turbidity level of 25 NTU (Nephelometric Turbidity Unit). The Removal of streamside trees and other vegetation can increase erosion. Similarly to temperature, turbidity is variable throughout the year, many times being highly turbid, showing increases well beyond the ten year mean. However, there is no apparent upward trend in the data showing an increase in turbidity through time (*Figure 10*).

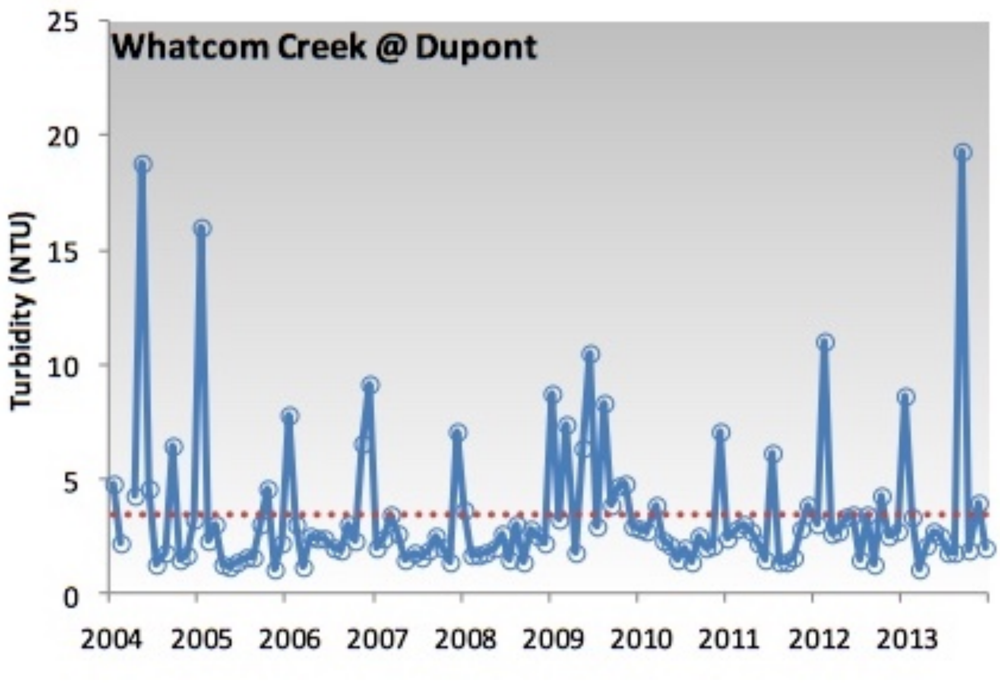


Figure 10: Average turbidity (NTU) values for Whatcom waterway with red lines representing a ten year mean.

Source: Department of Ecology Bellingham Field Office, 2006

Conductivity

The measurement water's ability to conduct electricity and is directly related to the total dissolved ions in the water. Conductivity can be used as an overall indication of water quality. Higher conductivities may be a sign of contamination in the water. Annual reports of Whatcom Creek has shown that conductivity has been stable, showing "no appreciable differences over the last decade" (Department of Ecology Bellingham Field Office, 2017).

Stream Flow
There are limited surface water influence on the site, with the only surface waters coming from precipitation. These currently lead into the Whatcom Creek and contribute to the annual streamflow, noting that the greatest time of streamflow are in winter months and should be considered when undergoing construction within the waterway area (*Figure 11*).

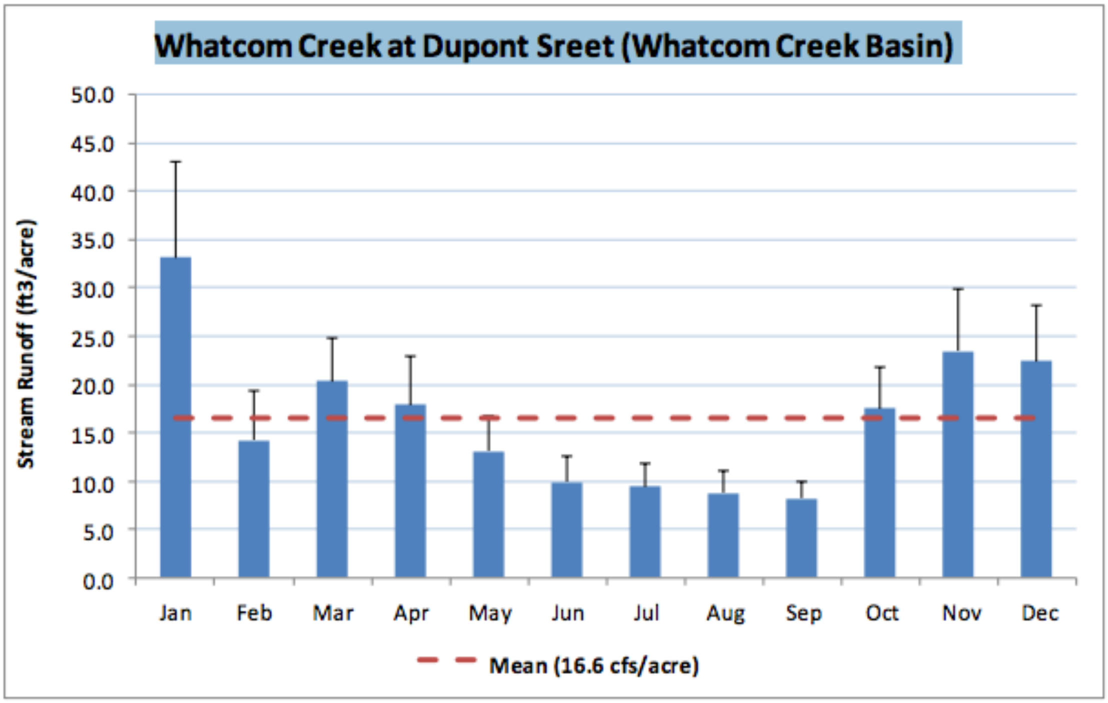


Figure 11: Average streamflow values for Whatcom waterway with red lines representing a ten year mean.
Source: Department of Ecology Bellingham Field Office, 2006

Groundwater should not be affected by the proposed action in a significant way. Impermeable surfaces have been limited to the concrete paths and northern end of the site where the present concrete lot will stay. These surfaces are not likely to produce any more surface runoff than what is currently being produced, thus deeper soil layers should not absorb any additional input or be changed in any significant way.

Proposed Action
Surface waters will not be influenced dramatically during and after the proposed action. In this way, steps will be needed to ensure the suitable habitat for salmon and other marine species. The construction will be adding to the base layers of gravel, and so there should be limited discharge and increased soil permeability and retention. Possible increases to turbidity in the waterway is expected, yet only during the beach demolition and construction. Surface flows from impervious surfaces will be directed into the Bellingham stormwater system. Drainage system placement has been highly strategized and will drain impermeable areas where there might be increased surface flows. Stormwater will be managed via a trench drain towards the beach end of the park as well as drains that extend adjacent to Whatcom

Waterway via a new stormwater infrastructure included with the development of Granary Avenue and Laurel Street (*Figure 12*).

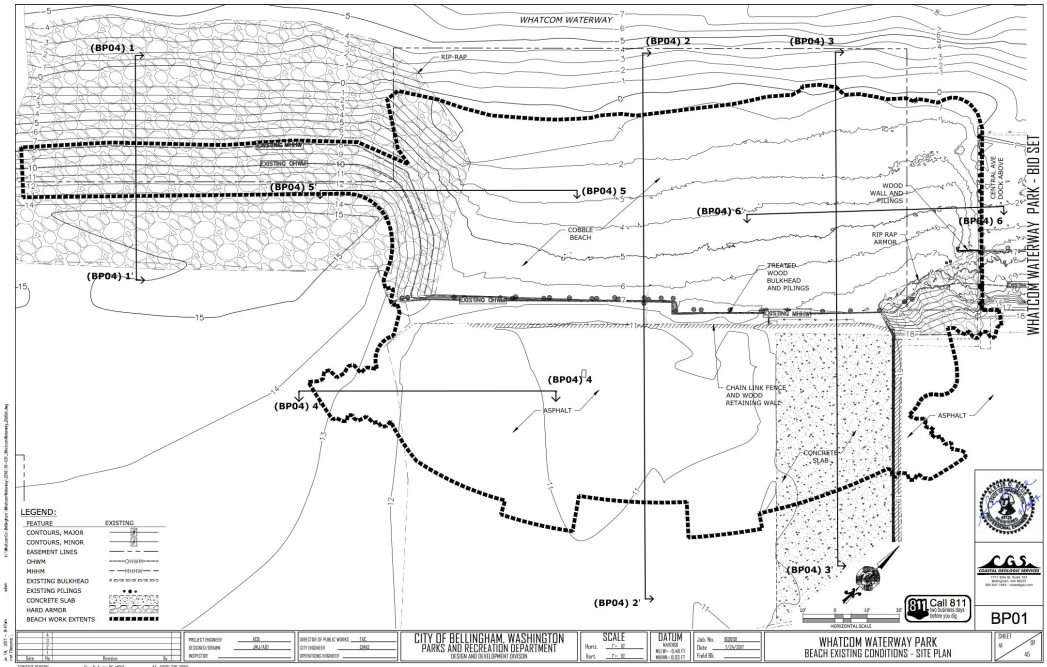


Figure 12: Beach existing conditions
Source: Austin, G. and Bryson, L., 2017

Mitigation

The project may start immediately and must be completed by February 15th, 2020. Work below the ordinary high water line occurs only between August 1st through December 31st as well as January 1st through February 15th of any given year. This will help protect from equipment spills and other construction hazards and will reduce the need for costly specialized equipment.

Potential impact to water quality, such as spilling hazardous materials or petroleum-based products associated with construction machinery, can be avoided and controlled through proper implementation of waste barriers and are not expected to result in negative impacts on the environment. Temporary erosion, sediment, and dust controls will be installed to prevent impacts of sediments and construction debris on water quality. Equipment must be checked daily for leaks and complete any required repairs before using the equipment in or near the water. Additional use of low intensity discharge features will be installed to encourage on site filtration.

Other BMPs recommended by GeoEngineers (2017) include

- Minimizing areas to exposure from construction.
- Scheduling earthwork during drier times of the year.
- Routing surface water through temporary drainage channels around and away from disturbed soils or exposed slopes.

- Using silt fences, temporary sedimentation ponds, or other suitable sedimentation control devices to collect and retain possible eroded material.
- Covering exposed soil stockpiles and exposed slopes with plastic sheeting, as appropriate.
- Using straw mulch and erosion control matting to stabilize graded areas and reduce erosion and runoff impacts to any sloped areas, where appropriate.
- Intercepting and draining water from any surface seeps, if encountered.
- Incorporating contract provisions allowing temporary cessation of work under certain, limited circumstances, if weather conditions warrant

Alternative Mitigation

Particle deposition within Whatcom Waterway could be greatly affected by the excavation and construction of the beach, which may result in increased turbidity, where particles get lifted into suspension and out to Bellingham Bay. It may be possible to decrease this input by creating settling ponds in which to work in, as not to disrupt seasonal variation in turbidity and nutrient loading. However, it is likely to be an engineering challenge on its own and would not come without project delays. Yet once implemented successfully, the practice could be expanded to other sites.

Permeable concrete should be considered for increased permeability of the walkways. This porous concrete allows for water and other liquids to pass through and into the ground. "Thirsty concrete" is a technology that has been well developed and implemented in many parks, homes and businesses. While reducing surface flows, this concrete will also help to distribute dissolved solids and other inputs into the ground, rather than into a stormwater system or Whatcom waterway (Weller, 2016).

Establish protocol to manage BMPs, as "Poorly maintained BMPs can result in significant quantities of sediment being discharged to storm drains" and negating the work to curtail sediment inputs into Whatcom waterway (EPA, 2011). Checking specifically for flaws in surface flows capture during the fall, winter, and spring months everyday will ensure that engineered mitigation efforts will perform expectedly. These should base around times where Whatcom Creek exceeds the yearly mean for streamflow (*Figure 12*).

The National Pollutant Discharge Elimination System (NPDES) also proposes BMPs for surface runoff. Check Dams are small dam walls that can be temporary placements to prevent sediment erosion and surface flow runoff in critical areas (CA). These dams can protect the areas around the waterway by acting as force absorbing obstacles to slow streamflow and prevent sediment loading from construction. Grass lined channels can also be used to absorb water and particulate matter, using these inputs as food and limiting the amount that enters the stream. These areas also act like a sponge for chemicals if there were to be an accidental spill during construction. A cofferdam could be an extreme method to clear the bulkhead of water. In this case the dam would not move the river, as there are so little places for it to go. Rather, it would create a dry place in the waterway for removal of the bulkhead and curbing the need for excavators to be in any amount of water (EPA, 2011).

No Action

If no action is taken, then nearly all exposed surface soils will remain impermeable. This causes further erosion of the southern bank of Whatcom Waterway as well as allows for anthropogenic inputs from surface flows and threatening all water quality parameters.

2.4 Plants

Existing Conditions

Washington State Department of Natural Resources (DNR) shows no sensitive plant records in the vicinity of the project (Department of Natural Resources, 2017). Dominant flora include invasive species such as Himalayan blackberry (*Rubus armeniacus*) and old man's beard (*Clematis vitalba*). Other species in proximity to the site include: Bindweed (*Convolvulus arvensis)* , English Ivy (*Hedera helix)*, Scotch Broom (*Cytisus scoparius),* and Canadian Thistle (*Cirsium arvense*). However there is little suitable habitat for the introduction of these species on to our site in its current condition.

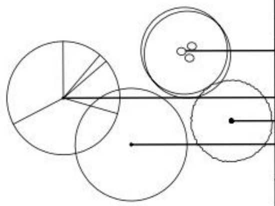
Marine Species consist of Zostera marina in the Whatcom waterway, there is also an absence of Phyllospadix species as well as Zostera japonica (Gaeckle et al., 2009). Green algae as well as mixed species of other algal taxa are consistently found within the Whatcom Waterway (*Figure 13*).

Figure 13: Zostera marina in the Whatcom waterway complex from 2008
Source: Department of Natural Resources, State of Washington, 2017

Proposed Action

The proposal seeks to increase plant biodiversity and habitat via constructed soils, as well as increase species diversity. An increase in native plants and decrease in invasive species should be seen after construction, with the added benefit of prolonged habitat assurance. Native species have been chosen to recreate and establish a habitat for terrestrial plants and will help to stem surface flows and help to shield the site and the new district from nearshore gusts (*Figure 14, 15*).

PLANT SCHEDULE



SYMBOL	KEY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QTY.
		TREES				
	AMGR	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	SERVICEBERRY	2" CAL. MULTI STEM OPEN HABIT	AS SHOWN	25
	CABE	GLEDITSIA TRIACANTHOS 'SKYCOLE'	SKYLINE HONEYLOCUST	3" CAL.	AS SHOWN	5
	MALO	STEWARTIA PSEUDOCAMELLIA	JAPANESE STEWARTIA	3" CAL.	AS SHOWN	4
	ARME	ARBUTUS MENZIESII	MADRONE	1 GAL. OR BAREROOT	AS SHOWN	4
		SHRUBS				
	CEVE	CEANOTHUS VELUTINUS	SNOWBRUSH	#2	30" O.C.	73
	COSE	CORNUS SERICEA 'KELSEYI'	KELSEY'S DWARF RED OSIER	#2	24" O.C.	281
	GASH	GAULTHERIA SHALLON	SALAL	#1	24" O.C.	941
	HODI	HOLODISCUS DISCOLOR	OCEAN SPRAY	#3	6' O.C.	34
	SEAU	SESLERIA AUTUMNALIS	AUTUMN MOOR GRASS	#1	18" O.C.	608
	SPBU	SPIRAEA X BUMALDA 'GOLDFLAME'	GOLDFLAME SPIREA	#1	24" O.C.	614
	SASC	SALIX SCOULERIANA	SCOULERS WILLOW	#3	10' O.C.	14
	SYAL	SYMPHORICARPOS ALBUS	SNOWBERRY	#2	4' O.C.	63
	VAOV	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	#3	24" O.C.	299

Figure 14: Proposed plant species list
Source: Austin, G. and Bryson, L., 2017

The project also calls for the maximum number of individuals for all shoreline and areas abutting shorelines (Austin, G. and Bryson, L., 2017). Placing debris alongside the shores will ensure that marine plant species will have places where the streamflow is stemmed and habitable.

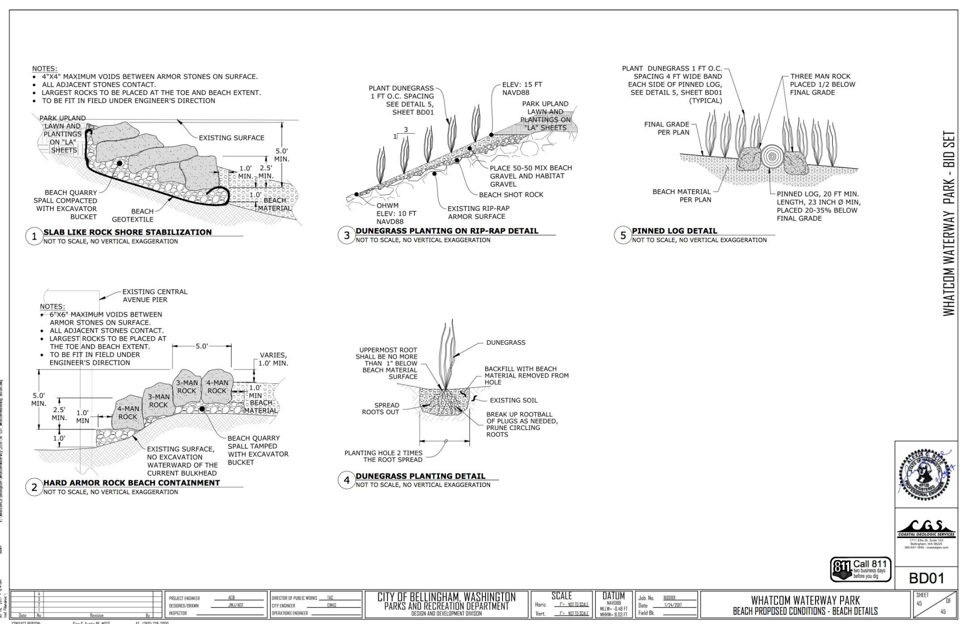


Figure 15: Shoreline planting details
Source: Austin, G. and Bryson, L., 2017

Mitigation

Habitat displacement and alteration will be temporary as there is only displacement of non-native species and little effect on native marine grasses. Once the proposed action takes place, measures will be needed to ensure the site does not host invasive species. To accomplish this goal, the site must be seeded **or** planted with appropriate vegetation on exposed areas as soon as earthwork is completed. Trees and shrubs will be planted in a way that minimizes the chance for rupture of the environmental cap while also having strong roots to survive winter storms (*Figure 16*). Since there are minimal species inhabiting the upland areas of the site, there is little need for mitigating or stemming the anthropogenic effects on flora currently at the site (GeoEngineers, 2017).

For future flora, debris placed in the waterway will allow for plant species to be properly anchored to the ground. In these areas recreational boating will be limited to stem any impacts to the ecological function of the shoreline. Yet there is not expected to be many impacts from many forms of recreational water activities such as swimming and tubing as water and air temperature are usually too cold for recreational swimming activities (Austin, G. and Bryson, L., 2017).

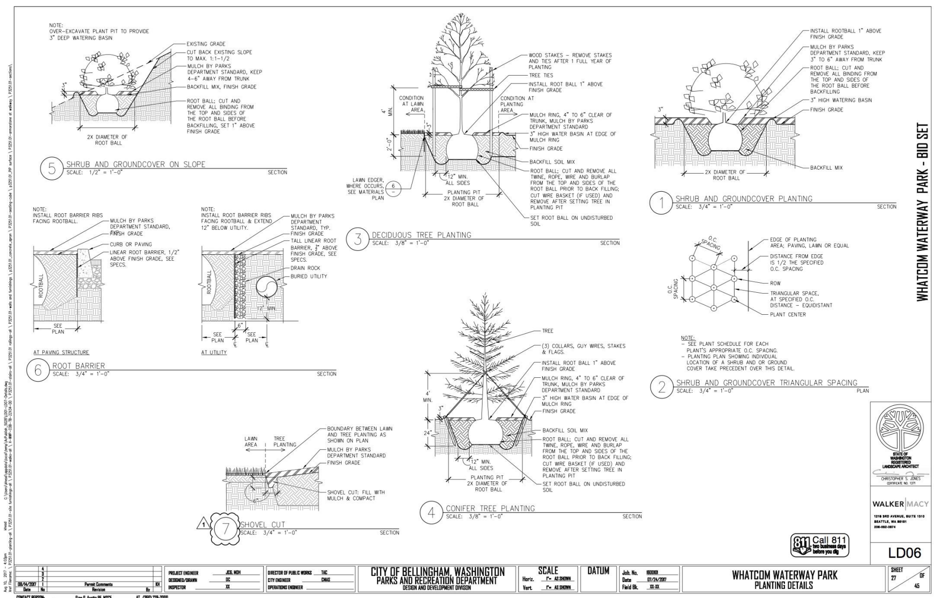


Figure 16: Trees and Shrubs planting details
Source: Austin, G. and Bryson, L., 2017

Additional Mitigation

There are few species proposed that are especially sensitive to invasive European species such as the American Dunegrass (*Leymus mollis*), which is expected to border the eastern end of the park. This species is often outcompeted by invasive grasses such as European Marram Grass (*Ammophila arenaria)* and species of Common Cordgrass (*Spartina angelica).* Monitoring for these species will ensure the positive health of the macroinvertebrates, as many invasive plant species are not as nutritious as native grasses. A decreased population of macroinvertebrates will further inhibit salmon from recovering in Whatcom County (Department of Ecology, State of Washington, 2017 C).

Coniferous trees that do well against fungal pathogens, like many of the coastal pine species. Coastal Pine trees are also suitable for the rainy, cold and windy weather in Bellingham and have proven effective in other parks throughout Bellingham. They are often resistant to many fungal pathogens and are native along the coastal regions of the PNW. This species also has semi-shallow roots that will not penetrate through the environmental cap liner. Trees could also be knotted at the root mass to encourage shallow root growth while encouraging lateral runners that absorb additional nutrient loads from the park. Checking seasonally for invasive species is important for the continual health of the park species that have been planted. When non-native species are observed, there should be immediate efforts to decrease individuals, propagules, and habitat for those species. Replanting these areas or covering them with a thick layer of wood chips could help stem the recovery of these unwanted plants.

Photosynthetic algae such as cyanobacteria (Green Algae) and Rhodophyta (Red Algae) should be monitored as an indicator of water quality. Many of these species are specialized in habitat and act as bioindicators, not just showing that there is an indication of poor water quality, but relate directly to specific environmental conditions and nutrient loading.

No Action

The no action alternative will leave the proposed site with a lack of suitable habitat for plant growth. Through time the site is thought to increasingly provide habitat to hearty invasive species such as Blackberry and Scotch Broom. These species will more than likely, establish a colony that enables for propagules to spread to other nearby parks and city residences. Increase of invasive species on the upland site are imminent. These would eventually start to choke out Whatcom waterway and the bulkhead section causing problems for fish, marine plants and those feed on them. In this way, marine species are not thought to be greatly affected if the proposed action does not take place. Yet, it is impossible to say what would happen over time as the disturbed areas would likely host and increasing number of plant species, producing multiple variable effects on the ecosystem.

2.5 Animals

Existing Conditions

No terrestrial critical habitat or endangered species are found within the project site, however several marine endangered species and habitats are found (GeoEngineers, 2017). Endangered species within the vicinity of WPP include Puget Sound Chinook Salmon, Puget Sound Steelhead, Bull Trout, Yellow Rockfish, Bocaccio Rockfish and the Southern Resident Killer Whale (*Table 4*). The freshwater species are within the jurisdiction of the US and the marine species fall under NOAA's jurisdiction. Bellingham Bay and estuary habitat, about 0.6 miles west of WPP, at the mouth of Whatcom Creek, are part of a migratory corridor for salmonid species and are used by salmonids for rearing, spawning and habitat. The Caspian tern breeding territory is within 0.3 miles of the project site. Groundfish species that may occur at the project site include Starry Flounder (*Platichthys stellatus*), English sole (*Parophrys vetulus*) and Dover sole (*Microstomus pacificus*) (GeoEngineers, 2017). Nearshore marine mammals that occur in the area are the endangered Killer Whale (*Orcinus orca)* and Harbor Seal *(Phoca vitulina)*. Southern Resident killer whales are highly unlikely to occur in the project vicinity during the in-water work period, and so there is no need to investigate mitigation efforts *(*GeoEngineers, 2017*)*.

Table 4: List of Endangered Species Within Project Vicinity

Common Name	Scientific Name	Jurisdiction	Status	Critical Habitat
Bull Trout	*Salvelinus confluentus*	USFWS	Threatened	Designated[1]
Puget Sound Chinook Salmon	*Oncorhynchus tshawyscha*	NOAA Fisheries	Threatened	Designated[1]
Puget Sound Steelhead	*Oncorhynchus mykiss*	NOAA Fisheries	Threatened	Designated[1]
Southern Resident Killer Whale	*Orcinus orca*	NOAA Fisheries	Endangered	Designated[1]
Bocaccio Rockfish	*Sebastes paucispinis*	NOAA Fisheries	Endangered	Designated[1]
Yelloweye Rockfish	*Sebastes ruberrimus*	NOAA Fisheries	Threatened	Designated[1]

Notes:

[1] Includes nearshore marine areas in Puget Sound.

Source: GeoEngineers, 2017

The project site resides along the Pacific Migratory Flyway and a resting stop for a number of avian species (PFC, 2017) (GeoEngineers, 2017). Common non-migratory species such as Seagulls (*Larus sp.*) visit the site frequently with occasional Great Blue Heron (*Ardea herodias*) and Bald Eagles (*Haliaeetus leucocephalus)* (Martin-Yanny, E. 1992). According to the Whatcom County Tourist Agency there are a number of species of nearshore birds occurring within proximity to the project area including but not limited to Harlequin Ducks, Double-crested and Pelagic Cormorants, and Glaucous-winged Gulls. Common Loons and Mew Gulls are examples of species which inhabit the site during winter months (Bellingham Whatcom County Tourism, 2017).

Terrestrial mammals known to occur on the site are the occasional Black Tailed Deer (*Odocoileus hemionus)* as well as Coyote (*Canis latrans)*. Invasive Eastern Grey Squirrels (*Sciurus carolinensis*) are another common park visitor however these can sometimes cause problems and populations should be monitored to ensure no public health hazards arise.

There are currently no macro fungi inhabiting the site in numbers. However, habitat is considered good for the occurrence of disturbance mushrooms in the Inky Cap Family, which has been known to produce fruiting bodies piercing through asphalt. Despite this, they are not a threat to park operations, nor any new lasting concrete or asphalt pavements.

Proposed Action

The construction during the project will adversely affect both marine and terrestrial organisms. Noise pollution and well as habitat displacement will occur as a result of the upland park excavation and beach enhancement (GeoEngineers, 2017). Project construction may pose a threat to the Harbor Seal habitat, as the once mostly peaceful flat area will now have heavy human involvement. Light, glare, and noise play a heavy role in an organism's ability to hunt and reproduce.

As a result, the proposed actions will increase natural shoreline habitat and thus food and shelter for all avian species. Freshwater and marine invertebrates are expected to outperform previous years and increase in populations due to the increased bioavailability of the natural grass species for native estuary based invertebrates. An increase in trees brush and grass, and well as deconstruction of the beach areas will increase habitat for many species of insects, birds, and other small organisms.. There will also be an increase in soil biota such as earthworms and nematodes that will help to enrich and ensure the stability of soil nutrients.

Proposed Mitigation

To ensure habitat rehabilitation, wooden pilings will be incorporated into the waterway to create resting areas and refuge. The project was determined to have no effect on designated critical habitat for Chinook

Salmon or other Pacific Salmon. Conservation measures will ensure that any negative effects on salmon, or groundfish habitat are offset by ensuring habitat restoration and rehabilitation. Restoration of the shoreline will have additional impacts on fish species and birds that rely on the present grasses for food or shelter. In this case, there should be mitigation efforts to curb habitat loss during construction, and before planting of new grasses begins.

The proposal will have major changes to plant species and in doing so, increases the total available food for migratory birds and insects. However, development of the upland park will likely result in less resting, as there are expected to be a 100% increase in the anthropogenic activity when compared with previous years. A positive characteristic of the park is the urban location, and that existing species are already conditioned for the city landscape and are experienced with people.

GeoEngineers (2017) recommends the following guidelines for BMP's to ensure minimal disturbance:

- The contractor will develop and implement a Temporary Erosion and Sediment Control (TESC) Plan and a Source Control Plan.
- The contractor will use the best management practices (BMPs) to control sediments from all vegetation removal or ground disturbing activities.
- The contractor shall prepare a Spill Prevention, Control and Countermeasures (SPCC) Plan prior to beginning construction.
- The SPCC Plan shall identify the appropriate spill containment materials, which will be available at the project site at all times.
- Construction equipment used for project activities will be operated from existing approach roads and structures above the MHW. Construction equipment will not enter below MHHW.
- All work below the MHW level will be conducted during the approved work windows for fish species that may occur in the project area.
- Construction activity and noise generated during the project will not exceed that of background conditions.
- Addition of gravel and other larger rocks to allow for salmonid habitat.
- All in-water work will be performed according to the requirements and conditions of the Section 10 permit and hydraulic project approval (HPA) issued by the Washington Department of Fish and Wildlife (WDFW).
- All equipment used for construction activities will be cleaned and inspected prior to arriving at the project site to ensure no potentially hazardous materials are exposed, no leaks are present, and the equipment is functioning properly.

There are no efforts to mitigate the project using fungi, nor mitigate the effects of park development on fungal species.

Additional Mitigation

Surface flows from construction create turbid waters, leading to increased temperature and decreased oxygen. A rise in temperature due to decreased vegetation and increased turbidity are a reason for salmonid eggs to suffocate. For instance, the temperature where Sockeye salmon eggs will not survive above about 13^{o}C (64^{o}F) (City of Bellingham, Department of Public Works Laboratory, 2013). Thus it remains important stem surface flows, and actively filter turbid waters. Inoculated straw bales of Oyster mushrooms (*Pleurotus ostreatus*) would allow for filtering and bioaccumulation of chemical residuals from construction. Saprobic Oyster mushrooms would also be optimal for protecting seeded areas in small areas of the park, providing nutrients to seeded soils and the need for chemical nutrients. Additional straw should be brought into to limit the amount of grass seed lost to terrestrial animals during planting.

Additional deconstruction of the concrete walls of the waterway could increase the project area and allow for additional wetland mudflats for migrating birds. Putting a natural shore within the waterway would be beneficial for all aspects of marine life. More marine grass will be able to grow and create dynamic salmonid habitat as well as provide habitat for avian and insect species. Increasing any of the marine shoreline habitats is thought to be the greatest way to increase the positive effects of the project on all biota.

Restricting public access to shoreline will provide better conditions for aquatic animals and is important for keeping anthropogenic inputs to a minimum. Disturbance is a large factor in an ecosystem's ability to function. In this way, lessening human impact is the most powerful tool for ensuring the survival and reproduction of planted flora and protection of the constructed ecosystem. Further restricting water recreation could ensure that marine and shoreline organisms are not disturbed. For these reasons it remains pertinent to not operate any construction equipment on the beach during fish spawning seasons.

Fungal pathogens should also be considered during the ongoing operations well after construction to ensure the health of tree species. These could include species in the genus *Armillaria* (Honey Mushrooms) that are parasitic to most deciduous and some coniferous trees. Once a fungal pathogen enters the ecological system, it is incredibly hard to mitigate the effects. If caught early, many of the pathogens are able to be excised.

No Action

Keeping the site undeveloped will continue to have a negative effect on the ecological stability of mammal, fish, and insect species as well including their habitat. Creosote pilings will continue to decay, releasing toxins into Bellingham Bay where bioaccumulation will occur up the food chain. The increase in plants will also increase animal activity for some time until the site is completely choked by invasive thick Blackberry and Scotch Broom, reducing habitable areas for terrestrial species.

Section 3: The Built Environment

3.1 Environmental Health

Existing Conditions

Fill soils at the Waypoint Park site contain hydrocarbons and heavy metals remaining from the old GP Pulp and Paper Plant pollution. As shown in *Figure 17*, soils have been capped by the completed park surfacing in accordance with Ecology's CUAP requirements for the RAU. During site cleanup, sheet pile walls were implemented to prevent contaminated groundwater from entering the bay, asphalt and debris were removed from beach, and creosote-treated timber was removed from Whatcom Waterway (Coastal Geologic Services [2017], Sundin [2017]). Hydrocarbons, dioxins, low pH, and metals remain above acceptable levels by Bellingham Standards. The remaining chemicals do not pose a problem for leaching, only contact and ingestion.

Proposed Action

Construction of Waypoint Park involves environmentally beneficial projects including excavation of contaminated soils, capping sediment, reshaping, and grading the shoreline to to help the land heal from past uses. Once cleanup is complete, pedestrian and bicycle paths will be added along with green space, playground equipment, art, and other amenities that may disturb the environment the site resides on. Vegetation will be carefully placed to combat destruction and aid in runoff. Fuel and petroleum products will be used by machinery during construction. These chemicals are not expected to spill but oil absorbent materials will be on site if needed. Overall, site cleanup is expected to improve environmental health. This will be done by reshaping and sloping the shoreline to mitigate tidal floodwater attenuation, and improve nutrient filtering and recycling by connecting intertidal and upland shoreline areas (Aspect Consulting, 2017).

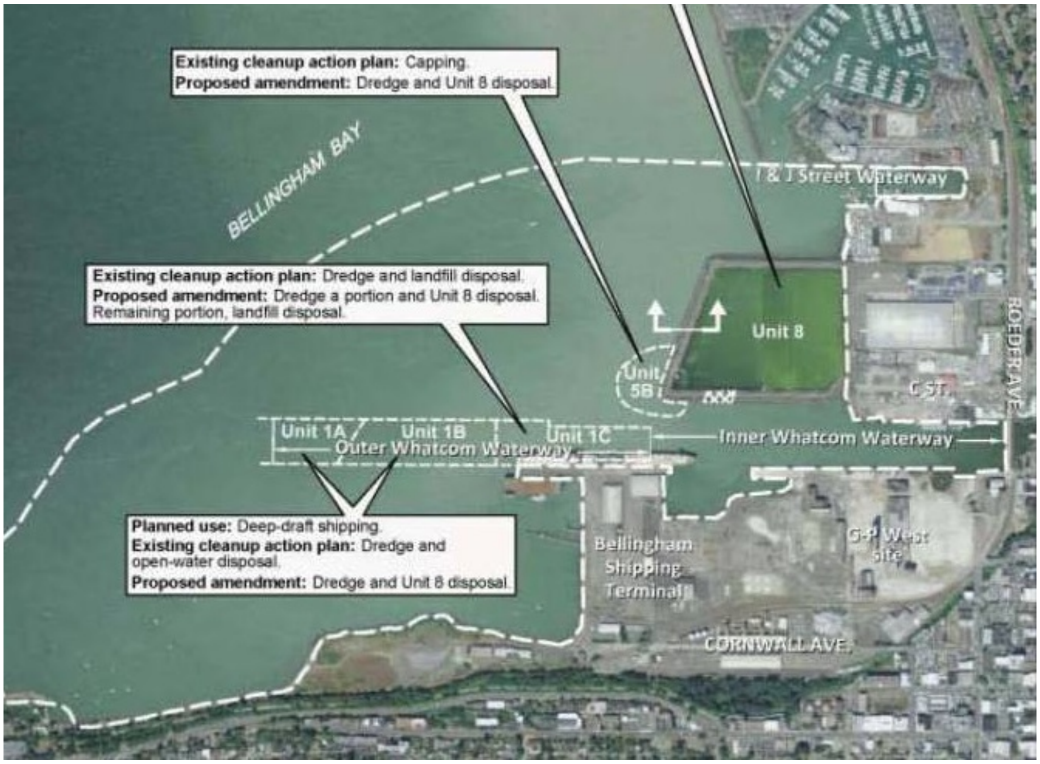


Figure 17: Cleanup measures for Whatcom Waterway
Source: McShane, 2011

Mitigation

Oil absorbent materials and an emergency spill containment kit will be kept on site in case of leaks and spills. Daily, appropriate waste management will be conducted for debris such as concrete, waste, and fuels that correspond to (Coastal Geologic Services, 2017; Sundin, 2017). Erosion control inspections and daily equipment checks will be completed to ensure park construction is not resulting in a net-loss of ecological function (GeoEngineers, 2017). Site preparation and activities such as excavation and grading will only be done in dry weather to prevent possibilities of leaching chemicals. The removal of creosote-treated bulkhead pilings that currently separate the in-water and upland areas will decrease the amount of chemicals on site, and an in-water sediment cap will be conserved by 1-2 feet of clean beach gravel (GeoEngineers, 2017), thus protecting hazardous and toxic materials from seeping into new sediment and the bay (Austin, 2017a). Plants will be chosen and placed strategically to provide adequate shade conditions to aid marine habitat. Lead paint will be removed from the acid ball art piece by the contractors and skilled professionals, leaving only metal visible in order to protect the health of park visitors and the environment (GeoEngineers, 2017).

Additional Mitigation

Use a polymer made from sulfur and limonene, a substance found on the skin of citrus fruits to separate mercury and heavy metals from sediment and water. Upon exposure to contaminants, a chromogenic or color changing effect will occur in order to easily remove contaminated sediment (Jeffrey, 2015). After beach excavation, exposed contaminated soil from the upland park should be transport it to a landfill instead of reusing it to fill and grade the park.

No Action

If no action is taken to along the Whatcom Waterway, contaminated sediment will remain along the shoreline and in the bay. If this sediment remains, ecological function will continue to decline, accumulating additional chemicals and settling deeper into the Earth, thus resulting in detrimental deterioration of the plants and animals who occupy the site.

3.2 Noise

Existing Conditions

The site itself is inaccessible to pedestrians and vehicles. It is surrounded by Bellingham Bay and the greater Bellingham CBD. Noises on site come vehicles, businesses, people, boats, industries, apartment buildings, wind, water and animals (Blueman and Associates, 2008). The EPA estimates urban areas to have a range of 60 dBA (Blueman and Associates, 2008). To scale, that is about the same decibel level as having a conversation with a friend (University of Washington, 2004).

Three classes of Environmental Designations for Noise Abatement (EDNA) are set forth in WAC 173-60 and provide maximum permissible levels of noise. Typical uses of the property establish EDNA into Class A, Class B, and Class C (*Table 5*). Class A being mainly residential, Class B involving commercial properties, and Class C typically associated with industrial zones (WAC 173-60). Exceeding permissible noise levels by 5 dBA for 15 minutes, in all EDNA classes, violates WAC 173-60.

Table 5: Maximum Permissible Levels of Noise (in dBA)

EDNA Noise Source	EDNA Receiving Property		
	Class A	Class B	Class C
Class A	55	57	60
Class B	57	60	65
Class C	60	65	70

Source: WAC-173-60

Proposed Action

No in water work is proposed for the mechanical equipment, and therefore noise impacts to marine organisms are limited (GeoEngineers, 2017). The construction of the park will generate noise during the day and impact both surrounding animals, and people nearby. According to the University of Washington School of Public Health and Community Medicine, the average construction noise of an 8 hour construction shift is 81.4 dBA (2004). *Figure 18* provides average generated noise levels from construction equipment.

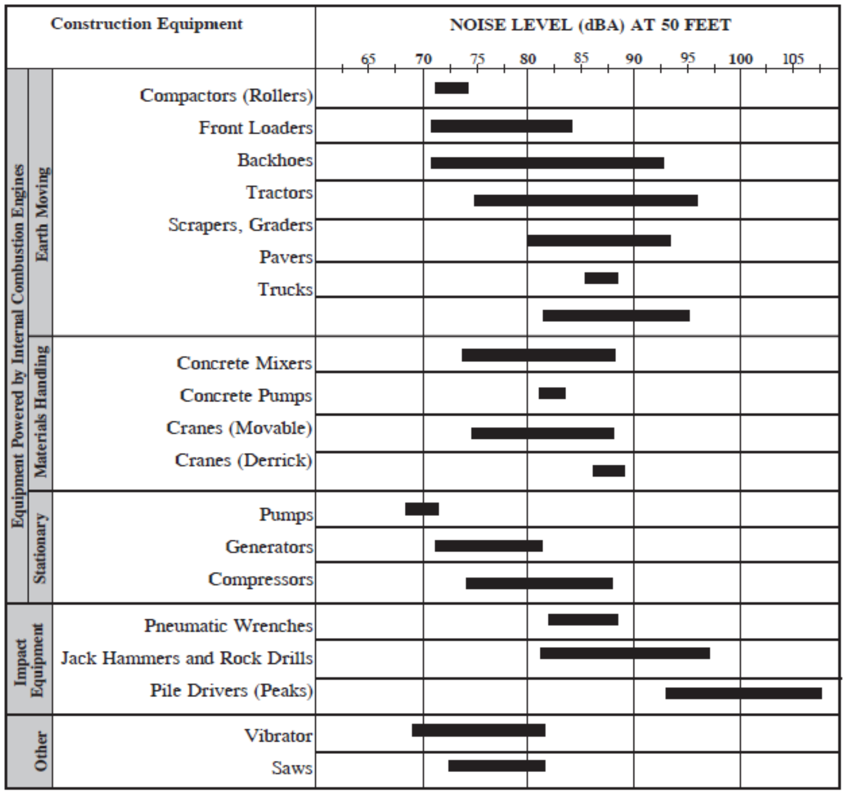


Figure 18: Average Noise Generated by Construction Equipment
Source: EPA, 1971

There are apartment buildings, local businesses and people that travel along Roeder Ave, that may be able to hear the construction throughout the day (GeoEngineers, 2017). If construction of the Granary building, or any other Waterfront District development occurring at the same time as construction for WPP, the COB should consider the increased effects of noise pollution on the nearby community. Once site construction is complete, noise will be limited to pedestrian activities. Once more of the Waterfront District becomes developed, and more people, cars, and public transportation are attracted to the area, noise impacts may need to be further addressed.

Mitigation

Construction will occur in compliance with local regulations and ordinances. Bellingham Municipal Code (BMC) 10.24.120 limits construction noise in Class EDNA to the hours between 7 AM and 10 PM.

Additional Mitigation

Regardless of weather conditions, construction should follow the BMC and only operate during the day so nearby residents will not be disturbed at night. There are very few other mitigation measures to address project construction noise.

No Action

No action alternative would leave the existing noise on site at a level of around 60 dBA.

3.3 Land and Shoreline Use

Existing Conditions

The project site occurs along Whatcom Waterway, as part of the Whatcom Creek estuary. The site is within the Waterfront District and zoned as Shoreline Mixed-Use (Austin, 2017b). It is currently inaccessible to the public with no existing vegetation (Aspect Consulting, 2017). The shoreline consists of one 156 ft creosote treated wood bulkhead along the existing MHHW, and another smaller bulkhead, about 12 ft long treated by the Central Avenue Pier. Many pilings are found along both the existing OHWM and the existing MHHW. Waterward of the larger bulkhead is cobble to guard the sediment cap placed in Phase 1 of the CUAP. Riprap rock and concrete slabs also exist along the current shoreline (GeoEngineers, 2017). *Figure 19* displays an aerial image of the shorelines current conditions.

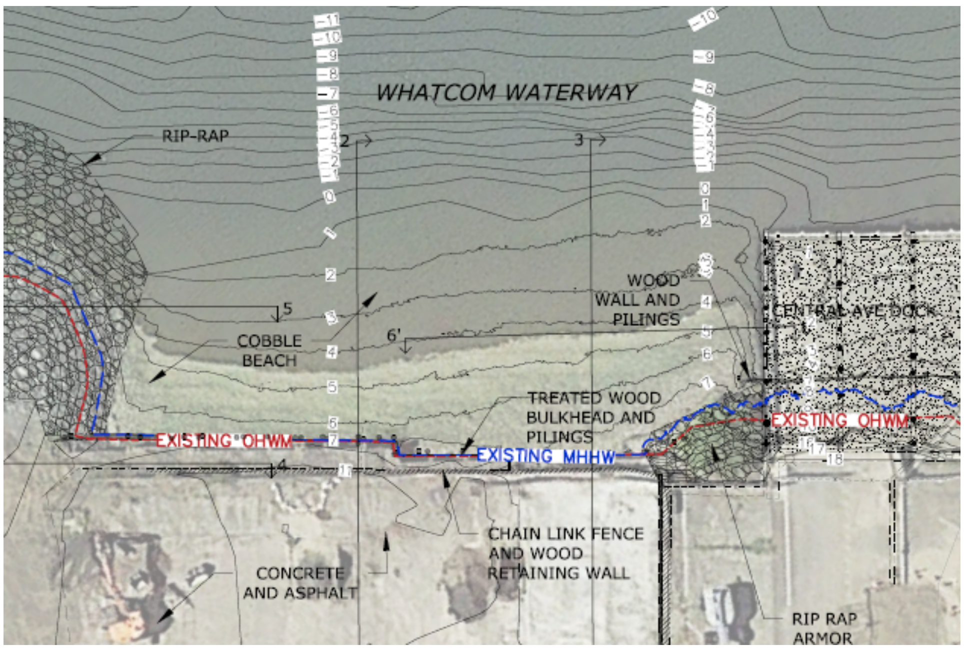


Figure 19: Existing shoreline conditions of the site
Source: Coastal Geologic Services, 2017

The creosote-treated bulkhead, and the smaller timber-treated bulkhead have not only allowed for the bioaccumulation of contaminants, but have altered the natural processes and ecological functions of the shoreline. Additionally, the waterway is sediment deprived due to fill and artificial shore protections (GeoEngineers, 2017).

Proposed Action

The project proposes to create a more natural sloping intertidal beach, extended 70 ft inland from the current bulkhead, and 60 ft waterward, to restore the shoreline and improve ecological functionality. A significant portion of the project involves the removal of the bulkheads and rip-rap rock. No in water sediment (below the MHHW) is planned to be removed during project construction (GeoEngineers, 2017).

Waterward of the MHHW, 1 to 2 ft of beach gravel will be placed on top of the existing cobble sediment cap (GeoEngineers, 2017). Material inland, landward of the MHHW, will be excavated to fulfill the proposed beach grade. The inland material excavated is likely to expose contaminated soil from part of the RAU environmental cap. The exposed soil will be shielded with a separation geotextile, and covered with 2 ft of clean materials to function as a new environmental cap, meeting the capping requirements set out in the RAU CUAP (GeoEngineers, 2017). The excavated exposed soil, managed in compliance with CMMP, will not undergo chemical testing, and unless found to be 'grossly contaminated,' will be used as fill for grading in the upland park. The same beach gravel used below the MHHW, will also be used on top of the clean import material, above the MHHW (GeoEngineers, 2017). The naturally occurring surface beach material will consist of water-rounded aggregate, free from dirt, clay or fractured thin pieces (GeoEngineers, 2017).

The beach import material, both beach gravel and beach cobble are to be consistent with the WSDOT standards 9-03.11(2) for beach cobble, and 9-03.12(5) for beach gravel (GeoEngineers, 2017). For the 2 ft of lower layer material, 4 inch stream cobble will be used, and for the 1 ft surface layer, gravel backfill for drywells will be used (WSDOT, 2016). There is also the option to replace the upper 6 inches of beach gravel closest to the upland park with sand of similar color to the beach gravel to improve the surface for children (GeoEngineers, 2017).

Due to the conditions of the shoreline, two hard armor material structures will be constructed to keep the expanded intertidal beach in place during high energy storms, waves and currents. The beach containment structure, sometimes referred to as a drift sill or a low elevation groin, will limit the transport of gravel to within the beach area, helping to address the sediment deprived conditions of the shoreline, and the waterway in general (Aspect Consulting, 2017). The shore stabilization structure will serve as an extension of the slope, preventing upland soil erosion and stabilizing the steep 2:1 slope once the bulkhead has been removed. The beach between the two hard armor structures will function as a "soft" shoreline modification (Aspect Consulting, 2017). Additionally, the project proposes to plant dune grass above the MHHW within some of the beach gravel to further improve fish habitat and address shore stabilization (GeoEngineers, 2017). *Figures 20 and 21* show the proposed conditions for the beach.

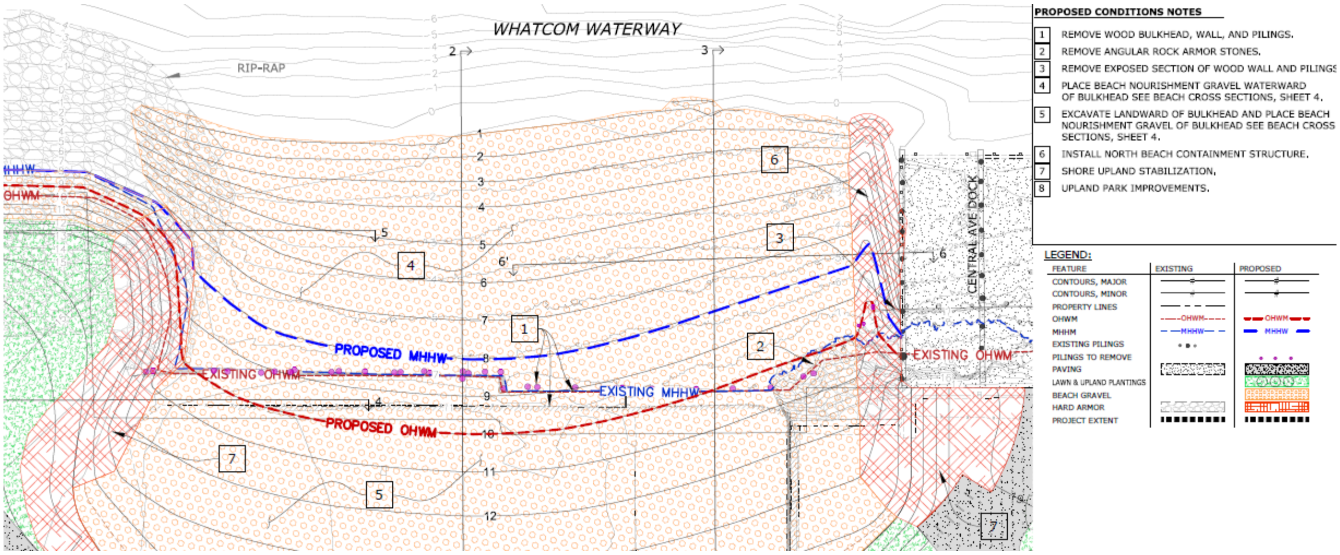


Figure 20: Proposed Shoreline Conditions
Source: Coastal Geologic Services, 2017

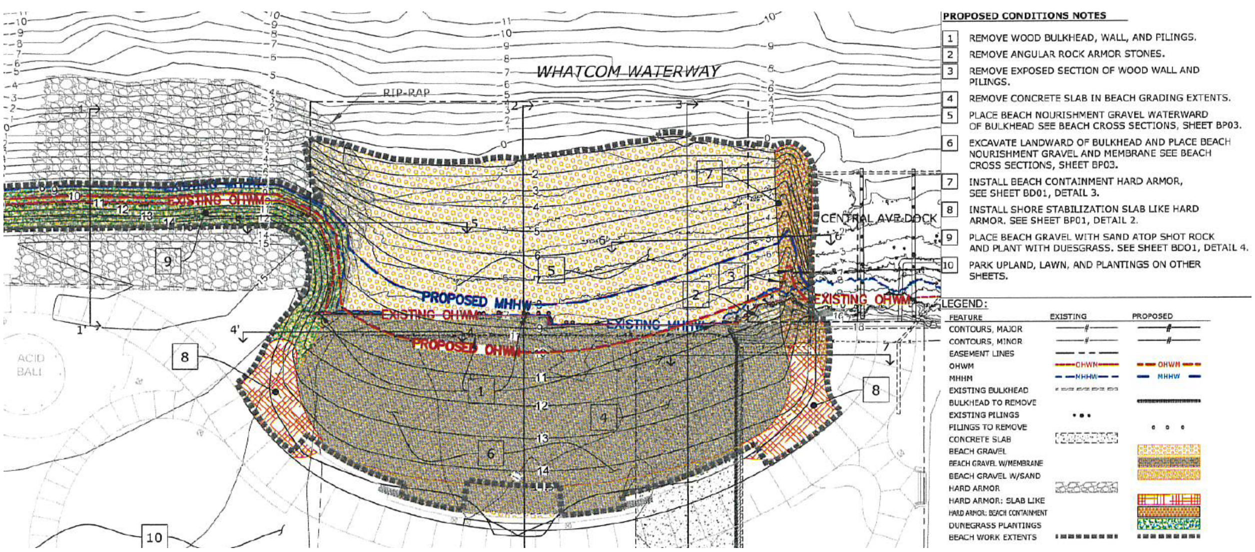


Figure 21: Proposed shoreline conditions B
Source: Coastal Geologic Services, 2017

The shoreline buffer for this project is 25 ft, and the upland park occurs 50 ft past the OHWM, consistent with Washington's Shoreline Management Plan (SMP). The project results in a no net less of shoreline function, and improves shoreline function, also in agreement with the SMP. WPP plans to balance public access while restoring ecological functions (Aspect Consulting, 2017).

The most significant adverse impacts of the project will come from construction. The removal of the bulkheads, construction of the hard armor structures, and addition of new substrate will generate noise pollution, alter habitat for fish, invertebrates and marine mammals and adversely affect water quality

(GeoEngineers, 2017). Furthermore, hydrocarbons associated with the creosote treated wood may contaminate the water during removal.

Long term impacts of removing the treated wooden bulkheads are project to positively impact the shoreline. Stabilizing the shore, and adding beach nourishment (gravel dry well) will reduce stormwater, excess runoff, and enhance nutrient filtering. The removal of the bulkheads with a natural sloped beach area will drastically improve habitat for benthic organisms, provide food sources and refuge for fish, and create quieter shoreline (Aspect Consulting, 2017). However, hard armor structures still negatively impact natural processes, habitat conditions and functionality of the shorelines (Gianou, 2014) (*Figure 22*).

Impacts of Shoreline Armoring

Shoreline armoring, also referred to as shoreline stabilization or shoreline protection, can have negative impacts to nearshore physical and biological processes, habitat, and ecological functions. Specific shoreline and nearshore impacts from shoreline armoring will vary between armoring techniques and shoreline sites. The following is a list of potential impacts shoreline armoring may have at a particular shoreline site (Shipman, 2010):

- Loss of upper beach and backshore
    - Reduces area of dry beach at high tide
    - Reduces amount of accumulated large wood and beach wrack
    - Reduces forage fish spawning habitat
    - Reduces area available for recreation
- Modifies aquatic-terrestrial connectivity
    - Affects movement of materials and organics between aquatic and terrestrial systems
    - Reduces quality of riparian functions
    - Alters drainage patterns to the beach
- Passive erosion
    - Does not allow for the natural retreat of the shoreline, which narrows the remaining beach
- Alters sediment delivery and transport
    - Reduces the delivery of sediment into the system and reduces the overall budget of the local littoral cell
    - Impedes alongshore transport and causes localized erosion downdrift
- Altered wave action
    - Increases erosion and scour through wave reflection

Figure 22: Impacts of shoreline armoring
Source: Gianou, 2014

Mitigation (GeoEngineers, 2017)

- Mitigate fragments of treated wood from bulkheads getting into water
- Follow Contaminated Materials Management Plan (CMMP)
- Provide upland vegetation to filter nutrients and excess sediments, and reduce stormwater runoff
- Avoid all equipment in water

Additional mitigation

In addition to the proposed mitigation, further mitigation measures are recommended throughout construction as to limit adverse impacts.

Soft Shorelines
The project proposes to build two hard armor structures for shore stabilization and beach containment to replace the treated wooden bulkheads and pilings. As a key objective of the project, restoration and enhancement of the shoreline should provide the greatest possible benefits for marine life, habitat, and ecological functions. "Soft" shorelines use natural materials to minimize impacts to ecological processes, whereas hard armor structures utilize concrete or stone in the design, which can disturb the shoreline and its processes (Gianou, 2014). Currently, the project proposes a hybrid structure, with soft shoreline stabilization techniques in between the two hard armor structures (Aspect Consulting, 2017).

Soft shoreline stabilization, also referred to as green shorelines, attempts to balance erosion control while enhancing the shoreline. Softer shorelines techniques create lower gradients, maintain connectivity between marine and terrestrial environments, use naturally occurring materials, and can be designed to naturally accumulate sediment (Gianou, 2014).

Instead, or in addition to the proposed hard armor structures, soft shoreline stabilization techniques should be utilized. Soft shoreline stabilization techniques include integrating logs as structural reinforcement, using vegetated buffers and bioengineered slopes for shore stabilization, and a range of cobble, rocks, and plants for habitat complexity. Integrating logs and vegetation can provide similar structural elements as hard armor structures, but do so in a more natural way and can further restore the functions and processes of the shoreline (City of Seattle, 2015).

Logs and Vegetation
The use of logs will provide structural reinforcement and shoreline stabilization. So as to not serve a hazard and provide proper stabilization, the logs should be secured down. Additionally, the logs should be waterward of the MHHW because otherwise they may cause a threat to salmon and foraging fish (City of Seattle, 2015). Using logs already found within the vicinity of the site, and with existing complexity, such as roots, will further improve the success of restoring the shoreline (City of Seattle, 2015).

Using vegetation can help create natural diversity and complexity within the shoreline. Additional vegetation will provide many benefits for the proposed beach at Whatcom Waterway. These benefits include providing habitat and food for organisms by shading the shoreline, restoring the shoreline food web by providing habitat and food, providing refuge for migrating birds, enhancing water quality by filtering out sediments, nutrients and contaminants, and reducing flood and erosion by providing natural structural support (City of Seattle, 2015).

Two suggested ways of incorporating additional vegetation into the shoreline are through vegetated buffers, and slope bioengineering. Using vegetated buffers is the idea of using emergent plants and trees along and behind the shoreline as erosion control and to provide habitat, refuge, and food for organisms (City of Seattle, 2015) (*Figure 23*). Vegetated buffers allow for a natural transition between upland and marine environments. Slope bioengineering involves using plants, and plant material to stabilize the shoreline and slopes in replacement of hard armor structures (*Figure 24*). More specific examples of slope bioengineering can be found in Appendix D.

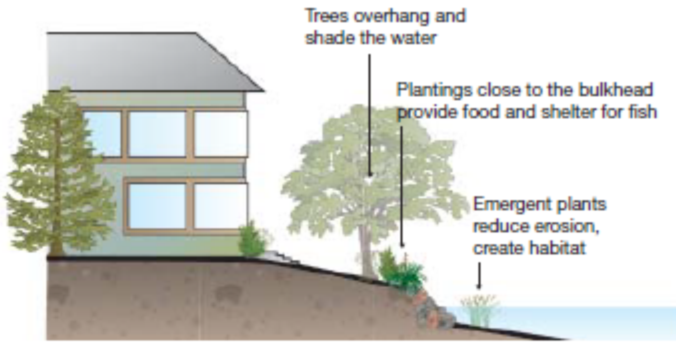


Figure 23: Using vegetated buffers
Source: City of Seattle, 2015

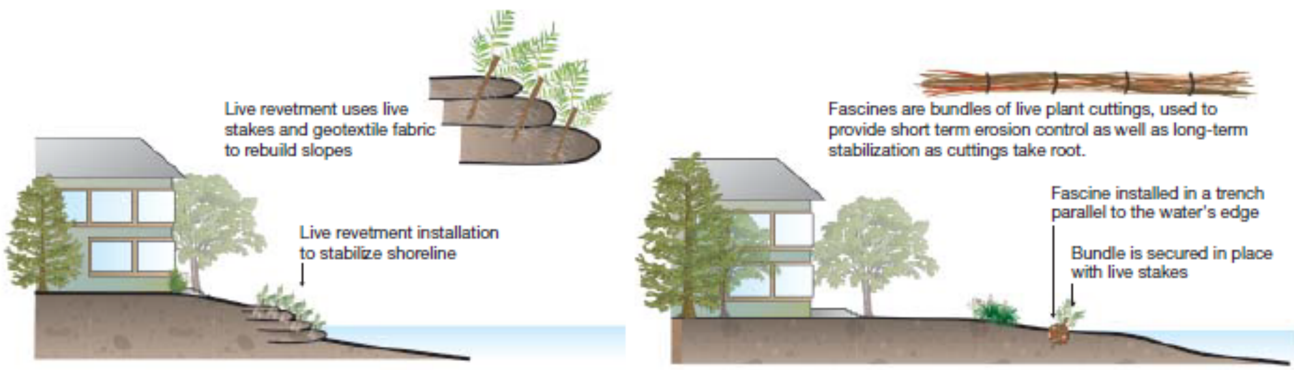


Figure 24: Slope bioengineering
Source: City of Seattle, 2015

If using only soft shoreline stabilization techniques is not feasible along the shoreline, WPP should at least implement the suggested techniques in addition to the proposed hard armor structures.

Incorporating shoreline plants, in addition to the proposed dune grass is vital to restoring and improving the shoreline at the project site. Trees such as willow, dogwood and cottonwood should be considered, as well as sedges, rushes, and additional grasses. A list of suggested native shoreline plants, trees, and shrubs can be found in Appendix D. WPP might also consider introducing submerged aquatic vegetation (SAV) such as eelgrass beds. Eelgrass beds are found in a variety of environmental conditions and in close association with many species (Long Island Sound Study, 2004) (*Table 6*).

Table 6: Species associated with eelgrass beds

mudsnail	Ilyanassa obsoleta	sand shrimp	Crangon septemspinosa
northern lacuna	Lacuna vincta	blue mussel	Mytilus edulis
common periwinkle	Littorina littorea	blue crab	Callinectes sapidus
lunar dovesnail	Mitrella lunata	hermit crab	Pagurus longicarpus
bay scallop	Argopecten irradians	horseshoe crab	Limulus polyphemus
northern quahog	Mercenaria mercenaria	bluefish	Pomatomus saltatrix
softshell clam	Mya arenaria	striped bass	Morone americana
common clamworm	Nereis virens	winter flounder	Pleuronectes americanus
isopod	Idotea triloba	lobster	Homarus americanus

Source: Long Island Sound Study, 2004

Eelgrass beds provide habitat, refuge, and protection for marine life. Marine organisms like snails and worms live along the eelgrass roots in the sediment, while others live within the eelgrass leaves. The complexity of eelgrass bed habitats provide many fish refuge and shelter from predators, and serve as an important food source for both marine organisms and birds (Long Island Sound Study, 2004). Because eelgrass beds provide habitat, food and protection, they are associated high diversity and abundance of marine species (Long Island Sound Study, 2004). Eelgrass beds are also incredible productive ecosystems, storing more carbon annually than terrestrial forests (National Science Foundation, 2012).

Eelgrass and other SAV also provide nutrient filtration and oxygen in the water, trap contaminants, and reduce wave energy (Long Island Sound Study, 2004). All of these would be extremely beneficial at WPP, in providing oxygen to marine life, trapping potential contaminants that make their way into the waterway, and reducing water currents, therefore reducing erosion and turbidity in the intertidal beach area. Given that eelgrass is already found within the Whatcom Waterway (*Figure 13*), transplanting existing eelgrass beds or seeding new eelgrass will be less challenging (Long Island Sound Study, 2004).

Substrate

For the 1 ft of beach gravel to be placed atop of the cobble, the project should consider using diverse substrate to provide more habitat complexity for fish. Spawning gravel is recommended as the beach gravel below the MHHM to benefit the needs of migrating salmonids. Additionally, the sand proposed to be placed on the upper beach to enhance the surface for children should be weighed against the potential harm to fish and other invertebrates. Fine suspended sediment, such as sand, creates turbid waters which have a harmful effect on salmonids (*Table 7*).

Table 7: Effects of Turbidity on Salmonids

Physiological	Behavioral	Habitat
gill trauma	avoidance	reduction in spawning habitat
osmoregulation	territoriality	effect on hyporheic upwelling
blood chemistry	foraging and predation	reduction in BI habitat
reproduction and growth	homing and migration	damage to redds

Source: Bash, Berman & Bolton, 2001

Construction methods and designs

Silt fences constructed along the perimeter of the beach area can help to reduce runoff and sediment erosion from the upland park. The proposed 25 ft buffer, could be increased further back to account for the SLR that is projected to occur in the project area (Gianou, 2014). By 2100, Bellingham Bay is projected to reach 2.4 feet over current levels (Bluemen and Associates, 2008). This should be taking into consideration in determining the buffer and proposed OHWM.

The GeoEngineers Biological Evaluation report found that "COPC remain in the soil at concentrations exceeding MTCA unrestricted cleanup levels" (2017). During excavation, the exposed upland soil is not required to go through chemical testing before it will be reused as grading in the upland park (GeoEngineers, 2017). As an additional mitigation measure the soil should be tested, and transported offsite to a landfill if found to be exceeding MTCA levels, replaced with clean import filling.

No Action

A no action alternative would leave the bulkheads, wood pilings and rip-rap rock as is. The shoreline would continue to be inaccessible to the public, and inconsistent with the SMP goals. The treated bulkheads would continue to contaminate the water, and deprive the shoreline of sediment and ecological functions. Fish, invertebrates, mammals and wildlife would continue to be adversely impacted by the artificially made shoreline.

3.4 Light and Glare

Existing Conditions

There is no artificial lighting or anything that can cause a glare in the current conditions of the waterway.

Proposed Action

Lighting for the park will include the relocation and installation of the acid ball and light posts along pedestrian walkways. After being treated to remove rust, the acid ball will be painted by an artist with reflective paint and will be lit from below and grade level and from the sides where the lights will possibly be mounted, not from above or from the inside. This will create light that reflects from the acid ball in all directions. The lighting from the acid ball will abide by all Crime Prevention Through Environmental Design (CPTED) guidelines. See Appendix E for the Acid Ball General Layout.

Fourteen foot steel post mounted lights atop a newly filled concrete foundation will be installed to provide site lighting along pedestrian walkways, distanced to meet safety requirements (City of Bellingham, 2017 B). LED light spill will be minimized by strategically spacing and orienting the luminaries. Lighting will comply with CPTED and safety standards. In order to discourage vandalism, tamper resistant stainless steel hardware will be installed. For further protection, the lights will have a shielding option, if necessary. See the site illumination plan in Appendix E.

Irregular timing of artificial lighting can have negative impacts on fishes diel patterns like salmonids and, potentially, migratory birds. The proposed action, however, is consistent with policies and regulations that will cause "no net loss of existing shoreline ecological function" (Sundin, 2017). The lighting of the acid ball should abide by similar standards as the conventional light posts, especially considering it is proposed to be put very near the water.

Mitigation
Mitigation that has already been established for this project includes avoiding having lighting that may spill into the waterway which is an effective way to mitigate any negative impact on fish species in that area. The project proposes a master lighting plan that complies with safety and CPTED standards. There will be some fully shielded lights and the LED light spill will be minimized through strategic spacing and orienting of the luminaries (Aspect Consulting, 2017). The electrical equipment exposed to weather is heavy duty, high impact, weather-proof and built to be protected in marine environments and the lowest level lighting possible will be used for the lamp post lights (City of Bellingham, 2017 B).

Additional Mitigation
Potential mitigation measures that could be used additionally include using motion sensor-triggered lights. Another potential mitigation measure would be to use solar lighting which includes LED lights that convert sunlight into electricity (Energy.gov, N.D.). Another mitigation option is to use IDA dark sky approved products like the VOLT® ShadowMaster™ LED Path & Area Lights (IDA, 2017). The lighting of the acid ball should have a curfew to prevent negative effects due to irregular lighting that may cause migration issues for migratory birds. Additional assessment may be necessary to assess the impacts of the lighting of the acid ball.

No Action
The no action alternative would leave the area unlit as it is and would not have further negative impacts on aquatic or terrestrial life.

3.5 Recreation

Existing Conditions
No current recreational opportunities exist on the site because it is inaccessible to the public.

Proposed Action
The proposed park will create recreational opportunities by providing access to the downtown waterfront. Construction involves implementing walkways, bike paths, art, viewpoints, open green-space, play equipment, and wildlife viewing opportunities (Sundin, 2017). Bike paths and pedestrian trails will eventually connect with impending trails extending further south along the shoreline (Aspect Consulting, 2017), and with the downtown community to create a strong sense of place**.** The completed park will provide improved opportunity for neighboring private development of the downtown Waterfront District (Austin, 2017b). Development of proposed recreation opportunities should offer a safe place for active and passive recreation, and should not deplete ecological function of the site. The appropriate mitigation measures will be taken to prioritize the health of the environment while constructing the park and its different amenities.

Mitigation
Non- water-oriented recreation such as bicycling, walking, lawn games, and sports should solely be located in areas where potential water-dependent uses are not anticipated, to avoid possible

contaminations. Seasonal and water temperature limitations are predicted to limit access to water in this location to help maintain LID measures. Bicycle/pedestrian trails should be built along shoreline routes and connect to pre-existing trails as determined in the City of Bellingham Park, Recreation and Open Space Plan (2014). LID techniques such as transformation of impervious area to pervious area for stormwater infiltration are expected to improve water quality in the Whatcom Waterway (Aspect Consulting, 2017) and new beach soils should protect the bay from possible leaching of chemicals disturbed by recreational uses.

Additional Mitigation

When constructing a playground, use techniques from Natural Playgrounds. The design process in these playgrounds not only use sustainable materials, but combine landscape elements, weather and drainage patterns, and movement corridors to create a safe, natural, and interactive learning environment for all involved (The Chalifour Design Group, 2013). Use a natural surface or porous, thirsty concrete called Flexi-Pave made up of recycled tires and stone to absorb 3,000 gallons of water an hour instead of asphalt/concrete in order to prevent additional chemicals from being used on site, decrease chances of leaching, and aid in mitigating stormwater runoff (Weller, 2016). Minimizing the amount of pathway material used to avoid disturbing natural environment is important as well as using native or site appropriate vegetation that can withstand heavy recreational use.

No Action

If the Waypoint Park site remained untouched, the area would likely remain a brownfield site, posing environmental health threats. The site is currently closed to the public, so proposed recreational opportunities would not be constructed. This would decrease the appeal and potential of the Downtown Waterfront District and Whatcom Waterway, both recreationally and economically. If recreational opportunities were not available in this location, the result would detrimentally affect revitalization efforts of the downtown waterfront.

3.6 Historic and Cultural Preservation

Existing Conditions

The Bellingham Waterfront has a history of occupation by the Lummi Nation and Nooksack Indian tribes before (and during) the timber industry in the 1850s. The Puget Sound Pulp and Timber Company is important that the historical significance of this site be taken into consideration throughout the entirety of this project (Blumen and Associates, 2008). The project area is located in an "archaeologically sensitive area of former tidal flats near the mouth of Whatcom Creek" that was filled with dredge fill in the 1900s (Aspect Consulting, 2017). The project exists in a medium probability zone for encountering archaeological materials (Aspect Consulting, 2017). A cultural resources assessment of the area uncovered a historic Whatcom trail, prehistoric shell deposits, two Native lithic artifacts and what remained of a historic plant nursery within a mile of the waterway (Kopperl et al., 2007). *Figure 25* demonstrates archaeological sites that have been recorded near the project area.

SITE NO.	COMPILER/DATE	AGE	DESCRIPTION
45WH41	G.F. Grabert 1972	Pre Contact	Shell Midden
45WH47	G.F. Grabert 1973; Kelly Bush, Jackie Ferry 2005	Pre Contact	Shell Midden
45WH56	J. Gaston, C. Swanson 1974	Pre Contact	Shell Midden/ Camp site
45WH60	G.F. Grabert, J. Grabert 1975	Pre Contact	Shell Midden
45WH71	Edris and Walker 1970	Pre Contact	Camp site
45WH726	Claborn 2004; Stevenson and Shong 2005	Pre Contact	Lithic Scatter
45WH732	Mike Shong 2004	1890-1913	Historic Saloon
45WH735	Reid and Hillegas 2005	Pre Contact/ Historical	Shell Midden; Roeder Mill

Figure 25: Archaeological sites recorded in the vicinity of Whatcom Waterway.
Source*:* Kopperl et al., Cultural Resources Assessment (2007)

Proposed Action

The project will involve a shallow excavation that is not expected to reach the depths of the native tidal flats because they would be below the dredge fill (Aspect Consulting, 2017). Excavating in an archaeologically sensitive area always runs the risk of disturbing archaeological materials, though the soils in that area have already been dredged. The project, however, will also give open access of this area to the public including Native tribes that have not had access to this culturally significant area for decades.

Mitigation

Though an encounter with archaeological materials is unlikely, the Historic Preservation Officer (HPO) of Lummi Nation made a recommendation, during the public comment period, to have an Inadvertent Discovery Protocol on-site at all times to ensure that proper protocol is followed and available if human remains or archaeological resources are encountered (Sundin, 2017). The excavation and construction complies to Revised Codes of Washington (RCW 27.44, RCW 27.53), Washington Administrative Code (WAC 25-48), and Bellingham Municipal Code (BMC 17.90). The area was assessed for archaeological and cultural resources in an EIA for the New Whatcom and Waterfront District Redevelopment project in December 2007. Although the site is not registered as a historical site, the acid ball from the old GP pulp mill will be incorporated as a historical and art piece at the new Waypoint Park.

Additional Mitigation

Making the Inadvertent Discovery Protocol a condition for the substantial development permit would be a minimal mitigation option. The Port of Bellingham could develop a management plan, approved by the appropriate local, state and tribal stakeholders, to ensure preparedness for a potential encounter with archaeological materials during excavation. This plan could consist of the discovery protocol suggested by Lummi Nation's HPO as well as awareness training and archaeological monitoring during construction for contractors.

No Action

Not allowing the excavation of the park does offer a higher chance of not disturbing historic materials any further than the dredging in the 1900s already did. It would, however, leave the area inaccessible to the tribes and Nations who find the waterway historically significant.

3.7 Transportation

Existing Conditions

No current roadways, pedestrian surfaces, walkways or vehicle transportation network systems exist on the development site itself. The project site is located 710 feet from a Whatcom Transit Authority (WTA) bus stop which is near the intersection of Holly Street and Central Avenue. However directly behind the entire development site is a heavy railway system that runs North and South, and the adjacent property is the POB's main terminal (Austin, 2017b).

Proposed Action

Pedestrian access via Central Avenue Pier to Waypoint Park. In order to serve the needs of Bellingham's transportation network new roadways will be paved; Granary Avenue will run north and south behind the Granary Building. This project will not offer additional on-site parking, and will rely on off-street parking accommodations. The new roadway will offer protected bike lanes, pedestrian-friendly sidewalks and several inner-urban trails leading to various parts of the park. This project will not interfere with the transportation of agricultural or natural resources in any way (Austin, 2017b).

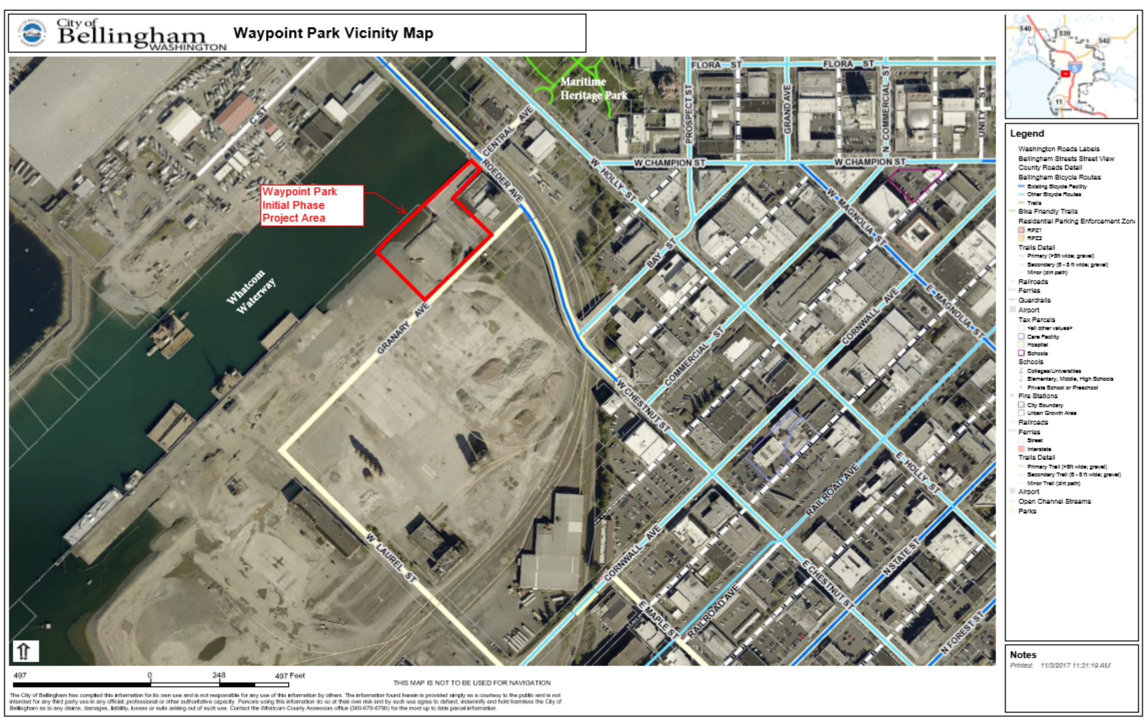


Figure 26: Bellingham Vicinity Map
Source: City of Bellingham, 2017 A

During the short term construction phases, an increase of up to 15 truck trips per day is expected. After construction, this will result in increased traffic and congestion on Cornwall, Roeder, and Granary Avenue as well as the surrounding arterials. However, this action will increase the connectivity of Bellingham's waterfront district to the downtown urban core (Austin, 2017b). Traffic signals, stop signs and other transportation information will be posted upon completion. Storm water runoff will dramatically increase with the addition of multiple impervious surfaces (sidewalks, roadways, pedestrian paths, etc.). With more development being proposed in the future, on-site parking may be required down the road. See *Figure 26*.

Mitigation

An emergency spill containment kit will be located on-site along with a pollution prevention plan detailing the on-site fueling storage, materials storage as well as equipment storage. Waste storage centers will be prepared to address the prevention and cleanup of spills (GeoEngineers, 2017). All roadway construction debris must be cleaned up and removed daily in order to limit dust exposure. To reduce stormwater runoff the pedestrian paths and inner-urban trails will mirror existing gravel walkways throughout Bellingham's parks system (Austin, 2017b). The COB, as explained above, has already capped the entire site and created an cap for contaminants and bacteria from past GP operations. The transport and disposal of excavated contaminated materials/soils will occur once per day. On-site parking will not be provided, and thus, excessive stormwater runoff at Waypoint Park should not be an issue. The existing stormwater treatment pump and facility, provided by GP, will be utilized in the short term. Lastly, WPP has plans to be linked downtown by Maritime Heritage Park to further improve pedestrian access.

Additional Mitigation

Mitigation efforts include substituting standard roadway asphalt with semi-permeable concrete, commonly referred to as "Thirsty Concrete," for vehicle roadways, gravel, and pedestrian walkways throughout park (Topmix Permeable, 2017). Examples of LID principles include vegetative strips at the edge of roadways, as well as ribbon curbs as opposed to conventional curbs. An example of BMP is to limit construction on dry/windy days to reduce the exposure to dust and airborne particulate and to amplify off-site preparations to prevent spills and on-site contaminations. This would ultimately increase the permeability of all roadway/pedestrian surfaces and significantly decrease the overall amount of stormwater runoff at Waypoint Park.

No Action

No impacts, existing conditions would stay the same.

3.8 Public Services

Existing Conditions

Currently unoccupied site; prepped and ready for development.

Proposed Action

The WPP development will require additional fire and police protection and service. The Granary Building will house office space, restaurants, a brewery, and several small businesses. Additionally the park itself may require nightly surveillance, if the need arises. The development plans include the need for facility/utility maintenance, and regular landscaping upkeep. The COB's Parks and Recreation department will provide these services (Austin, 2017b).

The proposed development will lead to increased traffic and commuter congestion around waterfront development area. Additionally, there will be an increased need to expand WTA jurisdiction into new development site and a fixed WTA bus route will frequent the waterfront district.

Mitigation

There is currently no proposed mitigation for this section put forth by the COB.

Additional Mitigation

Mitigation efforts include increasing the frequency of WTA pick-ups to the waterfront district. This would mean possibly creating a new WTA "Go-Line" that would run through Granary Avenue and connect the waterfront to the downtown core via public transit. Additionally, the construction of an official WTA bus stop in the development site on Granary Avenue would improve the likelihood of attracting more WTA riders. Other mitigation efforts include "Thirsty Concrete" for WTA bus stop sidewalks and pedestrian services. These actions would result in the reduction of vehicle congestion, the increase in public transit access at the waterfront district, and greater circulation from the waterfront district to the rest of Bellingham's transportation systems.

No Action

The site would remain undeveloped and vacant.

3.9 Utilities

Existing Conditions

The current site has stormwater and electricity services, however, this is limited to distinct locations. Currently, stormwater is treated in the Aeration Stabilization Basin (ASB), located across the Whatcom Waterway from the park site. It is pumped underwater from a pump house near the GP Wharf. The proposed development will tap into the existing stormwater treatment system, and continue to be pumped to the ASB (Austin, 2017a).

Proposed Action
The first section of the Granary Avenue roadway construction will provide underground electricity for park lighting, and a raw (non-potable) irrigation water supply to the proposed development area. Initially, the City of Bellingham will irrigate with potable water until the raw water system is built. Electricity for lighting will be needed for WPP and includes:

- Electrical service will be provided by PSE
- Power boxes will be nonmetallic and weatherproof
- In order to do this, they will need to excavate upland park soils
    - 95 CY of upland soils
    - Will occur above water table
- Irrigation system
    - Piping of 2 inches
    - Pipe, pump, control system
    - Will connect to Central Pier irrigation system
- Consistent with WSDOT and COB standards (GeoEngineers, 2017)

The proposed action will create a greater strain on the COBs electrical and hydrological systems. This may lead to an increased risk for non-natural hazards (fire, faulty connections, burst pipes, etc.) Additional connections to ABS System may decrease the overall efficiency of the existing stormwater treatment process.

Mitigation
There is currently no proposed mitigation for this section put forth by the COB.

Additional Mitigation
Limiting construction on dry, windy days; LID strategies and BMP techniques, heavier duty pipes and reinforced utility connections, increase the frequency of equipment/system checks. Additionally, use material other than concrete for foundation of lights:

- Solar panels for lights to eliminate need for PSE service
- Capture storm water to use for irrigation
- Control amount of water used for seasonal variations

This would decrease the amount of dust and airborne particulate matter during the construction phase. Additional mitigation efforts would have a greater overall [electrical/hydrological] efficiency, along with improved longevity of all utility systems.

No Action
The site would remain undeveloped and vacant. No additional electricity or water would be needed for the site.

Section 4: Summary of Findings

4.1 Conclusion

This EIA analysis has identified and investigated the potential environmental impacts of the Waypoint Park Project. After reviewing the proposed actions of the development of WPP, this EIA has identified potential environmental impacts. To address these impacts, the COB and POB have proposed mitigation measures in the hopes to combat construction and development. Complementary to the proposed mitigation for WPP, this EIA provided additional mitigation measures in order to further minimize the adverse environmental impacts. These additional mitigation actions include a larger emphasis on LID and would increase the overall sustainability of the site.

Elements of the natural environment analyzed in this EIA consist of earth, air, plants, and animals. Starting with the earth element, the site resides on a gravel cap covering contaminated fill from and must be closely monitored. Despite cleanup and capping efforts, small amounts of toxic soils are still present throughout the site and Whatcom Waterway. Erosion and earthquake shaking are hazards here because of the location of the man-made site, so a sloped beach will be created to prevent destruction of new development. By reducing the amount of impervious surfaces and adding topsoil to create a new beach and upland park, a new environmental cap will be created across the site. Liquefaction is another risk present associated with loose soils at the site. By increasing compaction of surface layers during construction, saturation of water in underlying soils along with dampening will reduce the chances of liquefaction during an earthquake. An alternative to aid in protection of the earth element includes using a more permeable surface soil blend with no fertilizer to allow for the compaction of soil and aid in growth of organisms. Increasing the geologic stability of the site by adding large rock jetties and other materials will aid in erosion prevention. For air, the only adverse impacts will come from construction of the park. This includes removing asphalt, bulkheads, extending and grading the beach and park, and excavation of soils. By using the appropriate mitigation techniques such as carefully following cleanup procedures, adverse air impacts will be minimal. Once the project is complete, air quality is expected to improve because of the native vegetation planted during construction. There will be no negative long term impacts to plants and animals because cleanup and mitigation measures are expected to improve the health and habitat of the previously contaminated plants and animals who occupy the site.

The elements of the built environment examined in this EIA include environmental health, noise, land and shoreline use, historic and cultural preservation, transportation, public services, and utilities. In terms of environmental health, no negative long-term effects are expected because the site's overall health will improve once cleanup, grading, excavating, recapping the contamination, landscaping, and reshaping the shoreline are completed. If there happens to be a chemical spill during construction, emergency containment kits are on site. Construction workers will also be taking the necessary cleanup precautions daily to avoid any potential hazards. Currently, pedestrians and vehicles are prohibited from entering the site. Surrounding the site, is the greater Bellingham CBD and the bay with noise coming from boats, industry, nature, distant vehicles, and pedestrians. Additional noise at the site will be largely limited to construction. The sound of equipment will be present, with people traveling along Roeder Avenue possibly being able to hear it. Once construction is complete, noise will be limited to pedestrian and recreation activities. If construction is done between the hours of 10PM and 7AM, a variance from BMC 10.24.12 for the construction of a public facility is needed.

Land and shoreline use in the long-term will improve from its current state to resulting in an improvement of shoreline function and restoration of ecological functions while balancing public access. This will be done by creating a more natural sloping intertidal beach, removal of bulkheads, creosote timber and debris, excavation, grading, and environmental capping, following the CMMP. Additional mitigation provided by this EIA for land and shoreline use includes using more porous concrete during construction to reduce the amount of impervious surfaces. The plan proposes to build two hard armor structures for shore stabilization and beach containment. A different approach would be to install more “soft” shoreline techniques using natural materials to minimize impacts to ecological processes instead of only using soft shoreline techniques between the two hard armor structures as proposed. This would result in enhancements by maintaining connectivity between marine and terrestrial environments. Additionally, the project should consider using diverse substrate to provide habitat complexity for fish, and the sand proposed to be placed on the upper beach to enhance the surface for children should be weighed against the potential harm to organisms.

As of now, there is no artificial lighting or structures that will cause a glare. To ensure safety, lighting along pathways and at the park will be installed and will comply with CPTED. The painting of the acid ball with reflective paint will create a glare that is reflected in all directions, while abiding CPTED guidelines. Additional mitigation measures include the use of motion-triggered lights, solar lights, and dark sky approved lights to lessen the disturbance and filter pedestrian lights. The site is currently closed to the public, so no current recreation opportunities exist. Development of the new park will create a recreation hub consisting of public waterfront access, pedestrian and bicycle pathways, a playground, art, wildlife viewing opportunities, and open green space. In order to protect the environment, recreation structures will be placed strategically, and LID techniques such as the transformation of impervious surfaces to pervious to aid in stormwater infiltration. Additional mitigation includes using green playground equipment and thirsty concrete.

Historical and cultural preservation are important to consider when working with this site because it is located in an “archaeologically sensitive area” of former tidal flats, and has a medium probability of uncovering archaeological materials. Development of the park will involve a shallow excavation not expected to reach the depths of the native tidal flats and will comply with local codes. An Inadvertent Discovery Protocol on-site at all times was recommended, however additional mitigation should require this to ensure proper protocol is followed if archaeological materials are discovered. There are no current transportation effects on the site, however it is located near a WTA stop and heavily used railroad. No on-site parking will be constructed, but pedestrian access via Central Avenue Pier to WPP will be constructed and new roadways will be paved with bike lanes, sidewalks, and trails, but is not expected to interfere with the transportation of natural and agricultural resources. During construction, the transport and disposal of excavated contaminated materials/soils will occur once per day, with additional mitigation again to use thirsty concrete.

Public services such as additional fire and police protection will be required with the new park development. The Granary Building will be home to office space, restaurants, a brewery, and small businesses and may need surveillance along with facility/utility and landscaping upkeep. Proposed development will increase traffic and commuter congestion around the area and therefore WTA will need to expand routes. The plan currently does not provide any mitigations for this, but this EIA provides an idea for a WTA "Go-Line" to result in less vehicle congestion and an increase in public transit access. Currently, the site has stormwater and electricity service utilities, but additional electric service, power boxes, and an irrigation system will be needed for and after construction. This will create a greater strain on the COBs electrical and hydrological systems, along with decreased efficiency of the existing stormwater treatment process. The city provides no mitigation. This EIA recommends limiting construction to calm, dry days, using solar panels to eliminate need for PSE service, capturing stormwater to use for irrigation, and controlling the amount of water needed based on seasonal variations.

Based on the analysis of the above elements and the decision matrix, the proposed action, along with the implementation of the recommended additional mitigation will have the least adverse environmental impacts. These additional measures will further mitigate the development of WPP, while meeting the project objectives of improving the shoreline, creating a recreational hub that balances intertidal habitat with public access to the waterfront, and preserving and appreciating the historical aspect of the site and Whatcom Waterway as a whole.

4.2 Decision Matrix

[1 = Best Action, 2 = Neutral Action, 3 = Worst Action]

Environmental Element	Proposed Action	Additional Mitigation	No Action
Earth	2	1	3
Air	3	2	1
Water	2	1	3
Plants	2	1	3
Animals	1	2	3
Environmental Health	2	1	3
Noise	2	3	1
Land and Shoreline Use	2	1	3
Light and Glare	3	2	1
Recreation	1	2	3
Historic and Cultural Preservation	2	1	3
Transportation	3	2	1
Public Services	2	1	3
Energy and Utilities	3	1	2
Total	32	22	36

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4.4 Appendices

Appendix A: Vicinity

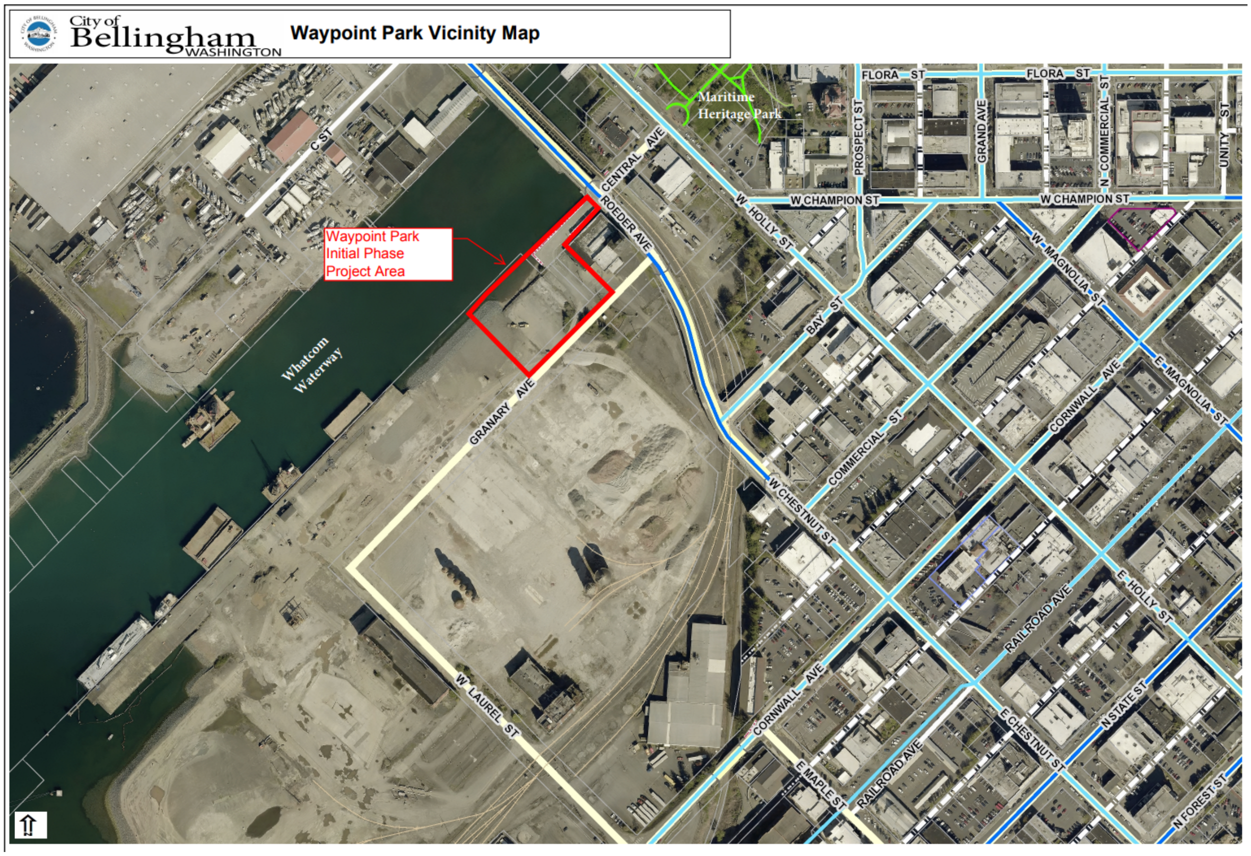

Figure A.1 Waypoint Park Vicinity Map A

Source: City of Bellingham, 2017

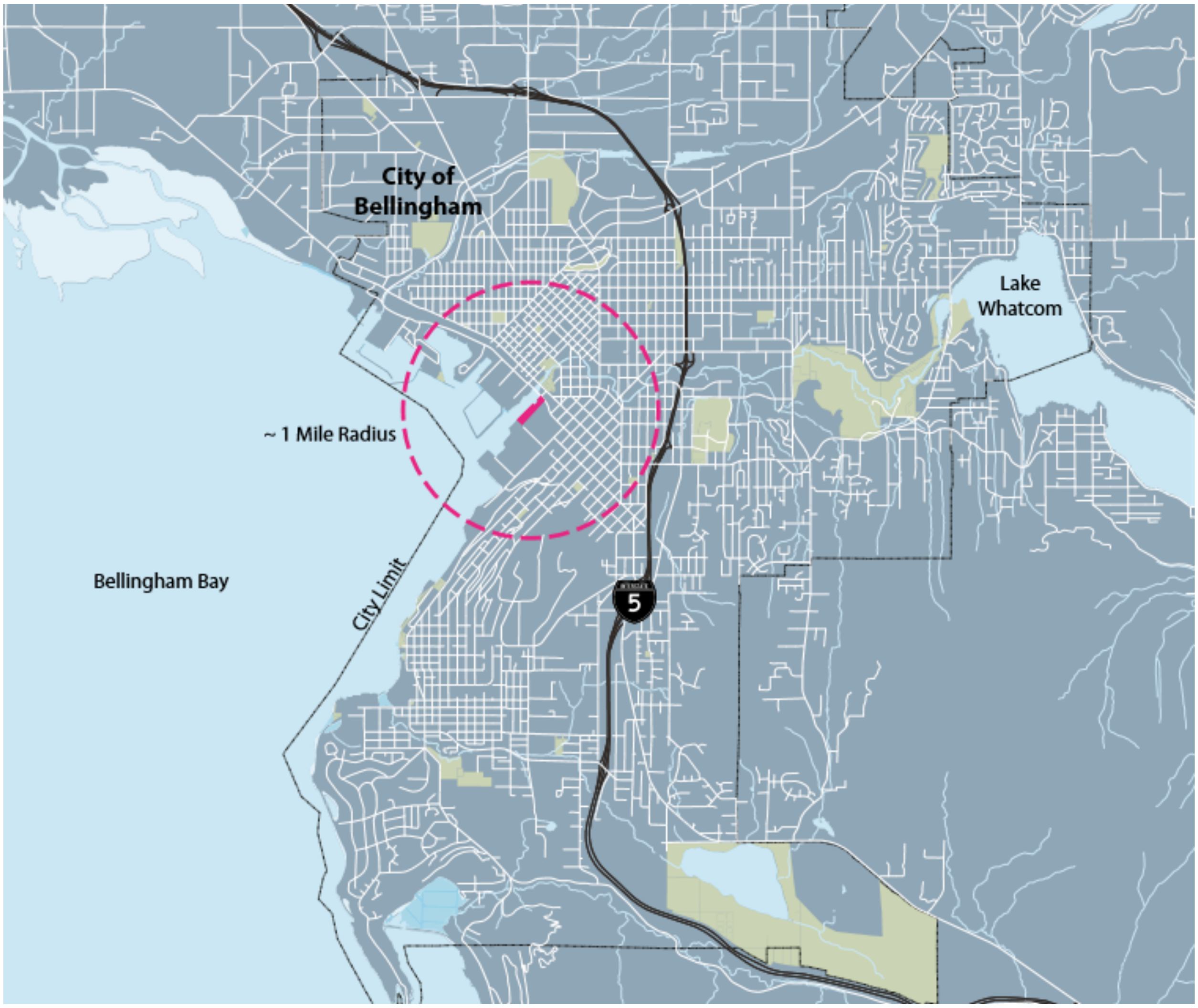

Figure A.2 Waypoint Park Vicinity Map B
Source: City of Bellingham, 2015

Appendix B: History

Figure B.1 Native American camp along Whatcom Creek
Source: Northwest Archaeological Association, 2007

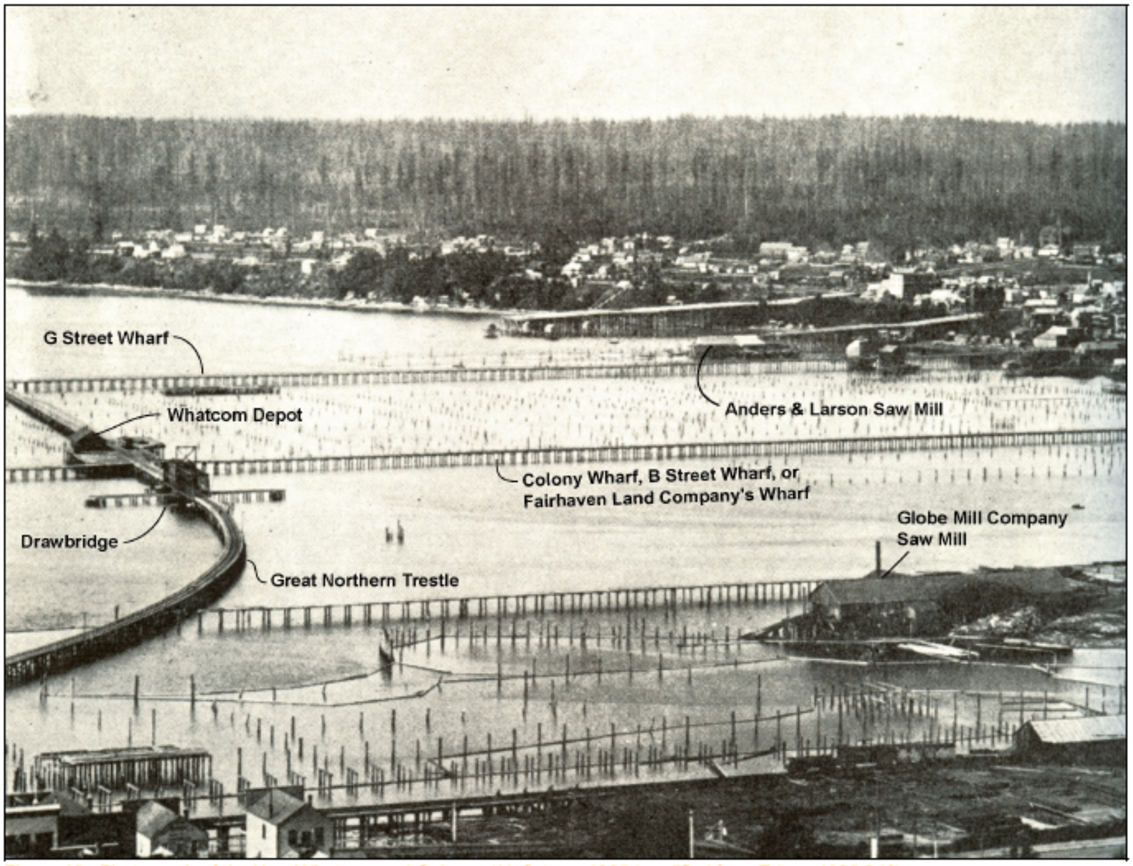

Figure B.2 Waterfront and tide flat conditions 1895

Source: Northwest Archaeological Association, 2007

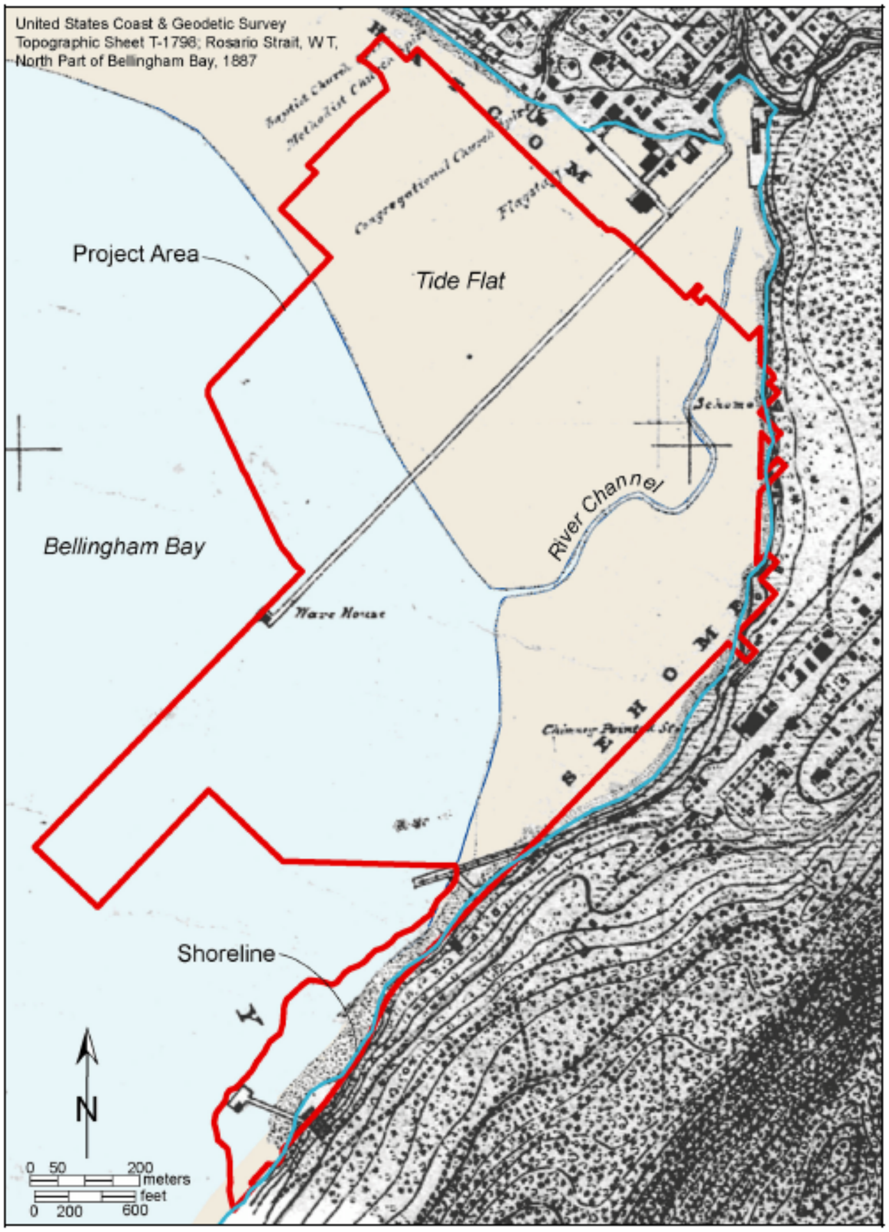

Figure B.3 Pre development (1887) shoreline features of Bellingham Bay

Source: Northwest Archaeological Association, 2007

Project Area refers to the Waterfront District as a whole, not the WPP site specifically

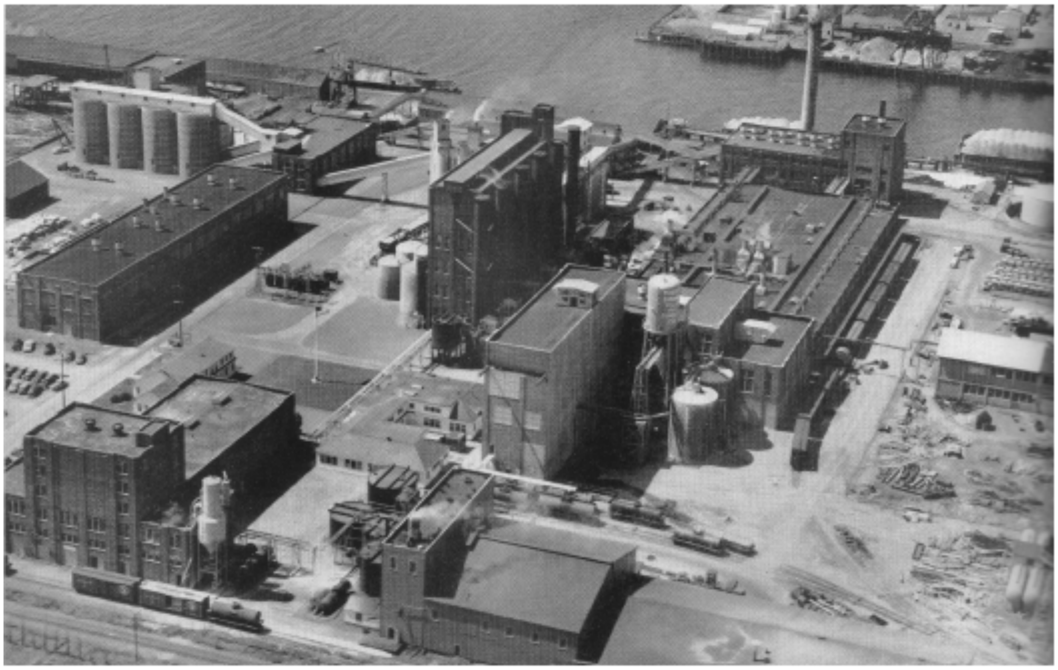

Figure B.4 Aerial view of GP Pulp and Tissue Mill facilities
Source: Artifacts Consulting, 2007

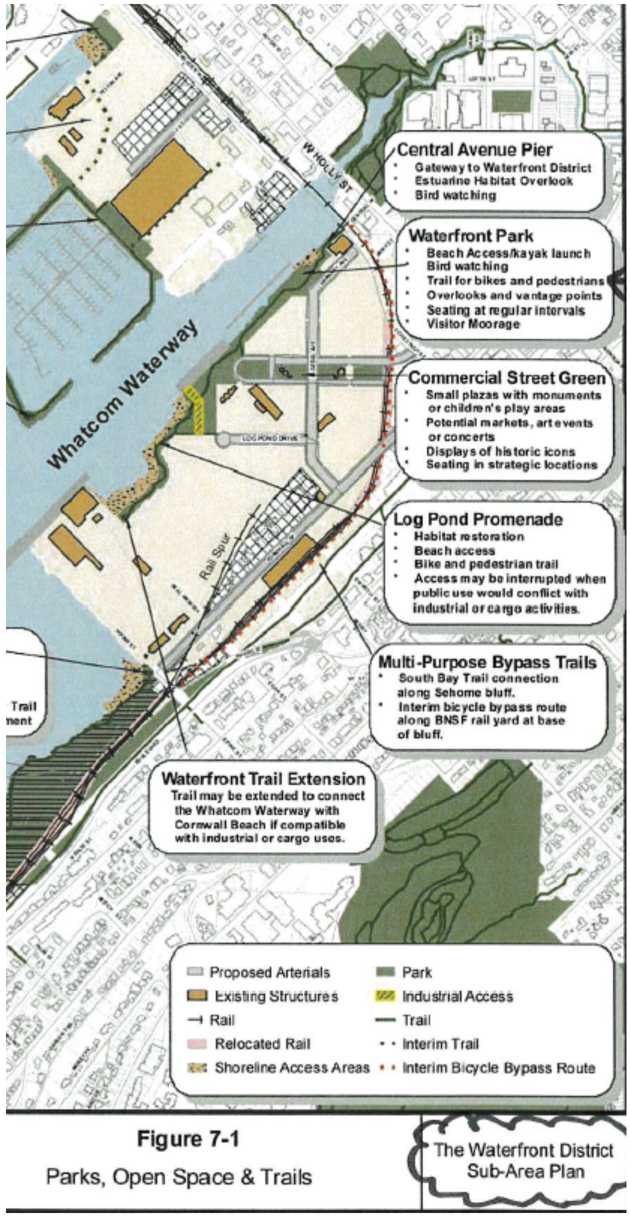

Figure B.5 Parks, Open Space and Trails

Source: Port of Bellingham and City of Bellingham Public Partnership, 2013

Georgia Pacific West

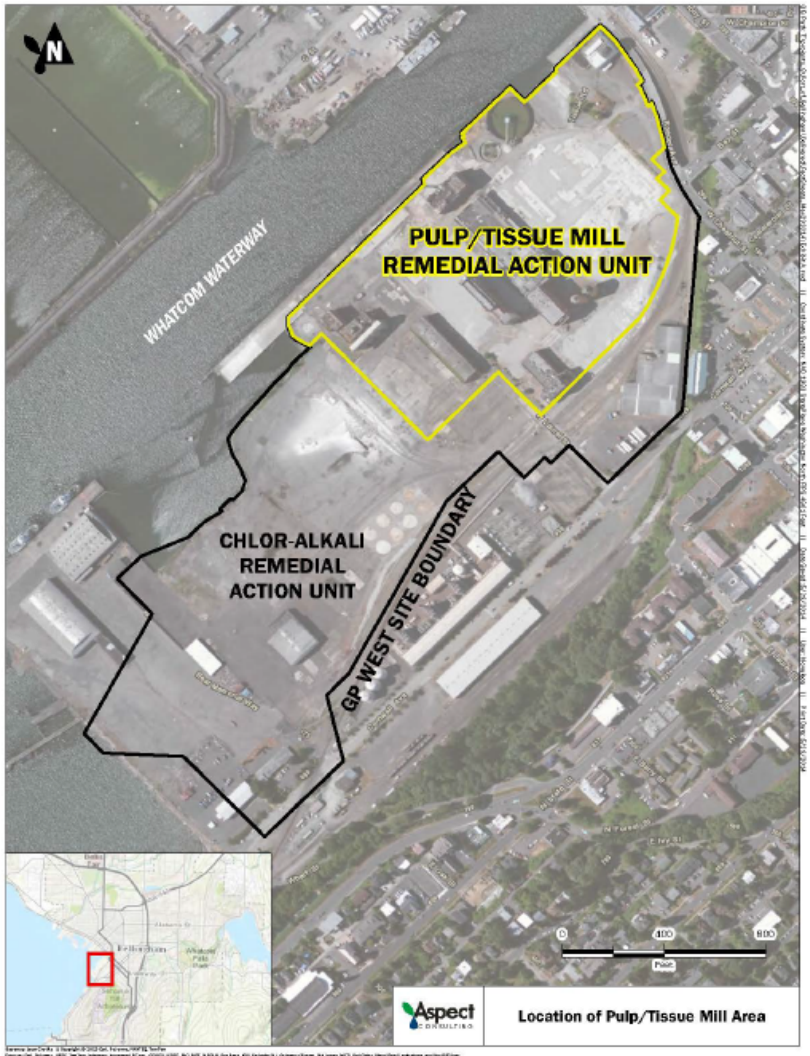

Figure B.6 Remedial Action Unites within the GP West Site
Source: Port of Bellingham and city of Bellingham Public Partnership, 2013

Appendix C: Air

Table C.1 EPA current NAAQS

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 $\mu g/m^3$ [1]	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb [2]	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm [3]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 $\mu g/m^3$	annual mean, averaged over 3 years
		secondary	1 year	15.0 $\mu g/m^3$	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb [4]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: EPA, 2017 C

Appendix D: Land and Shoreline Use

Examples of Slope Bioengineering

Each of the dozens of slope bioengineering techniques has its own advantages specific to different situations. A few examples are listed below:

1. Live stakes are a key element of almost all bioengineering projects. These are cuttings from plants that will grow roots when inserted into moist ground. Willows, dogwoods, and other shoreline species adapted to reproduce through cuttings are all viable candidates. Live stakes can be a simple and cost-effective way to bind soil in place and provide plant cover.

2. Fascines are long bundles of thin branches, tightly bound with twine. They are partially buried in trenches parallel to incoming waves and "nailed" into place with live stakes. These thick masses of branches provide immediate structural support, catch sediment coming from upslope, and can establish their own roots and new growth. Since they are usually composed of several different species, the resultant growth comes in as a thicket of mixed plants. For this reason, fascines should be placed carefully to avoid blocking views.

3. Live revetment is used to stabilize steep banks. Geotextile fabric holds earth-filled terraces in place. Further structural support is provided by live stakes driven through the fabric.

Source: City of Seattle, 2015

Selected Native Wetland and Aquatic Plants by Type and Habitat

HERBACEOUS PLANTS

Emergent in wet or moist soil

- Tufted hairgrass *(Deschampsia cespitosa)*
- Tall mannagrass *(Glyceria elata)*
- Reed mannagrass *(Glyceria grandis)*
- Daggerleaf rush *(Juncus ensifolius)*
- Common rush *(Juncus effusus)* — Plants sold in nurseries are typically not native and may form dense stands.
- Other rushes *(Juncus sp.)*
- Small-flowered woodrush *(Luzula parviflora)*
- Skunk cabbage *(Lysichiton americanum)*
- Yellow monkey-flower *(Mimulus guttatus)*
- Coltsfoot *(Petasites frigidus)*
- Cooley hedgenettle *(Stachys cooleyae)*

Emergent in standing water

Bulrushes
- Tule, Hardstem bulrush *(Scirpus acutus)*
- Wooly sedge, woolgrass *(Scirpus atrocinctus, S. cyperinus)*
- Small fruited bulrush *(Scirpus microcarpus)*

Sedges
- Slough sedge *(Carex obnupta)*
- Lenticular sedge *(Carex lenticularis)*
- Sawbeak sedge *(Carex stipata)*
- Beaked sedge *(Carex utriculata)* — May form dense stands.

Other emergents
- Creeping spike-rush *(Eleocharis palustris)*
- Water-parsley *(Oenanthe sarmentosa)*
- Wapato, arrowhead *(Sagittaria latifolia)*
- Bur-reeds *(Sparganium emersum, S. angustifolium)*
- Cattail *(Typha latifolia)*

King County
Lake Stewardship Program

SHRUBS

Tolerate standing water
- Red stem dogwood *(Cornus sericea* or *C. stolonifera)*
- Pacific ninebark *(Physocarpus capitatus)*
- Labrador tea *(Rhododendron,* or *Ledum, groenlandicum)*
- Hooker's willow *(Salix hookeri)*
- Sitka willow *(Salix sitchensis)* — Spreads easily.
- Mountain or subalpine spirea *(Spiraea densiflora)* — Mountain species that can tolerate sea level; not invasive.
- Hardhack *(Spiraea douglasii)* — Forms large dense thickets at water's edge. Consult with neighbors before planting!

Wet or moist soil
- Twinberry *(Lonicera involucrata)*
- Pacific crabapple *(Malus fusca)*
- Swamp gooseberry, swamp currant *(Ribes lacustre)*
- Swamp rose *(Rosa pisocarpa)*
- Salmonberry *(Rubus spectabilis)*
- Scouler's willow *(Salix scouleriana)*

Moist or damp soil
- Indian plum, Osoberry *(Oemlaria,* or *Osmeronia, cerasiformis)*
- Thimbleberry *(Rubus parviflorus)*
- Red elderberry *(Sambucus racemosa)*

Floating
- Yellow pond-lily/Spatterdock *(Nuphar luteum)* — Grows in up to 13 feet of water.

King County Department of Natural Resources and Parks
Lake Stewardship Program
201 S. Jackson St., #600
Seattle, WA 98104
206-296-6519

Source: King County Department of Natural Resources and Parks, 2017

Table D.1 Soft Shoreline Techniques for Improved Shoreline Functions

Shoreline Process or Function	Shoreline Stabilization Impact	Soft Shoreline Stabilization Attributes	Examples:
Sediment availability	Impound sediment	Does not significantly alter the amount of sediment entering the system	Projects that still allow some natural erosion; OR projects that use periodic beach nourishment/gravel placements that add appropriate amounts of sediment to the system.
Sediment transport	Impede longshore sediment drift	Allows sediment to travel along the drift cell	Projects that do not use structures that would act as groins within the drift cell.
Forage fish spawning	Scour and coarsen sediment; Displace shading riparian vegetation	Flexible materials that do not increase on site erosion and sediment scour; Natural materials that are the appropriate size for fish spawning; Plantings and retention of natural riparian vegetation	Projects that utilize spawning gravel; Projects with limited use of hard structures near the high tide line; Projects that use native vegetation that provides shade

Source: Gianou, 2014

Table D.2 Soft Shoreline Techniques for Improved Shoreline Functions

Shoreline Process or Function	Shoreline Stabilization Impact	Soft Shoreline Stabilization Attributes	Examples:
Backshore/upper beach habitat	Displace backshore habitat, including vegetation; Reduce shade; Reduce large woody debris accumulation; Impede terrestrial-aquatic connectivity; Scour and coarsen sediment	Natural locally found materials that are reflective of natural habitat conditions and appropriate size for fish spawning; Minimal use of artificial structures and materials; Allow for transfer of terrestrial material into aquatic system	Projects that utilize soft, naturally occurring materials such as sediment, large wood and vegetation; Projects that utilize spawning gravel; Projects that use no or limited amounts of artificial elements; Projects that incorporate overhanging vegetation for material input and shade
Intertidal habitat	Scour and coarsen sediment; Passive erosion; Steepen shoreline gradient	Soft, natural materials; Flexible design and materials; Low gradients	Projects that do not steepen the natural gradient of the shoreline; Projects that utilize flexible designs and natural materials to reduce scour and intertidal erosion; Projects that utilize appropriate sediment materials for invertebrate habitat

Source: Gianou, 2014

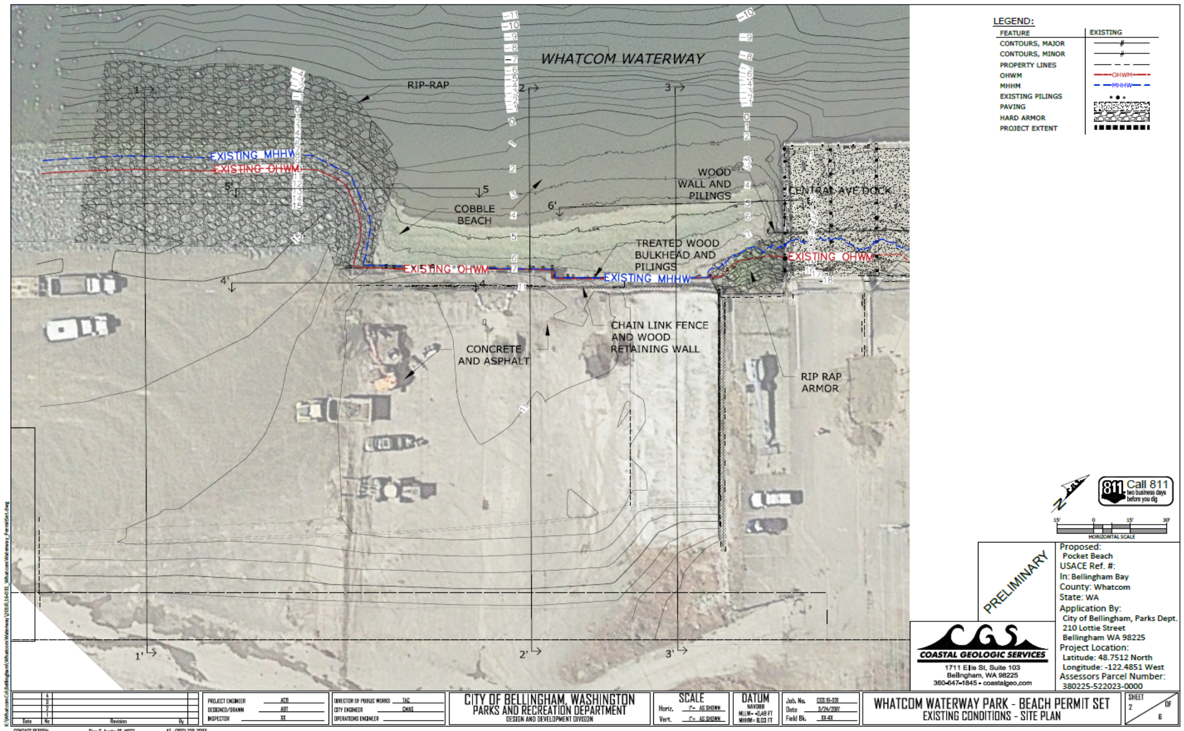

Figure D.1 Existing site conditions

Source: Coastal Geologic Services, 2017

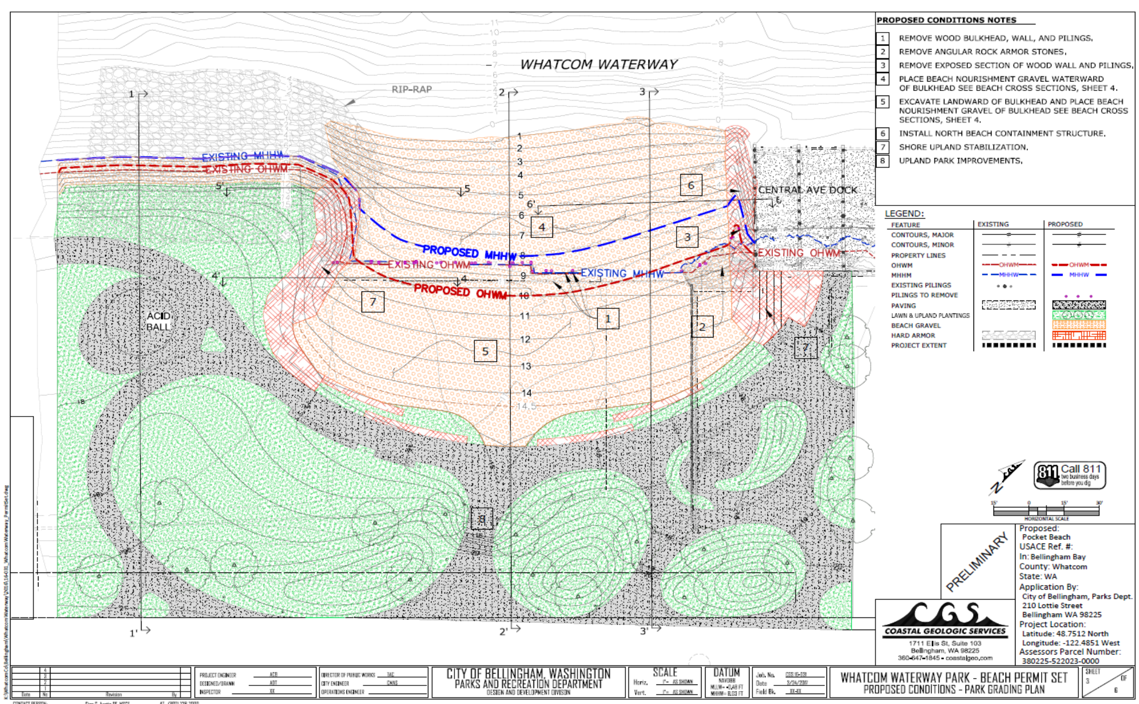

Figure D.2 Proposed conditions

Source: Coastal Geologic Services, 2017

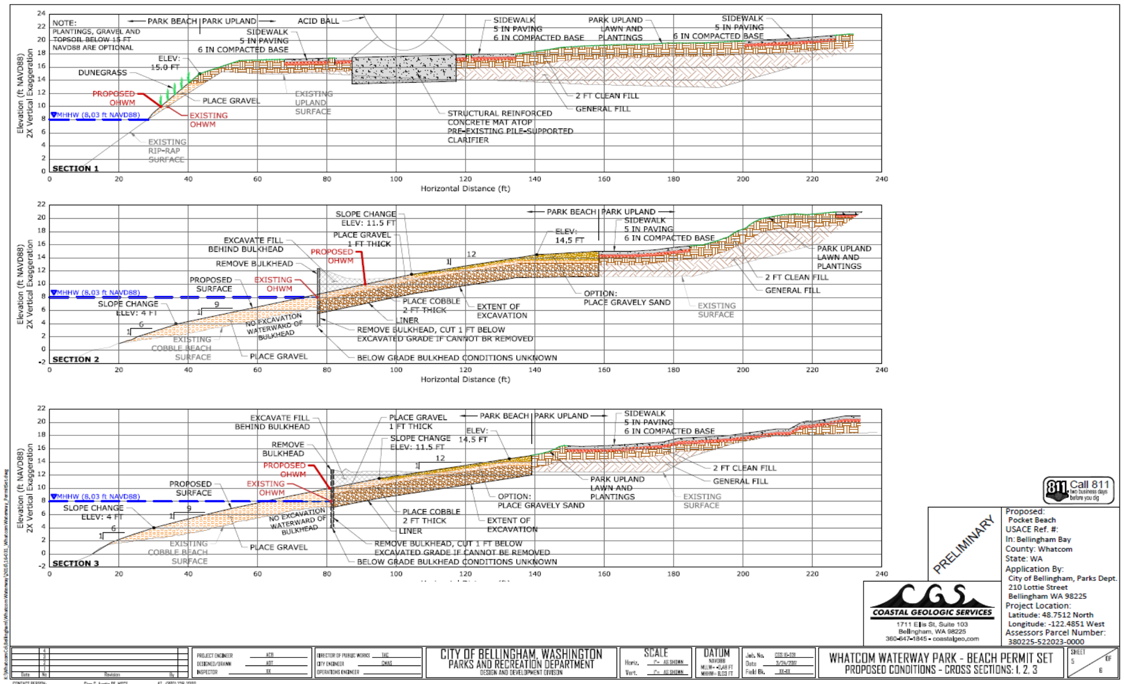

Figure D.3 Cross sections of Proposed Beach Conditions

Sources: Coastal Geologic Services, 2017

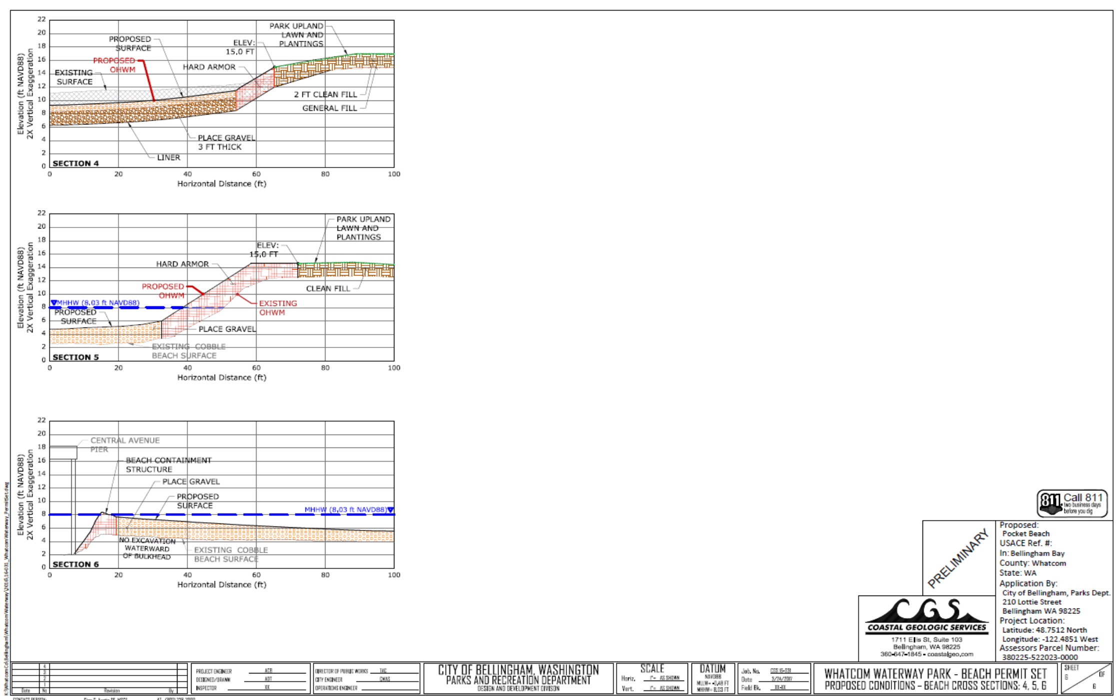

Figure D.4 Cross sections of Proposed Beach conditions

Source: Coastal Geologic Services, 2017

Appendix E: Light and Glare

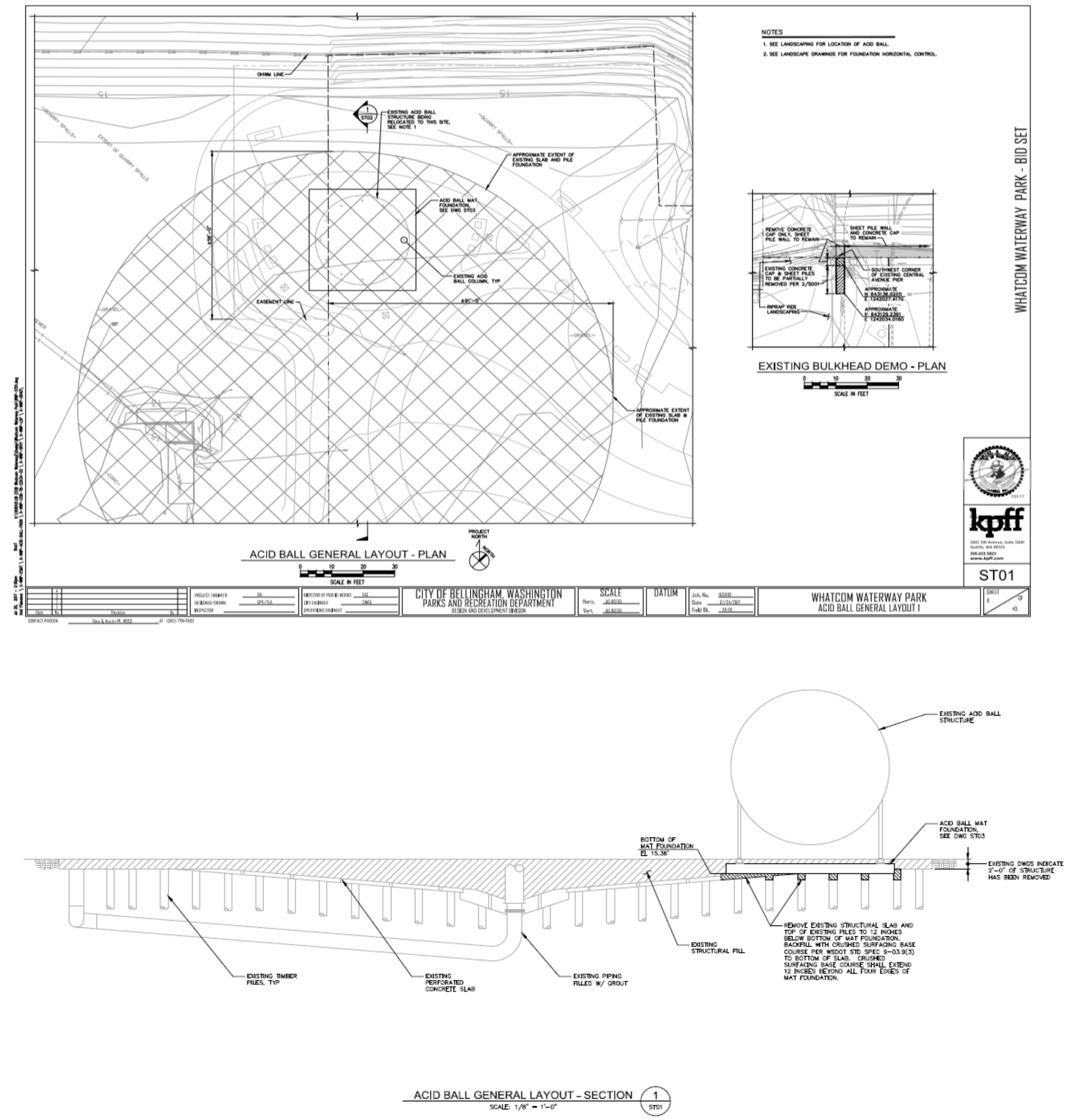

Figure E.1 Acid Ball Layout, A

Source: City of Bellingham, 2017 B

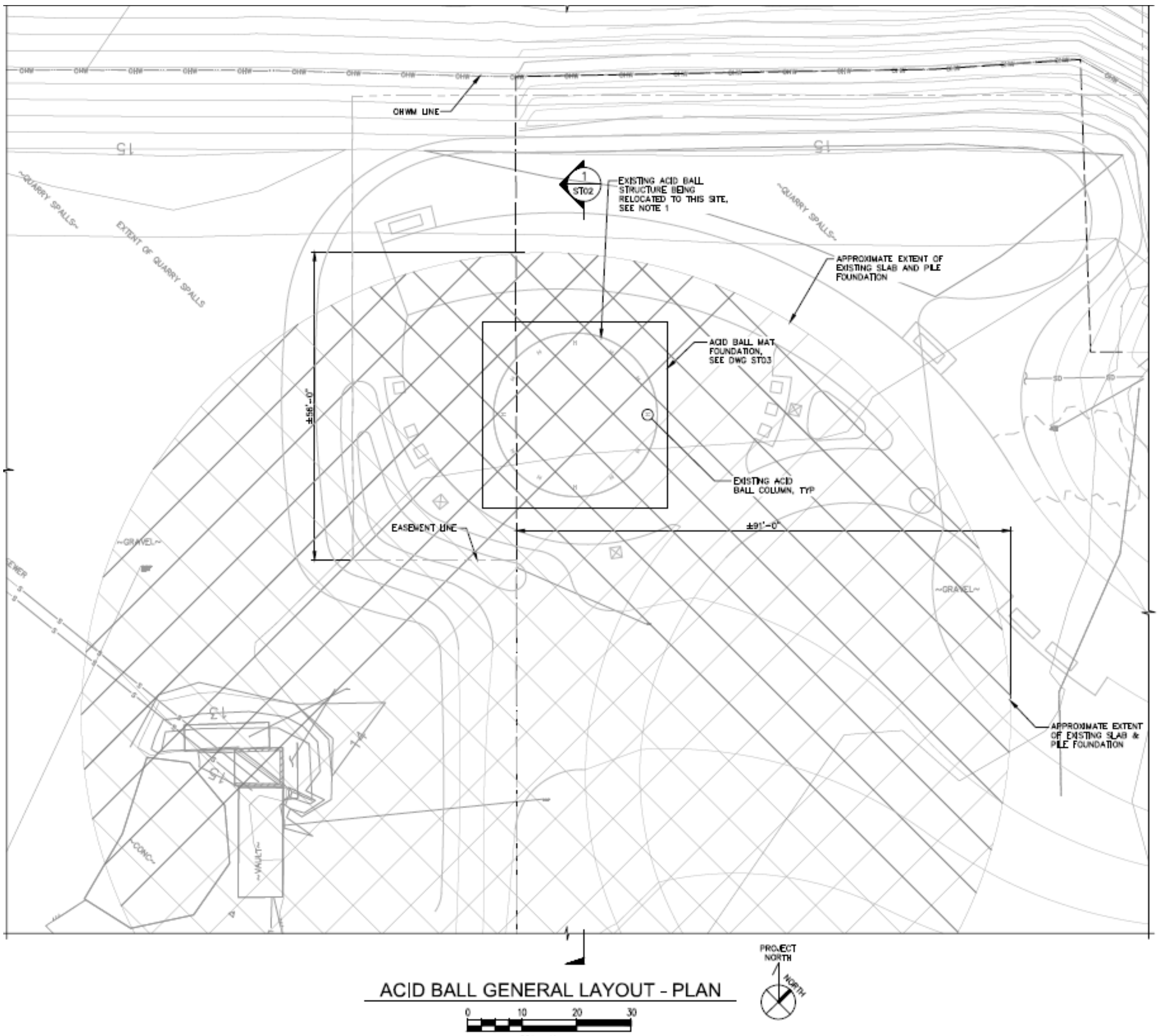

Figure E.2 Acid Ball Layout, B
Source: City of Bellingham, 2017 B

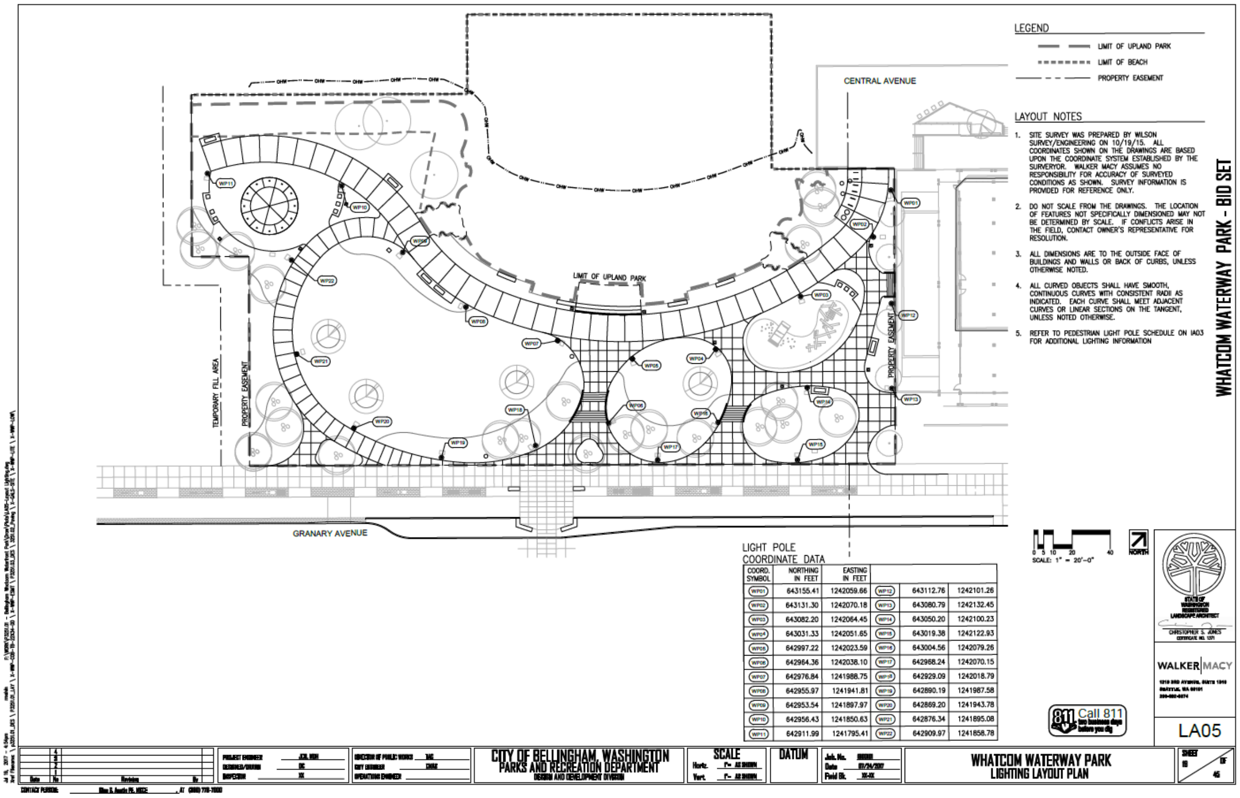

Figure E.3 Lighting layout plan
Source: City of Bellingham, 2017b

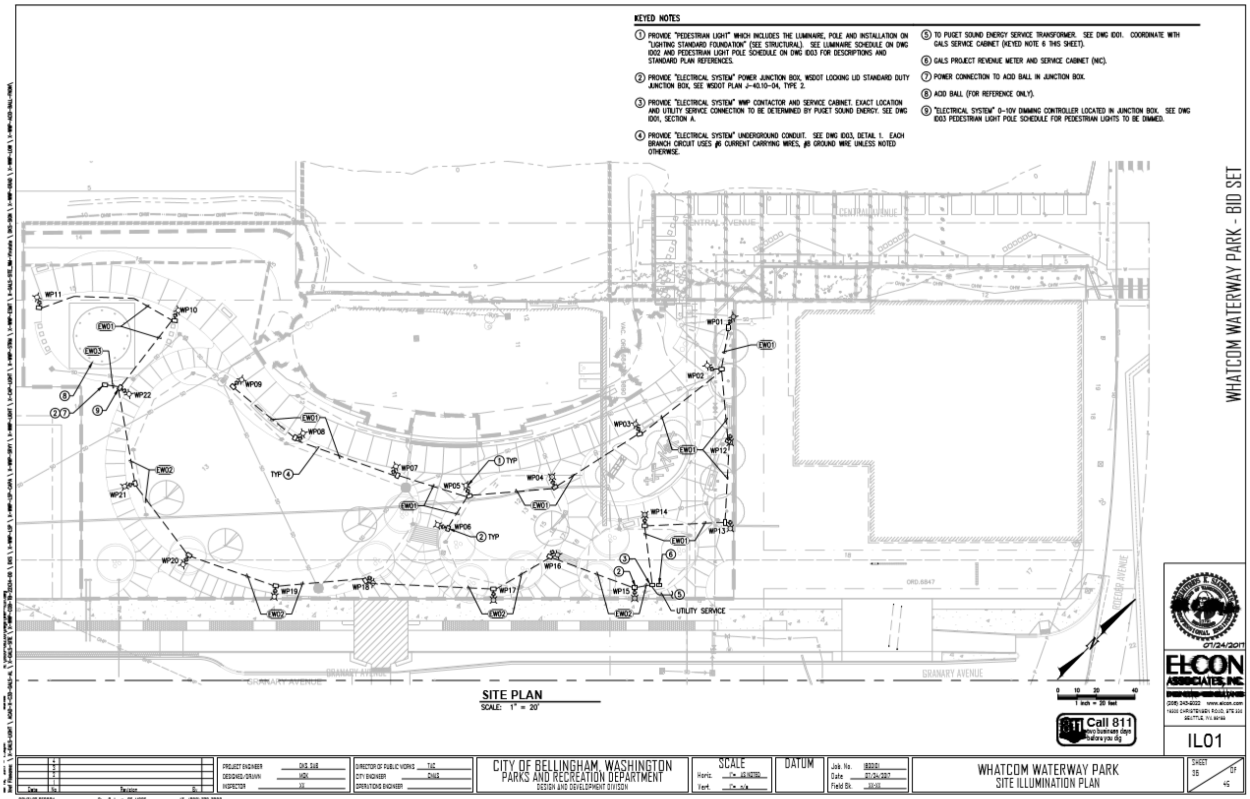

Figure E.4 Site Illumination Plan

Source: City of Bellingham, 2017b

Appendix F: Historic and Cultural Preservation

Table F.1 Archaeological potential along Bellingham Bay Shoreline

LANDFORM	DESCRIPTION	PRE-CONTACT ARCHAEOLOGICAL POTENTIAL	HISTORIC ARCHAEOLOGICAL POTENTIAL
Tideflats	The lowermost portion of the deltaic plain of the Nooksack and smaller stream deltas in northern Bellingham Bay. Tidal channels provided locations for weir and net fishing; gently sloping substrate provided platform for historic features on pilings or fill.	Moderate	Moderate
Delta	Upper intertidal zone and leading edge of the subaerial portion of the Whatcom Creek deltaic plain.	Moderate	Moderate
Tidal Wetlands	Small and possibly ephemeral wetlands that may have formed at the Whatcom Creek estuary	Low	Low
Beach	Beaches exhibit variable substrates which may be conducive to either habitation or resource harvesting, depending on local conditions.	High	Moderate
Bluffs	Bluffs define the back of the shoreline for much of the length of Bellingham Bay. Suitability for human use would vary according to topography and height of the bluff edge.	High	High

Source: Blueman and Associates, 2008

Figure F.1 Potential for finding Native American Archaeological Material
Source: Blueman and Associates, 2008