

Summer 2012

# Birch Bay shoreline enhancement: environmental impact assessment

Ellen Cole

*Western Washington University*

Laura Higashi-Poynter

*Western Washington University*

Ashley Hill

*Western Washington University*

Rachel Morton

*Western Washington University*

Brian Noel

*Western Washington University*

Follow this and additional works at: [https://cedar.wwu.edu/huxley\\_stupubs](https://cedar.wwu.edu/huxley_stupubs)



Part of the [Environmental Studies Commons](#)

---

## Recommended Citation

Cole, Ellen; Higashi-Poynter, Laura; Hill, Ashley; Morton, Rachel; and Noel, Brian, "Birch Bay shoreline enhancement: environmental impact assessment" (2012). *Huxley College Graduate and Undergraduate Publications*. 33.

[https://cedar.wwu.edu/huxley\\_stupubs/33](https://cedar.wwu.edu/huxley_stupubs/33)

This Environmental Impact Assessment is brought to you for free and open access by the Huxley College of the Environment at Western CEDAR. It has been accepted for inclusion in Huxley College Graduate and Undergraduate Publications by an authorized administrator of Western CEDAR. For more information, please contact [westerncedar@wwu.edu](mailto:westerncedar@wwu.edu).

# Birch Bay Shoreline Enhancement Environmental Impact Assessment



Western Washington University  
Huxley College of the Environment  
Environmental Risk Assessment Summer 2012



# DIGITAL RELEASE

Environmental Impact Assessment  
Huxley College of the Environment

We grant to Western Washington University the non-exclusive royalty-free right to archive, reproduce, distribute, and display this Environmental Impact Assessment document in any and all forms, including electronic format, via any digital library mechanism maintained by WWU.

We represent and warrant this is original work, and does not infringe or violate any rights of others. We warrant that we have obtained written permission from the owner of any third party copyrighted material included in this document.

We acknowledge that we retain ownership rights to the copyright of this work, including but not limited to the right to use all or part of this work in future work, such as articles or books. Library users are granted permission for individual, research and non-commercial reproduction of this work for educational purposes only. Any further digital posting of this document requires specific permission from the author(s).

Any copying or publication of this document for commercial purposes, or for financial gain, is not allowed without my/our written permission.

Signature \_\_\_\_\_  
Ellen Cole

Signature \_\_\_\_\_  
Laura Higashi-Poynter

Signature \_\_\_\_\_  
Ashley Hill

Signature \_\_\_\_\_  
Rachel Morton

Signature \_\_\_\_\_  
Brian Noel

Date \_\_\_\_\_

Dear Concerned Citizens,

This Environmental Impact Assessment (EIA) examines the potential environmental impacts from enhancing the Birch Bay shoreline. The purpose of enhancement is to provide easier access to the shoreline and beachfront area, better pedestrian and biker safety, and improvement of the roadway.

This document was created in compliance with the State Environmental Policy Act (SEPA) and follows the Washington Administrative Code (WAC) 197-11. A group of Western Washington University students constructed this document under the supervision of Professor Jean Melious as an academic exercise. This EIA should not be treated as an official document and is an academic version of SEPA's Environmental Impact Statement.

The proposed action includes constructing a wider beach, bike and pedestrian pathways, and aesthetically pleasing enhancements that will help improve the shoreline. These improvements will also bring better flood control, easier means of recreation, and a more sustainable waterfront.

This document utilizes scientific studies on impacts regarding similar projects, and past reports and documents about Birch Bay and potential redevelopment. We hope you find this document helpful and an informative assessment of the environmental impacts on the enhancement of the Birch Bay shoreline.

Sincerely,

The Birch Bay Shoreline Enhancement EIA Team

Signature \_\_\_\_\_  
Ellen Cole

Signature \_\_\_\_\_  
Laura Higashi-Poynter

Signature \_\_\_\_\_  
Ashley Hill

Signature \_\_\_\_\_  
Rachel Morton

Signature \_\_\_\_\_  
Brian Noel

WESTERN WASHINGTON UNIVERSITY

# Birch Bay Shoreline Enhancement

Environmental Impact Assessment

Environmental Studies 436  
Professor Jean Melious

Ellen Cole  
Laura Higashi-Poynter  
Ashley Hill  
Rachel Morton  
Brian Noel

This report represents a class project that was carried out by students of Western Washington University, Huxley College of the Environment. It has not been undertaken at the request of any persons representing local governments or private individuals, nor does it necessarily represent the opinion or position of individuals from government or the private sector.

# FACT SHEET

## Title

Birch Bay Shoreline Enhancement

## Description

This Environmental Impact Assessment (EIA) is based on the State Environmental Policy Act (SEPA) and the requirements for any proposed action that has a significant, adverse impact on the environment. The requirements for the actions are laid out in Chapter 197-11 of the Washington State Administrative Code (WAC).

The proposed action for the Birch Bay Shoreline Enhancement is to make both waterside and landside improvements in the areas paralleling Birch Bay Drive between the mouth of Terrell Creek north and the mouth of Rogers Creek. The waterside improvements will include the removal of fill and debris along the specified shoreline areas and replacing with a sand covered gravel berm. A portion of the berm will underlie the pedestrian pathway that will consist of a sidewalk and rain garden with native vegetation. Landside improvements will largely focused on Birch Bay Drive itself with the entire reconstruction of the road and the addition of two five foot bike lanes (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

The alternative action will include the same shoreline enhancement as outlined in the proposed action, however, added with the placement of trash and recycling receptacles which will help to minimize litter on the beach that could be a result of increased pedestrian use after the new walkway is built. Furthermore, the construction of designated beach access points will help to mitigate beach erosion and protect the important rain garden, and with the removal of invasive shoreline vegetation, and planting of native vegetation, better coastal processes will be in place.

## Location of Site

Birch Bay is located north of Bellingham, Washington. The site is located on the shoreline and the floodplain next to Birch Bay Drive between the mouth of Terrell Creek north to the mouth of Rogers Creek. The intersection of Harborview Drive and Birch Bay Drive divides the site into two reaches, the Cottonwood (north) and the Central (south) Reach. The two reaches indicate slight differences in the project, but reflect the entire area that will be enhanced under the proposed action (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

**Proposer**

Huxley College of the Environment Environmental Impact Assessment Summer  
2012- Environmental Studies 436

**Lead Agency**

Whatcom County  
Planning and Development Services  
5280 Northwest Drive  
Bellingham, Washington 98226-9097

**Approvals and Permits**

Endangered Species Act (ESA) Section 7 Consultation (requiring a consultation  
by the U.S. Army Corps of Engineers with National Oceanic and Atmospheric  
Administration and U.S. Fish and Wildlife)

National Historic Preservation Act Section 106 Consultation

Clean Water Act Section 404 Permit (Nationwide Permit 27-Aquatic Habitat  
Restoration, Establishment, and Enhancement Activities

Clean Water Act Section 401 Water Quality Certification

Coastal Zone Management (CZM) Act Consistency Determination

Construction Stormwater General Permit (NPDES)

State Hydraulic Code- Hydraulic Project Approval (HPA)

Shoreline Substantial Development Permit

**Contact Person**

Jean Melious, J.D.  
Associate Professor  
Huxley College of the Environment  
Western Washington University  
Bellingham, Washington 98225

## **EIA Contributors**

Ellen Cole: Aesthetics, Housing, Land and Shoreline Use, Light and Glare  
Laura Higashi-Poynter: Animals, Energy and Natural Resources  
Ashley Hill: Land and Shoreline Use, Vegetation, Water  
Rachel Morton: Public Services, Recreation, Utilities  
Brian Noel: Air, Earth, Environmental Health and Noise, Transportation

## **Distribution List**

Kathy Berg, Chair  
Birch Bay Steering Committee  
Birch Bay, Washington 98230

Kate Blystone  
Director, Whatcom Chapter of Futurewise  
1155 N. State Street #310  
Bellingham, WA 98225

Jean Melious, J.D.  
Associate Professor  
Huxley College of the Environment  
Western Washington University  
Bellingham, Washington 98225

Wilson Library  
Western Washington University

Huxley College Electronic File

Environmental Impact Assessment Team Contributors

## **Acknowledgements**

The following people deserve many thanks for their guidance and assistance in the making of this document:

Jean Melious, J.D., Associate Professor, Western Washington University

Katie Skipper, Communications Manager for the Bellingham Field Office,  
Department of Ecology

Kathy Berg, Chair, Birch Bay Steering Committee



Kate Blystone, Director, Whatcom Chapter of Futurewise

Roland Middleton, Special Projects Manager, Whatcom County Public Works

**Issue Date**

July 26, 2012

**Public Hearing**

10:00 AM; Wednesday, July 25, 2012

Western Washington University, Academic West: Room 405  
516 High Street  
Bellingham, Washington 98225

# Table of Contents

Digital Release.....	2
Dear Concerned Citizens Letter.....	3
Fact Sheet.....	5
Table of Contents.....	9
List of Figures and List of Tables.....	10
Executive Summary.....	11
Glossary of Technical Terms, Acronyms, and Abbreviations.....	19
Section 1. Background of the Proposal & Alternatives Considered	
1.1 Proposed Action.....	22
1.2 Alternative Action.....	22
1.3 No Action Alternative.....	23
1.4 Decision Matrix.....	25
Section 2. Natural Environment: Affected Environment, Impacts and Mitigations	
2.1 Water.....	27
2.2 Earth.....	31
2.3 Air.....	35
2.4 Vegetation.....	37
2.5 Animals.....	40
2.6 Environmental Health and Noise.....	43
2.7 Energy and Natural Resources.....	46
Section 3. The Built Environment	
3.1 Land and Shoreline Use.....	49
3.2 Transportation.....	53
3.3 Public Services.....	55
3.4 Utilities.....	56
3.5 Recreation.....	57
3.6 Aesthetics.....	58
3.7 Housing .....	59
3.8 Light and Glare.....	60
APPENDIX.....	62
References.....	71

## LIST OF FIGURES

Figure 1. Location in Whatcom County, Washington and conceptual phasing as laid out in the proposed action.

Figure 2. Conceptual cross section of shore and landside renovation

Figure 3. Typical cross section of the landside reach

Figure 4. Roadways along Birch Bay Drive

Figure 5. Close up of roadways along Birch Bay Drive

Figure 6. Watersheds and waterways in Whatcom County

Figure 7. Coastal Drainage Stations indicating water quality status

Figure 8. Soils in Whatcom County

Figure 9. Species and spawning areas

Figure 10. Sound Pressure Levels in Birch Bay

Figure 11. Zoning and parks in Birch Bay

## LIST OF TABLES

Table 1. Green House Gas Emissions Analysis for Birch Bay Drive

Table 2. Maximum Permissible Environmental Noise Levels (dBA)

## Executive Summary

### Proposal Objectives and Project Purpose

The objective of the Birch Bay Shoreline Enhancement Project is to enrich the Central and North Birch Bay community by creating better access to the shoreline and beachfront area, constructing a pathway, and widening of the beach to help with flood control, aesthetics, ecosystem function, and sustainability. This will be accomplished by bettering the roadways and creating a pedestrian and bike friendly pathway that will run between the water and Birch Bay Drive. The project will focus on two specific areas—The Central Reach and The Cottonwood Reach (Figure 1). These are separate, as most of the intensive waterside and landside improvements will be made in the Central Reach. Waterside improvements will extend into the Cottonwood Reach to address the very narrow beach and flood risk to residences (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

The motivation for this project had its beginnings in the late 1970's and early 1980's. Wolf Bauer designed the Birch Bay Shore Resource Analysis that contained detailed sketches of his shoreline plan (consequently these sketches were used in the design of the proposed action for the current Birch Bay Shoreline Enhancement) (Appendix A1). In 1982 Birch Bay Drive was flooded and this storm event spurred community and governmental review of the current infrastructure on and near the shoreline. In 1986 a test renovation was performed on a portion of the bay. Characteristics of this test will be carried over in the current proposed action such as the installation of the gravel berm and beach nourishment. As a result, this proposal is a culmination of community and Whatcom County involvement over the last 30 years and has the potential to infuse socioeconomic vitality (<sup>2</sup>Philip Williams & Associates, Ltd., 2007).

With the implementation of the proposed action, the health of the coastal environment will improve through the restoration of more natural coastal processes like shoreline weathering, sediment transport and deposition, and coastal erosion. Planting raingardens will assist in the process of stormwater management and filtration. Plus, the restoration will improve pedestrian and cyclist safety, enhance the aesthetic value of Birch Bay, and better the roadway (<sup>3</sup>Philip Williams & Associates, Ltd., 2007.; Coastal processes, National Park Service).

### Site Description

Birch Bay is located about 20 miles north of Bellingham, Washington (Figure 1). The Birch Bay Community is active in its environmental protection and has participated in the establishment of the Birch Bay Watershed and Aquatic Resources Management District that helps to monitor stormwater and water quality. Birch Bay contains each critical area as defined by the Washington State Growth Management Act. The critical areas are wetland recharge areas (Appendix D), aquifer recharge areas, frequently flooded areas (Appendix E), geologically hazardous areas, and fish and wildlife habitat conservation areas.

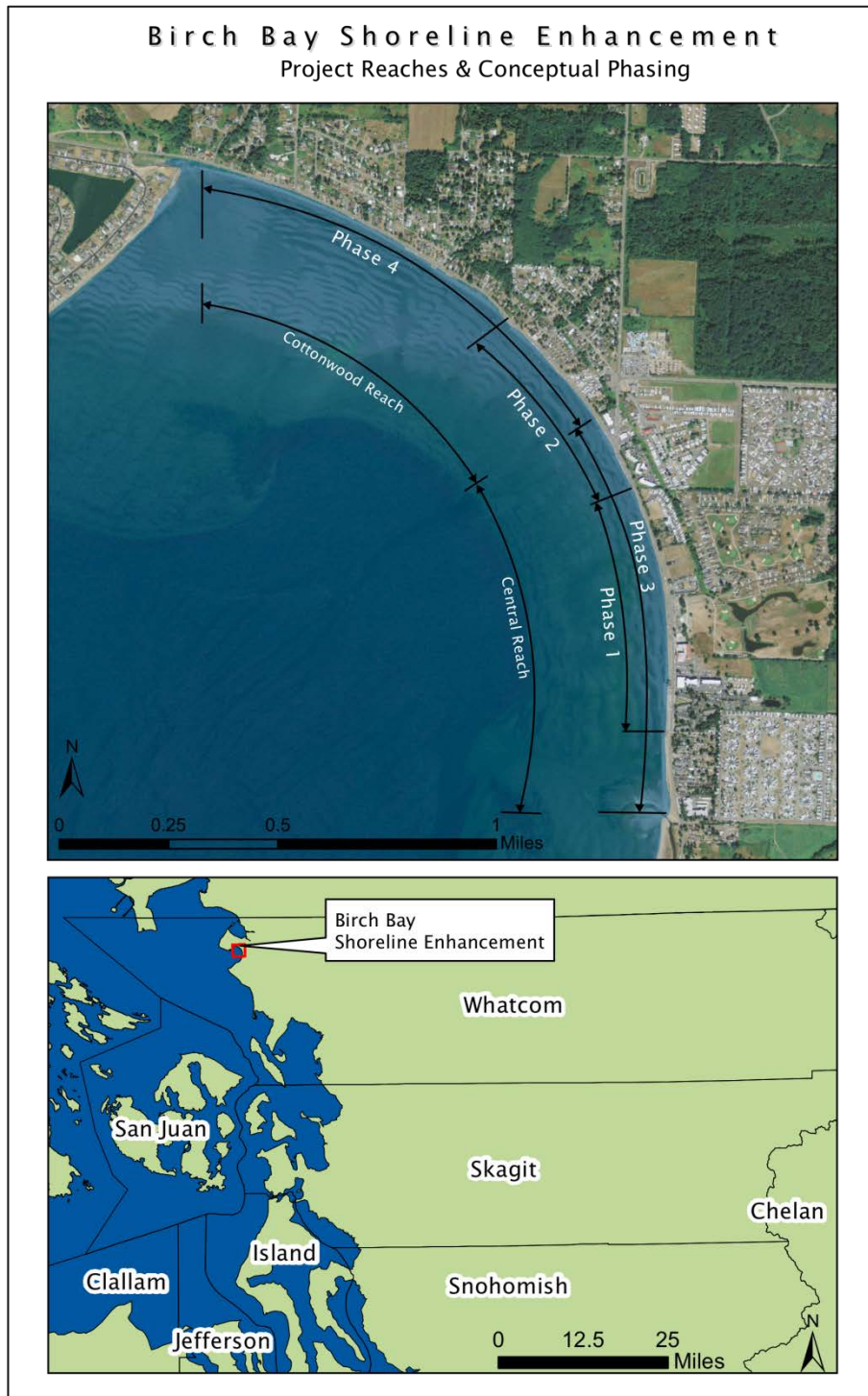


Figure 1. Location in Whatcom County, Washington and conceptual phasing as laid out in the proposed action.

## Legal Site Description

Public land survey system coordinates: SE ¼, SW ¼, NE ¼, sec.30, T40N.,R1W  
Longitude & Latitude: 122°44'57" West, 48°56'15"North

## Proposed Action

The Birch Bay Shoreline Enhancement Project outlines the improvement of the shoreline along Birch Bay Drive in Birch Bay, Washington. The project scope ranges from landside reconstruction to waterside renovation and enhancement (Figure 2). This project is currently in its second phase and is planned to be completed by 2015. The phases for the project can be seen in Figure 1. Phases I, II, and III will focus on the Central Reach portion of the proposed project.

Phase IV will focus on the Cottonwood Reach (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

Landside improvement will impact the Central and Cottonwood Reaches differently. In the Central Reach the enhancement will consist of complete road reconstruction of Birch Bay Drive, addition of bike lanes, curbs, a possible sidewalk, a pedestrian pathway, and a raingarden on the waterside of the roadway. In the Cottonwood Reach the roadway will also be reconstructed with some relocation, possible construction of bike lanes, construction of a pedestrian and bike trail, and the installation of raingardens. In both the Central and Cottonwood Reaches the utilities will be placed underground. The construction in each of the reaches will have similar environmental impacts and to mitigate some impacts the construction in each reach is to occur over the course of one year per phase (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

The waterside elements and enhancement will be constrained to the Central Reach and the southernmost 1,500 feet of the Cottonwood Reach. The waterside renovation is planned to be consistent with an original bayscape project compiled by Wolf Bauer in 1975 (Appendix A1) (Bauer, 1975) along with a test section that was constructed in 1986 and finally with the configuration created by Philip Williams & Associates in 2002 (Figure 3). These documents culminated in a sand-covered gravel berm that will rise 1 foot above the current level of Birch Bay Drive, will be 15 feet wide, and host a pedestrian and bike trail. In order for this berm to be constructed all current debris and fill will be removed. Storm Drain Outfalls that are consistent with the Birch Bay Comprehensive Stormwater Plan (BBCSMP), such as passive flap or duckbill tide gates, will also be put in place (<sup>3</sup>Philip Williams & Associates, Ltd., 2007). Duckbill tide gates are meant to prevent backflow (Tideflex).

## Alternative Action

The alternative action will include all the features of the proposed action including additional waterside and landside improvements such as construction of signage designating shoreline access points, solar powered lighting along the pedestrian pathway, removal of invasive vegetation, and installation of garbage and recycle stations along the shoreline area.

## **Impact Summary**

### **Water**

Significant impacts on water are focused on sedimentation during construction as well as impacts on water quality throughout the project and after its completion. The expansion of Birch Bay Drive will increase impervious surfaces, which in turn will lead to an increase of polluted stormwater entering the bay. Mitigation measures include retrofitting of the stormdrain outfalls and water quality monitoring during and after the project.

### **Earth**

On either side of the bay there are headlands and these will provide the source of sand and gravel for the berm and beach infill. The removal of this material will impact the currently eroded headlands as there is no plan to mitigate their erosion.

### **Air**

Odor and potential health concerns from paving Birch Bay Drive along with carbon dioxide release from concrete used during sidewalk construction are considered to be notable impacts. During construction the dumping of sand and gravel causes increased particulate matter in the air during which could exacerbate conditions such as asthma or chronic bronchitis. There will also be an increase in average car volume along Birch Bay Drive, which is correlated with increased carbon dioxide emissions. These impacts will not be mitigated, as they are non-point sources of pollution.

### **Vegetation**

Vegetation on the site is minimal. Few native and invasive species will be impacted during construction, and after construction the native plants have the capacity to create more diverse, self-mitigating community.

### **Animals**

Shellfish, salmon, herring, and Great Blue Herons are among the species that will be significantly impacted during this project. Vibrations from construction have the potential to increase turbidity in the water. In order to mitigate effects on the sensitive aquatic receptors, work on the shoreline is limited to specific windows that will protect habitat during spawning periods.

### **Environmental Health and Noise**

Chemicals that will be used during road construction (ie. Asphalt) can have adverse effects on human health such as increased rates of headache and throat and eye irritation. There are no mitigation measures in place. In addition, noise during construction will increase. It is uncertain to what level the noise will increase as no previous study has been completed. There are also no mitigation measures in place to address noise.

### **Energy and Natural Resources**

The sand and gravel that will be used in construction of the berm will be sourced from the Birch Bay headlands. Use of this resource is not expected to have a significant impact. There are no plans to mitigate natural resources.

### **Land and Shoreline Use**

Currently, land use is mostly residential and commercial and is immediately adjacent to the site on the landside of Birch Bay Drive. There will be no significant impacts to the land use and there are no mitigation measures surrounding land use. Shoreline use, however, will be significantly impacted. The construction of the berm and removal of current beach protection structures could cause sedimentation in the water. Mitigation for shoreline use will include using local sediment for the berm and restoring natural beach processes involving wave action.

### **Transportation**

Peak traffic volume along Birch Bay Drive ranges from 130 vehicles per hour (vph) to 650 vph. These traffic volumes are expected to increase but will not have a significant impact. There are no planned mitigation measures.

### **Public Services**

Birch Bay is an Unincorporated Growth Area (UGA) and as a result public services are dispersed throughout Birch Bay and other municipalities such as Ferndale and Blaine. This project will have no significant impact on Public Services and does not have planned mitigation measures.

### **Utilities**

Onsite utilities include one portable toilet and telecommunication poles, which harbor lighting and electrical utilities. The proposed action will relocate the telecommunication utilities underground. The exact site of this relocation is yet to be determined. No significant impact will occur and no mitigation is planned.

### **Recreation**

Recreation along the shoreline in Birch Bay will be limited and temporarily interrupted during the construction phase of the project. Post project completion will improve the quality of recreational services provided by the installation of a wide, crushed limestone pedestrian/ bike pathway.

### **Aesthetics**

The proposed action will not have a significant impact, but it will improve the aesthetic character of the waterfront by removing telephone poles, beach groins, and riprap. No mitigation measures are proposed to reduce or control aesthetic impact.

### **Housing**

There will be no significant impacts on housing, with disturbance only during construction. No mitigation measures have been established.



**Light and Glare**

No significant impacts involving lighting will occur and there are no plans for mitigation.

**Significant adverse impacts that cannot be mitigated**

The impacts described below cannot be mitigated due to the fact that they are a byproduct of the construction. These impacts include temporary disturbances to air quality, soil stability, and noise generation, which will have significant adverse impacts only during the construction phase; after which the effects will be self-mitigating. Water quality will also be temporarily disturbed during the construction phase, but will remain a significant adverse impact after construction due to stormwater pollutants.

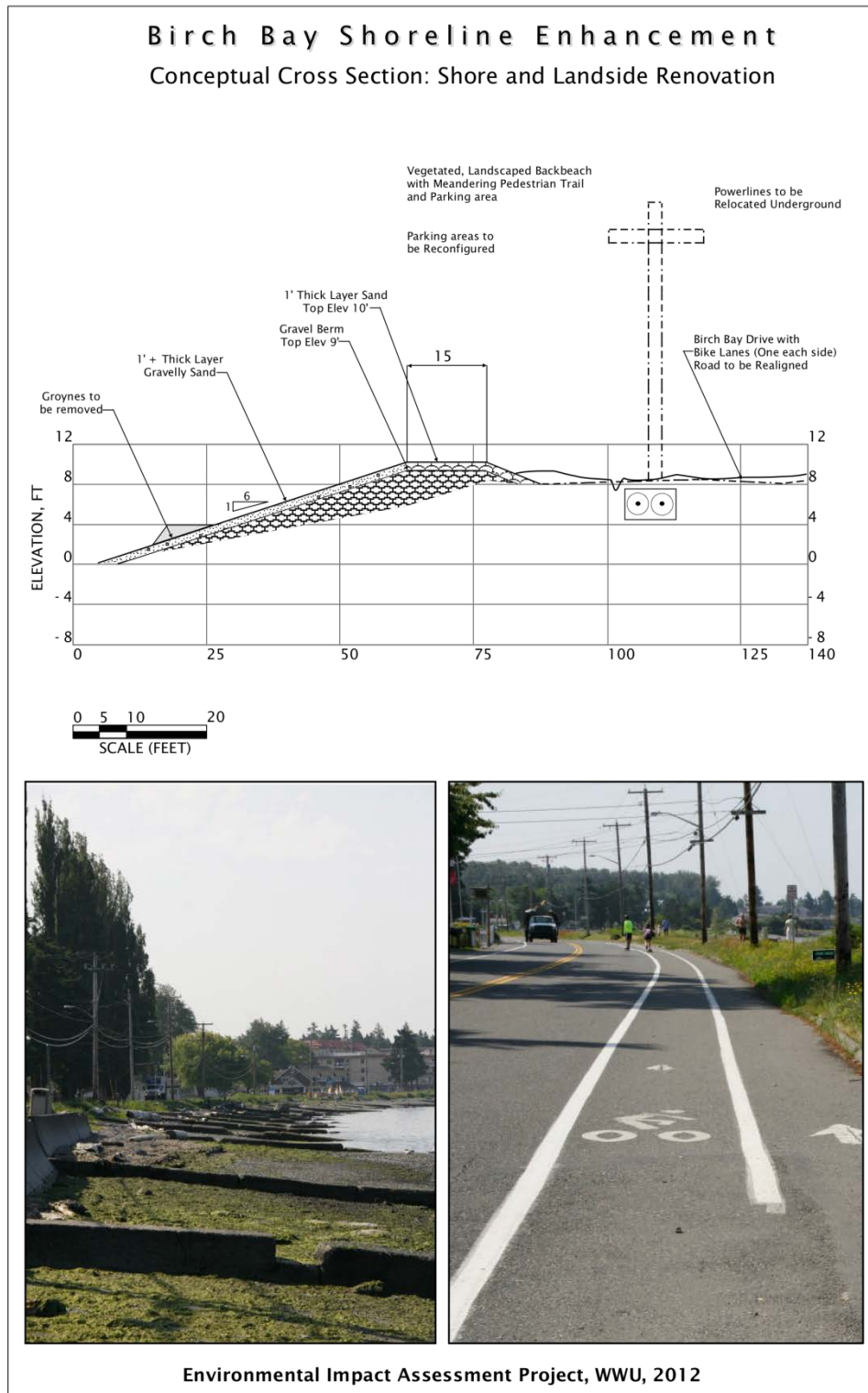


Figure 2. Conceptual cross section of shore and landside renovation

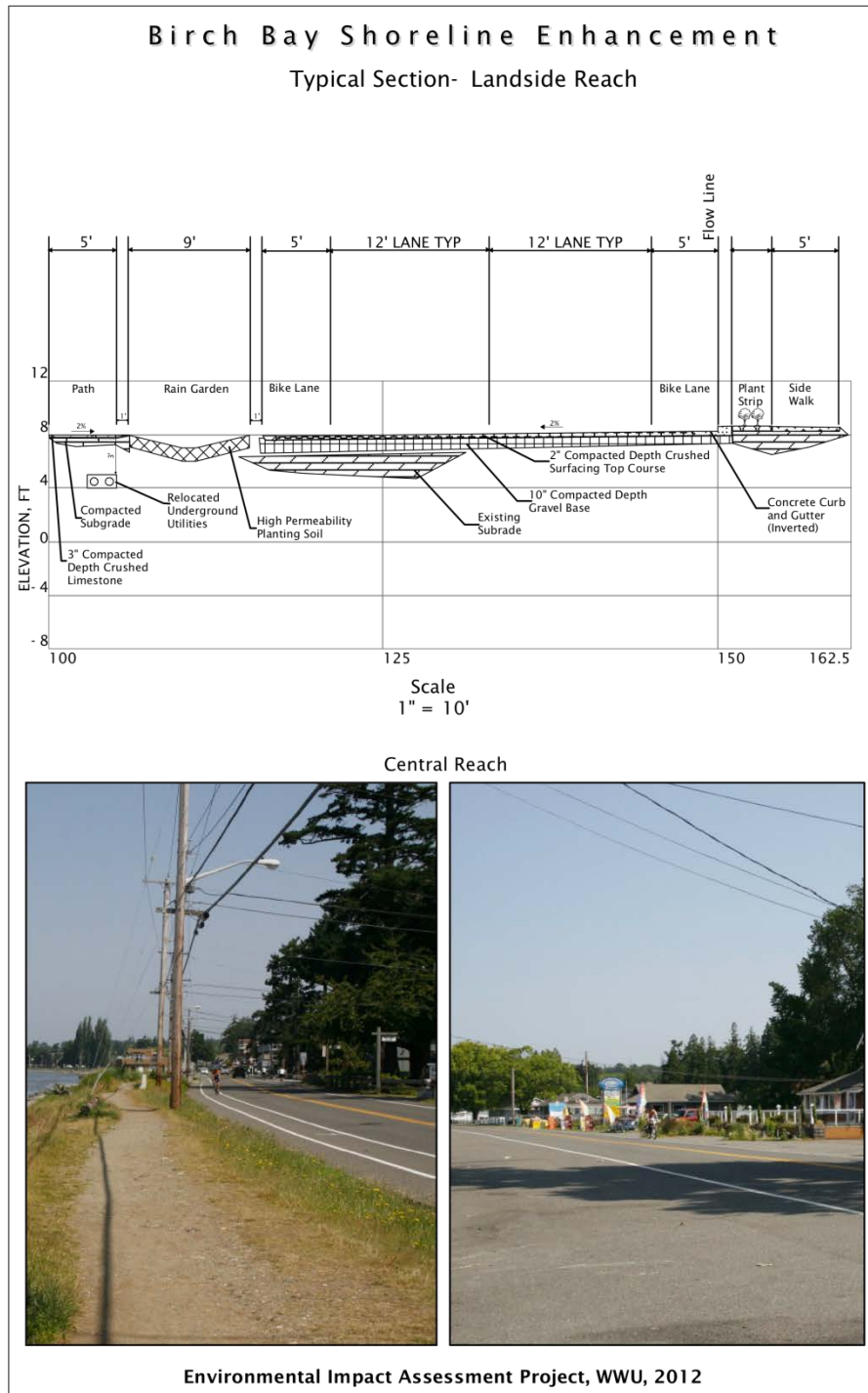


Figure 3. Typical cross section of the landside reach

# GLOSSARY OF TECHNICAL TERMS, ACRONYMS, AND ABBREVIATIONS

**ADA:** Americans with Disabilities Act  
**AQI:** Air Quality Indices  
**BBCSMP:** Birch Bay Comprehensive Stormwater Plan  
**CTR:** Commute Trip Reduction  
**CZM:** Coastal Management Zone  
**dBA:** Weighted Decibel Rating  
**DMS:** Dimethyl Sulfide  
**DO:** Dissolved Oxygen  
**EDMA:** Environmental Designation for Noise Abatement  
**EIA:** Environmental Impact Assessment  
**ESA:** Endangered Species Act  
**HPA:** State Hydraulic Code- Hydraulic Project Approval  
**MHHW:** Mean Higher High Tide  
**MLLW:** Mean Lower Low Tide  
**NOAA:** National Oceanic and Atmospheric Administration  
**NPDES:** Construction Stormwater General Permit  
**RSLR:** Relative Sea Level Rise  
**SEPA:** State Environmental Protection Act  
**TSP:** Suspended Particulates in the Air  
**UGA:** Unincorporated Growth Area  
**Vph:** Vehicles Per Hour  
**WAC:** Washington Administrative Code  
**WCC:** Whatcom County Code (16.08)  
**WTA:** Whatcom Transit Authority

**Anthropogenic:** referring to human impacts on the environment  
**Berm:** a raised bank, or terrace which serves as a buffer between the body of water and the landside shoreline  
**Bivalves:** an aquatic mollusk that has a compressed body enclosed within two hinged shells  
**Diurnal:** during the day or active in the daytime  
**Glacial till:** unsorted glacial sediment  
**Greenhouse Gas (GHG):** a gas in the atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. Although carbon dioxide and other GHGs are naturally occurring in the atmosphere, an overabundance is thought to negatively contribute to climate change  
**Groins:** a low wall or sturdy timber barrier built out into the sea from a beach to check erosion and drifting  
**Headlands:** a narrow piece of land that projects from a coastline into the sea  
**Impervious surfaces:** mainly artificial structures--such as pavements (roads, sidewalks, driveways and parking lots) that are covered by impenetrable materials such as asphalt, concrete, brick, and stone and rooftops, soils compacted by development are also highly impervious

**Invertebrates:** an animal lacking a backbone, such as an arthropod, mollusk, annelid, coelenterate, etc.

**King tides:** the very highest of high tides

**Municipalities:** city or town that has corporate status and local government

**Nutrient cycling:** continuous cycling through an ecosystem of minerals, compounds, or elements that promote biological growth or development

**Paratransit:** a type of transportation which is not restricted to standard public transit routes, services include pick-up and drop-offs which can be scheduled to meet the individual's needs, typically paratransit is utilized by older clientele and peoples with disabilities

**Pathogens:** bacterium, virus, or other microorganism that can cause disease

**Raingarden:** islands of vegetation (often using native plants) in depressed areas at the edge of impervious surfaces that capture water runoff, particularly after storms, and lessen damage to streams and other waterways

**Riparian zone:** the interface between land and a river or stream

**Riprap:** loose stone used to form a foundation for a breakwater or other structure

**Sedimentation:** the phenomenon of sediment or gravel accumulating

**Soil compaction:** pressing of soil that removes pores, eliminating water- and air-holding capacity

**Turbidity:** muddiness created by stirring up sediment or having foreign particles suspended

**Watershed:** a geographical region drained by a river, river system, or other body of water

## Section 1

### Background of the Proposal & Alternatives Considered



## 1.1 Proposed Action

The phasing of the proposed action for the shoreline enhancement was to have minimum impacts on local business, homeowners, and the environment. The project is expected to occur in four phases. Phase I will entail waterside renovations from north of the mouth of Terrell Creek to the area near the intersection of Harborview Drive and Birch Bay Drive (Figure 4 & 5). Phase II will involve waterside improvements from the south end of the current parking area to the area near Beach Way Drive and Birch Bay Drive. Phase III will have landside improvements from the mouth of Terrell Creek to the area near Birch Bay Drive and its intersection with Harborview Drive. Finally, Phase IV, will involve the landside improvements from the area near the intersection of Harborview Drive and Birch Bay Drive to the mouth of Rogers Creek (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

Within the scope of the proposed action the landside enhancements will impact the Central and Cottonwood Reaches (Figure 1). The reconstruction of the road, Birch Bay Drive, will improve road conditions and allow for the entrance of trucks for sediment transport and installation of pavement and cement. The road reconstruction will entail repaving, striping, and new signage along with the addition of two 5 foot wide bike lanes and vertical curbs. There will be repairs made to the public parking facilities that lie next to the current sea wall. A sidewalk will be added to the landside of the roadway if space allows. The rain garden on the waterside of the roadway will be planted with native species of plants to aid in stormwater management (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

Waterside enhancements cover several aspects of stormwater management, flood control and restoration of natural coastal and beach processes. To do this local sediment will be used as fill, along with recovered driftwood, to restore natural coastal morphology that will assist in flood mitigation and stormwater runoff. Along with the installment of the berm, most of the groins that are currently in place will be removed, thereby reestablishing a more aesthetically pleasing beach area. No enhancement will occur in front of what used to be the Bluefish Restaurant on the waterfront or to the boat launch at the end of Cedar Road. The separation of the Cottonwood and Central Reaches will also dictate the design of the waterside improvements. In the Central Reach the beach will be restored by the removal of groins and fill and replacing these with beach nourishment in the form of the berm. The proposed action also calls for planting native plant species along the backshore and in areas along the landward edge of the beach. The pedestrian walkway (on the waterside of the roadway) will sit on the upland area of the restored coastline. In the Cottonwood Reach only the southern most 1,500 feet of beach will undergo beach nourishment (<sup>3</sup>Philip Williams & Associates, Ltd., 2007).

## 1.2 Alternative Action

The alternative action is not expected to alter the current phasing laid out in the proposed action and will fit in with the permitting and permissions required for the

proposed action. With the addition of solar powered pedestrian walkway lights, the need for power lines is still eliminated. The removal of invasive vegetation along the shoreline will aid in management of flooding and stormwater. In addition the actions above, more garbage cans and recycling containers will be added to the shoreline. Although this may not be entirely aesthetically agreeable, it will help to protect the shoreline from the influx of beach visitors and garbage. Finally the installation of designated shoreline access points will help to decrease erosion on the beachfront.

### 1.3 No Action

If the No Action alternative is taken, no shoreline enhancement or improvements to Birch Bay Drive will be made. The area would remain as is, with the current road, beach protection structures, and flood mitigation measures in place. The environmental impact of the No Action alternative would allow for continued coastal degradation and decline in water quality of the area.

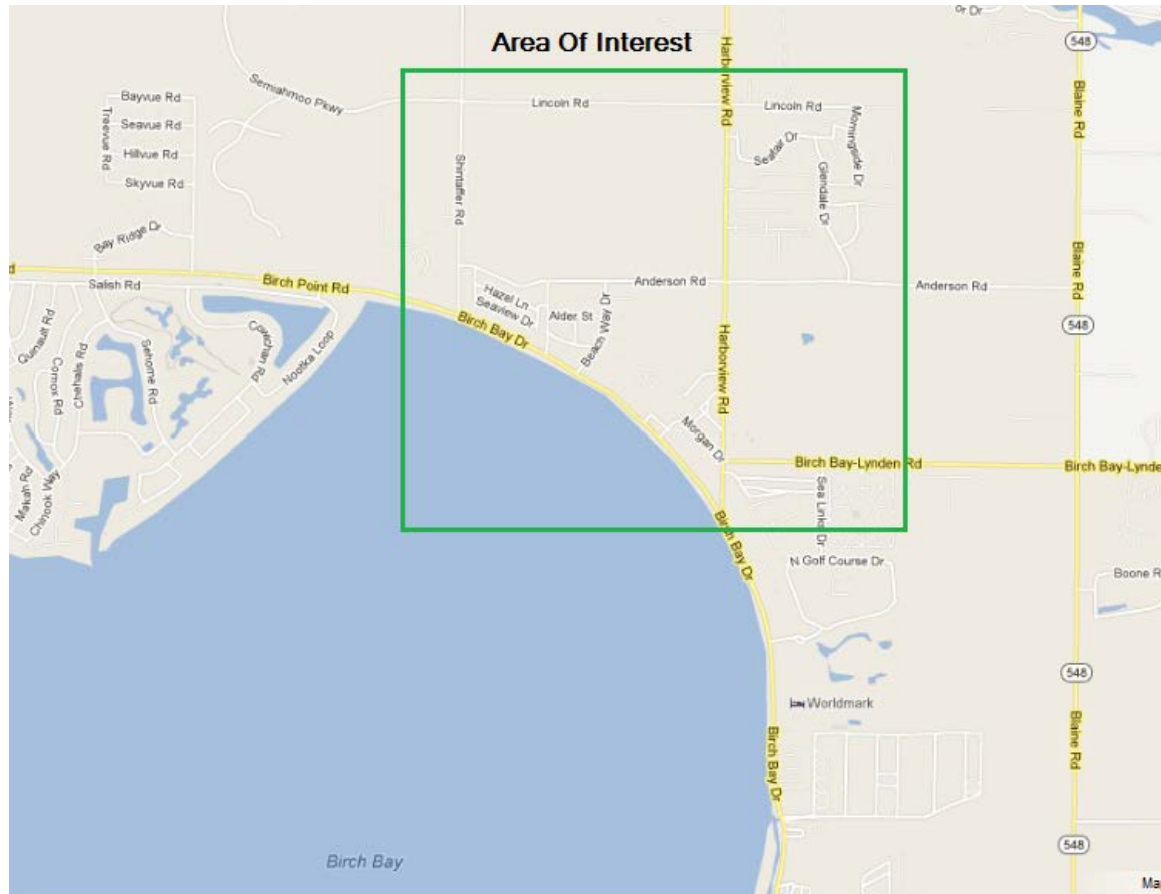


Figure 4. Roadways along Birch Bay Drive



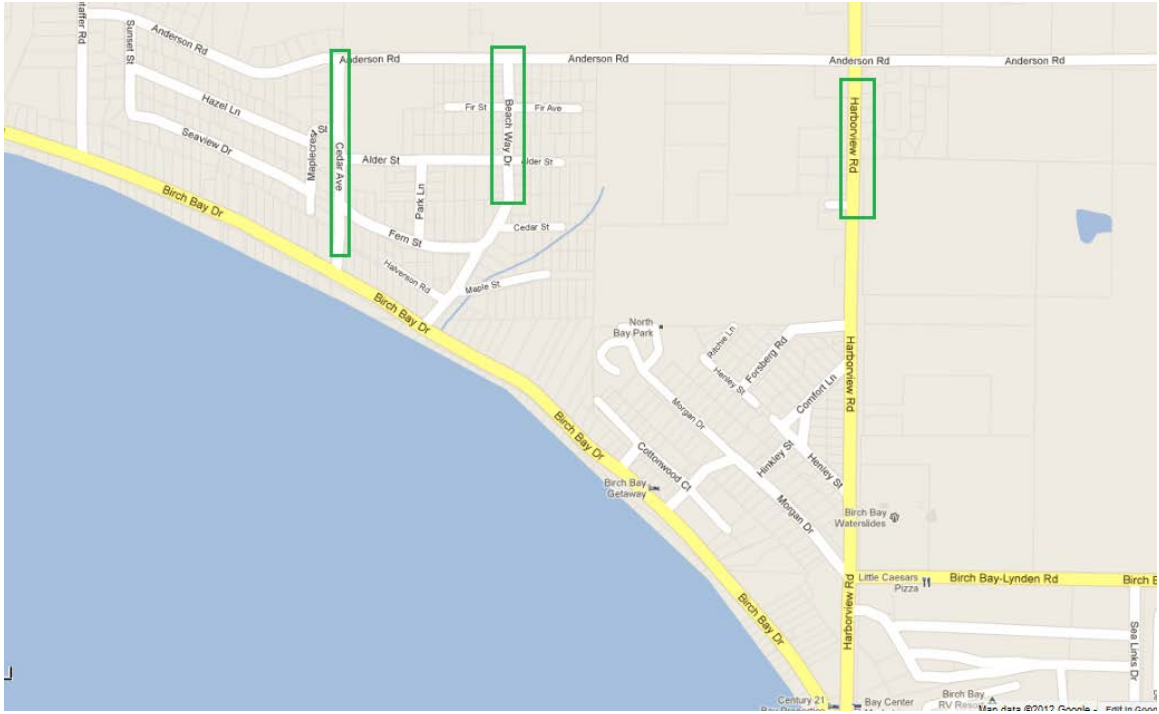


Figure 5. Close up of roadways along Birch Bay Drive

# 1.4 Decision Matrix

<b>Decision Matrix</b>			
	<b>Proposed Action</b>	<b>Alternative Action**</b>	<b>No Action</b>
<b>Natural Environment</b>			
<b>Water</b>			
Surface Water*	0.5	0.5	-2
Flooding	1	1	-2
Ground Water	0	0	0
Runoff/Absorption*	-0.25	0.25	-2
Public Water Supplies	0	0	0
<b>Earth</b>			
Geology	0	0	0
Soils	1	1	0
Topography	0	0	0
Erosion	2	2	-2
Unique Physical Features	0	0	0
<b>Air</b>			
Air Quality	-1	1	1
Odor	-1	1	0
Climate	0	1	0
<b>Vegetation</b>			
Unique Species*	0.25	1	-0.25
Vegetation*	0.25	1	-0.25
Habitat/Diversity*	0.25	1	-0.25
<b>Animals</b>			
Unique Species	0	0	0
Animals	1	1	-0.5
Habitat/Diversity	1	1	-0.5
Migration Routes	0	0	0
<b>Environmental Health and</b>			
Noise	-1	-1	1
Risk of Explosion	-2	-2	0
Public Health*	-0.5	-0.5	1
<b>Energy and Natural Resources</b>			
Amount/Efficiency	1	0	0
Source/Availability	0	0	0
Renewable Resources	0	0	0
Scenic Resources	1	2	0
<b>Built Environment</b>			
<b>Land and Shoreline Use</b>			
Existing Land Use	0	0	0
Housing	0	0	0
Aesthetics	2	2	-2
Recreation	2	2	-1
<b>Transportation</b>			
Transportation Systems	1	1	0
Vehicular Traffic	1	1	-1
Waterborne, rail & air traffic	0	0	0
Traffic Hazards	-1	-1	0
<b>Public Services</b>			
Fire/Police	0.25	0.25	0
Schools	0	0	0
Parks & Recreation	1	1	-1
Maintenance	0	-1	0
<b>Utilities</b>			
	-1	2	0
<b>Recreation</b>			
	2	2	-1
<b>Aesthetics</b>			
	2	2	-1
<b>Housing</b>			
	0	0	0
<b>Light and Glare</b>			
	0	1	0
Totals:	12.75	23.5	-13.75
<b>No Impact / Not within Scope of Docu</b>			
<b>*Positive and Negative Impacts: (Positive + Negati</b>			
<b>Large Positive Impact: 2                      Positive Impact: 1</b>			
<b>Large Negative Impact: -2                      Negative Impact: -1</b>			
** Numbers in a green cell represent an improvement to the proposed			
** Numbers in a red cell represent			

## Section 2

### Natural Environment: Affected Environment, Impacts and Mitigations



## 2.1 Water

### Existing Conditions

Birch Bay is a part of the Samish River and Whatcom Creek Watershed and receives about 30 square miles of drainage along with 35 inches of rainfall each year (Figure 6) & (Appendix B). Due to the narrow nature of the watershed and the gradual sloping topography, all water movement in the 17, 255 acre watershed is toward the bay. The southern area of Birch Bay is mostly glacial till, a result of sedimentary deposition and compaction by ice deposition and retreat. The glacial till causes low permeability and low infiltration, which leads to occurrences of flooding. However, the area in northern Birch Bay is mostly marine sedimentary deposits (<sup>3</sup>Philip Williams & Associates, Ltd., 2007; CH2MHILL, 2006).

The bay is semicircular in shape with a maximum depth of 30 feet and is approximately 2.5 miles wide (US Department of Agriculture, 1991). The diurnal tidal range is about 9.1 feet and this large tidal range creates the vast areas of tidal flats that are seen in Birch Bay which support nutrient cycling and provide food for many animals. The beach at Birch Bay has been deemed a shoreline of statewide significance (RCW 90.58.310) (<sup>3</sup>Philip Williams & Associates, Ltd., 2007; CH2MHILL, 2006; ESA Adolfson, 2007).

The Birch Bay watershed drains 32 subbasins and Terrell Creek is the largest and most important source of freshwater drainage with its termination in Birch Bay. Terrell Creek is 8.7 miles long from its beginning in Lake Terrell. Terrell Creek suffers from destruction of the riparian zone, low dissolved oxygen levels and increased fecal coliform counts. The water that is flowing into Birch Bay from Terrell Creek carries pollutants from the outlying watershed. The ground water in the area is assumed to flow toward the bay for most of the watershed, except for an area of Birch Point South where the water likely flows west. Where the watertable meets the surface, marshes and wetlands are created in the area surrounding Terrell Creek (CH2MHILL, 2006; ESA Adolfson, 2007). The area immediately adjacent to Birch Bay lies in a 100 year flood plain that extends 200 feet inland (Appendix C). Currently, seawalls are in place to protect residences and businesses that line the shore.

The surface water drainage, especially the stormwater runoff, into Birch Bay contains contaminants like pathogens and nutrients from septic systems, sewage outfalls, agricultural waste and pet waste. As a result, in 2003 Birch Bay was added to the Washington State Department of Health's list of "threatened" shellfish harvesting areas. Bivalves that reside in a body of water receiving contaminated surface water can indicate when bacterial contamination is high. In the case of Birch Bay the declining water quality is based on the presence and amount of fecal coliform (Figure 7) (CH2MHILL, 2006). In response to the declining water quality the Birch Bay Water and Aquatic Resources Management District was developed and established water quality monitoring to assess the state of the bay (Stroebe, 2010).



Figure 6. Watersheds and waterways in Whatcom County

**Coastal Drainage Stations  
Water Quality Status  
January 2010 – June 2011**



**Figure 7. Coastal Drainage Stations indicating water quality status**

**Proposed Action**

**Construction Impacts**

Construction along the shoreline will significantly impact the marine water in Birch Bay. However, construction will not have a significant impact on the groundwater or the upland surface water in the area. However, the sediment loading from the construction on the roadway and subsequent water runoff will significantly impact the marine water; causing increased turbidity, which can in turn lower dissolved oxygen levels and increase water temperatures.

The renovation of storm drains and removal of groins will significantly impact the marine systems and nutrient cycling immediately seaward also causing sedimentation, increased turbidity, and warmer temperatures. The physical disruption of the beachfront may impact the sediments and soils that could release unwanted sedimentary deposits.

**Operational Impacts**

New accessibility to the beachfront will contribute to beach litter, increased nutrient input, and foot traffic. The increased foot traffic, recreational shoreline, and walkway use will continue to put pressure on the water quality in Birch Bay

Birch Bay will remain an area of concern for water quality and the proposed action will not alter the water quality to below a level of significance. The storm

water runoff will still be contaminated with neighborhood pollutants (eg. fertilizer, metals, and oil and grease). This increased nutrient-rich runoff will affect processes such as nutrient cycling that directly impact freshwater and marine ecosystems.

The construction of the pedestrian pathway and widening of the road will increase the impervious surfaces around the site and will change the rate at which surface runoff will enter the water. This will significantly impact the water quality immediately adjacent to the shoreline. Additionally, the amount of surface runoff and the speed at which it is entering the bay could lead to beach erosion. The proposed action does not plan to remove the seawall. The seawall is meant to protect housing and structures from flooding, it can do the opposite by pushing the water back on the beach and eroding the beach surface. The berm will aid in this by raising the beach profile about 1 foot above the current level.

### **Mitigation**

Washington Department of Fish and Wildlife, U.S. Army Corps of Engineers, or National Oceanic and Atmospheric Administration can change the work windows on a case by case basis for construction in the water. This will protect species in the marine water and help to minimize impacts on the water quality. Further, the reconstruction of Storm Drain Outfalls and renovation of other utilities like sewer and water will assist in minimization of impacts from upland watershed processes.

The project plans to coordinate with the Birch Bay Comprehensive Stormwater Management Plan (BBCSMP) surrounding the placement and configuration of stormwater outfalls, which are dictated by Chapter 2 of Volume IV of the *Stormwater Management Manual for Western Washington*, compiled by the Department of Ecology in 2007.

Raising the coastal profile 1 foot will help to control flooding and the installment of a raingarden will help to minimize stormwater runoff.

### **Level of Significance**

After mitigation measures, the impact on the water will remain significant. There are no particular actions being taken to improve the water quality in the bay in the proposed action. Reconstruction of the storm drain outfalls will aid with neighborhood runoff control, but the increased impervious surfaces will be detrimental to the environment and water.

### **Alternative Action**

#### **Construction Impacts**

The impacts from the alternative action will be very similar to the proposed action impacts. The sedimentation in the bay will have a significant impact on water quality by the same processes as described in the proposed action. The removal of invasive species along the shoreline could also cause temporary sedimentation from destabilization of the shoreline.

### **Operational Impacts**

The alternative action will include the same shoreline enhancement as outlined in the proposed action, however, the placement of trash and recycle receptacles will help to minimize the litter on the beach that could be caused by increased pedestrian use after the new walkway is built.

### **Mitigation**

The same mitigation measures would occur for the alternative action, however the garbage system would lower the impact of waste on the water. Additionally, the specific beach entry points would help to decrease beach erosion and therefore lower sedimentation in the marine water.

### **Level of Significance**

The level of significance of the alternative action will not lower the impacts to below a level of significance, but may less impact than the proposed action.

### **No Action**

If the beach were to remain as it is, the polluted runoff would still occur as would the fluctuations in beach width due to the current beach structures. The conditions of the runoff would likely continue to worsen, changing the water chemistry in the bay to be less habitable for fish and other invertebrates, including poor impacts on vegetation. The water quality would gradually become worse and have an extremely negative impact on the marine ecosystem.

## **2.2 Earth**

### **Existing Conditions**

The existing shoreline area of the site is characterized by a slight slope ranging from 0-8 degrees. Birch Bay Drive has a 2 degree slope which slants toward the bay. Birch Bay is exposed to waves approaching from the northwest to southeast. Waves from the northwest are generated in the Strait of Georgia and can be quite large. The southeasterly waves tend to be less powerful. The result of this is a shallow bay with a gentle grade up to the landside. Due to the very slight grade and shallow bay during king tides and storm events the area is subject to flooding (<sup>3</sup>Philip Williams & Associates, Ltd. 2007).

The surrounding community is part of an Urban Growth Area distinguished by substantial rural and suburban density residential development although that around 50% of the homes are for seasonal or vacation purposes. The closest NOAA tidal gages to Birch Bay, located at Cherry Point (approximately 3 miles to the south), indicate that the mean daily tidal range is 9.1 ft between mean higher high tide (MHHW) and mean lower low tide (MLLW) (Perlman 2012).

The prominent soil contained within the site is Typic Psammaquents with an elevation of 0 feet and is considered to be a tidal flat soil with alluvium parent



material (Figure 8). The soil remains highly saturated with the water table settling at surface level (0 inches). Due to the high water table the frequency of flooding and ponding are frequent. Evidence of this can be seen in past flooding events along Birch Bay Drive. This soil tends to be slightly saline to moderately saline ranging from 8.0 - 16.0 mmhos/cm. Historically the site has been subject to erosion, especially the eroding headlands that makeup the end points of Birch Bay- Birch Point in the north and Point Whitehorn in the south (US Department of Agriculture 1991).

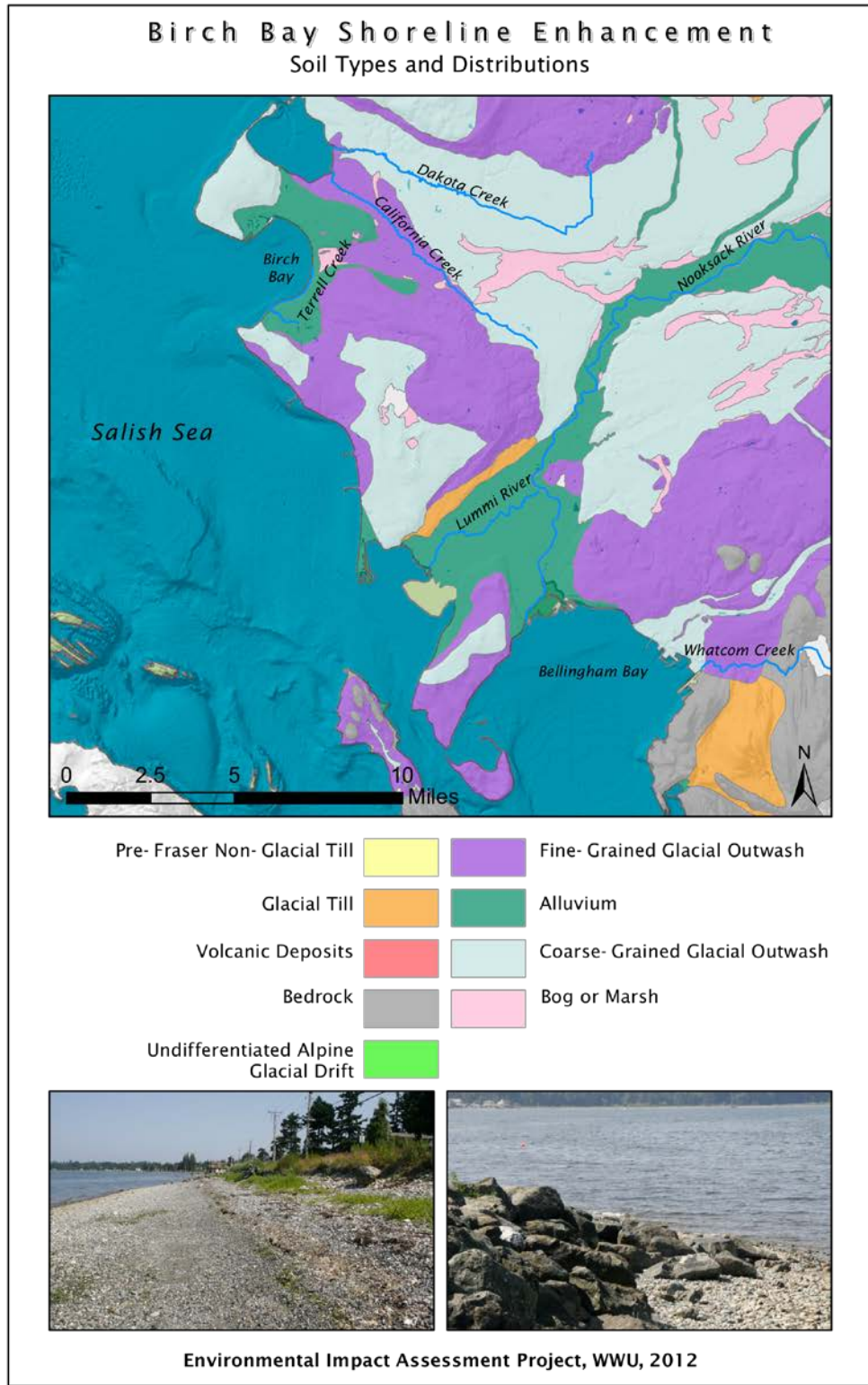


Figure 8. Soils in Whatcom County

## Proposed Action

### Construction Impacts

During construction the infill sediment will be sourced locally from the currently eroded headlands Birch Point and Point Whitehorn. These bluffs are comprised of glacial till which provide a mixture of sand, gravel, and cobbles for Birch Bay beach infill. The mixture applied will have a high level of permeability for drainage and is comprised of roughly 61% gravel, 26% gravelly sand, and 13% sand. The shoreline restoration will remove old fill and coastal structures and infill with the ratio of described above in order to restore the natural coastal process. A small amount of erosion is expected to occur during the construction period as much of the shoreline will be exposed, but will be offset by the newly constructed berm and new soil infill (<sup>3</sup>Philip Williams & Associates, Ltd. 2007).

### Operational Impacts

High levels of pedestrian activity have been linked to increased erosion from soil compaction. The odds are that some erosion will occur from general use but will be less than the current levels due to the construction of a berm. High levels of pedestrian activity can lead to more litter on the ground, degrading the quality of the soil upon which it sits.

### Mitigation

Best practices during construction will be implemented which include, but are not limited to: pre-project planning, alignment, constructability, design effectiveness, materials management, team building, quality management, disputes resolution, zero accidents techniques, and project delivery methodology. Best management practices may be found in WCC 16.08. The project is deemed to be self-mitigating although a 5 year checkup period has been established to make sure the expected reduction in shoreline erosion has been met (<sup>3</sup>Philip Williams & Associates, Ltd. 2007).

Currently the agency mitigating the berm is unknown. The small amount of mitigation that will occur will consist of replacing eroded berm on the south end of the bay with more gravel/sand infill from the headlands.

### Level of Significance

Upon completion of the project the level of impact will be below a level of significance as the natural morphology of the shoreline will be restored and lower levels of erosion are expected.

## Alternative Action

### Construction Impacts

During the alternative action construction phase headland erosion and beach erosion during the construction of the berm will continue as they are unmitigated portions of the project. The impacts during the construction are a temporary byproduct of the proposed action. The only way to mitigate these impacts would be to not carry out the project at all.

### Operational Impacts

Due to increased pedestrian traffic erosion along the shoreline is likely to increase. This will be a non-significant impact which does not need mitigation.

### Mitigation

Impacts to earth will be reduced via best construction practices in WCC 16.08.

### Level of Significance

Upon completion of the project the level of impact will be below a level of significance as the natural morphology of the shoreline will be restored and lower levels of erosion are expected.

### No Action

If the beach were to remain as it is continued erosion would occur making the Birch Bay community more susceptible to flooding and damages associated with said flooding as there wouldn't be any berm left to protect residents. In this case the impacts to earth would be significant.

## 2.3 Air

### Existing Conditions

For the last decade Birch Bay's Air Quality Indices (AQI) have been below the Washington State mean AQI and well below the U.S. mean AQI. Therefore Birch Bay has very good air quality overall. The total level of suspended particulates (TSP) has matched Washington State mean TSP levels while remaining below the U.S mean TSP from 1999-2008. In 2009 both Washington State and Birch Bay exceeded U.S mean TSP going from 19.4 micrograms per cubic meter to 53.9 micrograms per cubic meter (EPA 2012). For greenhouse gas emissions analysis for Birch Bay drive reference Table 1.

Green House Gas Emissions Analysis For Birch Bay Drive		
Criterion Considered	Year	
	2007	2027
Cars per day:	180	290
Cars per year:	65,700	105,850
CO2 emissions from gallons of gasoline consumed:	38,521,413	62,062,276
*projected traffic increase from 2007 - 2027 estimated at 61%		

Table 1. Green House Gas Emissions Analysis for Birch Bay Drive

When compared to state and national air standards Birch Bay appears to have above average air quality standards. This high level of quality is offset by the pungent odor emitting from the bay. Particularly pungent smells may come from the beach when a common type of seaweed known as sea lettuce decays in an environment with low dissolved oxygen (DO). When this occurs, sulfur gases are produced, including hydrogen sulfide, which smells like rotten eggs or sewage,

and dimethyl sulfide (DMS), which smells like rotting shellfish (Coastal Processes).

Human exposure to low levels of hydrogen sulfide may, at times, cause irritation to eyes, nose or throat. Some people sensitive to such odors can detect hydrogen sulfide at very low concentrations. At higher concentrations, hydrogen sulfide can be a respiratory irritant and may lead to headaches, nausea and vomiting. Hydrogen sulfide can also aggravate asthma (World Media Group).

## **Proposed Action**

### **Construction Impacts**

During the construction phase of the project the new bike lane and maintenance to Birch Bay drive will produce unpleasant odors from the pouring of asphalt. Workers applying asphalt are required to implement safety measures to protect themselves from hot asphalt and toxins. Health effects from exposure to asphalt fumes can include headache, skin rash, sensitization, fatigue, reduced appetite, throat and eye irritation, cough, and skin cancer. Due to the close proximity of residences to Birch Bay Drive, odor from asphalt application should be considered but overall it is a significant adverse impact that cannot be mitigated.

Additionally the amount of small particulate matter will likely increase due to the dumping of sand and gravel onto the shoreline. Long term Increased particulate matter can lead to asthma, chronic bronchitis, and heart disease. Only about 7% of the total particulate load introduced will remain and negative health effects will likely be minimal to nonexistent (United States. Minerals Management Service 1985).

### **Operational Impacts**

Due to the fact the shoreline post-project will be more aesthetically appealing, more people will be visiting the beach. As a result, more trips will be made to this location and personal vehicles will be the main form of transport. Due to the increased number of trips the carbon dioxide emissions from motorized vehicles will be more prominent thereby degrading air quality. The average daily traffic volume for Birch Bay is about 14,000 cars for Birch Bay-Lynden Road and with the beachfront restoration project these numbers along with carbon dioxide emissions are expected to rise (Transpo. 2008).

### **Mitigation**

The proposed action will be mitigated via best practices during construction (WCC16.08).

### **Level of Significance**

The impacts on air are temporary as they only occur during the construction phase the impacts on air are below the level of significance.

## **Alternative Action**

### **Construction Impacts**

During the construction phase of the alternative action, asphalt from road maintenance and particulate matter from gravel dumping will still be present. As a result the potential for negative odor and health impacts are still existent.

### **Operational Impacts**

During the operational phase of the alternative action more trips to the waterfront will be generated due to the increased aesthetic appeal of the restored shoreline. The increased vehicle volume will in turn increase the amount of carbon dioxide present lessening the quality of the air.

### **Mitigation**

The mitigation will employ best practices during construction as found in WCC16.08. Impacts will be present as they are byproduct of the construction process and can be considered a significant adverse impact, which cannot be mitigated.

### **Level of Significance**

As the impacts on air are temporary as they only occur during the construction phase the impacts on air are below the level of significance.

### **No Action**

Under the No Action alternative the air quality would remain unaffected and below a level of significance.

## **2.4 Vegetation**

### **Existing Conditions**

The terrestrial vegetation on and near the site is minimal. Some species on the landside of the project include Douglas Fir. Along the shoreline, immediately adjacent to the road, there are several species of terrestrial vegetation. Among these: Dunegrass (*Elymus mollis*), Reed canary grass (*Phalaris arundinacea*), Yarrow (*Achillea millefolium*), invasive Himalayan blackberries (*Rubus armeniacus*), and other shrubbery that is possibly invasive.

Besides terrestrial vegetation, wetlands comprise a large portion of the Birch Bay area. There is an estimated 1,252 acres of wetland area in the ten neighborhoods of Birch Bay (Kask, 2004). The wetlands function importantly as water filtration systems, provide flood protection and shoreline stabilization, and benefit groundwater recharge and streamflow maintenance. Most of the land in Birch Bay is wetland, as can be seen in Appendix D (Washington State Department of Ecology). However, most of this land has been developed and structures have been built on top of the previously working wetlands. As a result, the water quality is lower in Birch Bay and species that reside in wetlands are at risk.

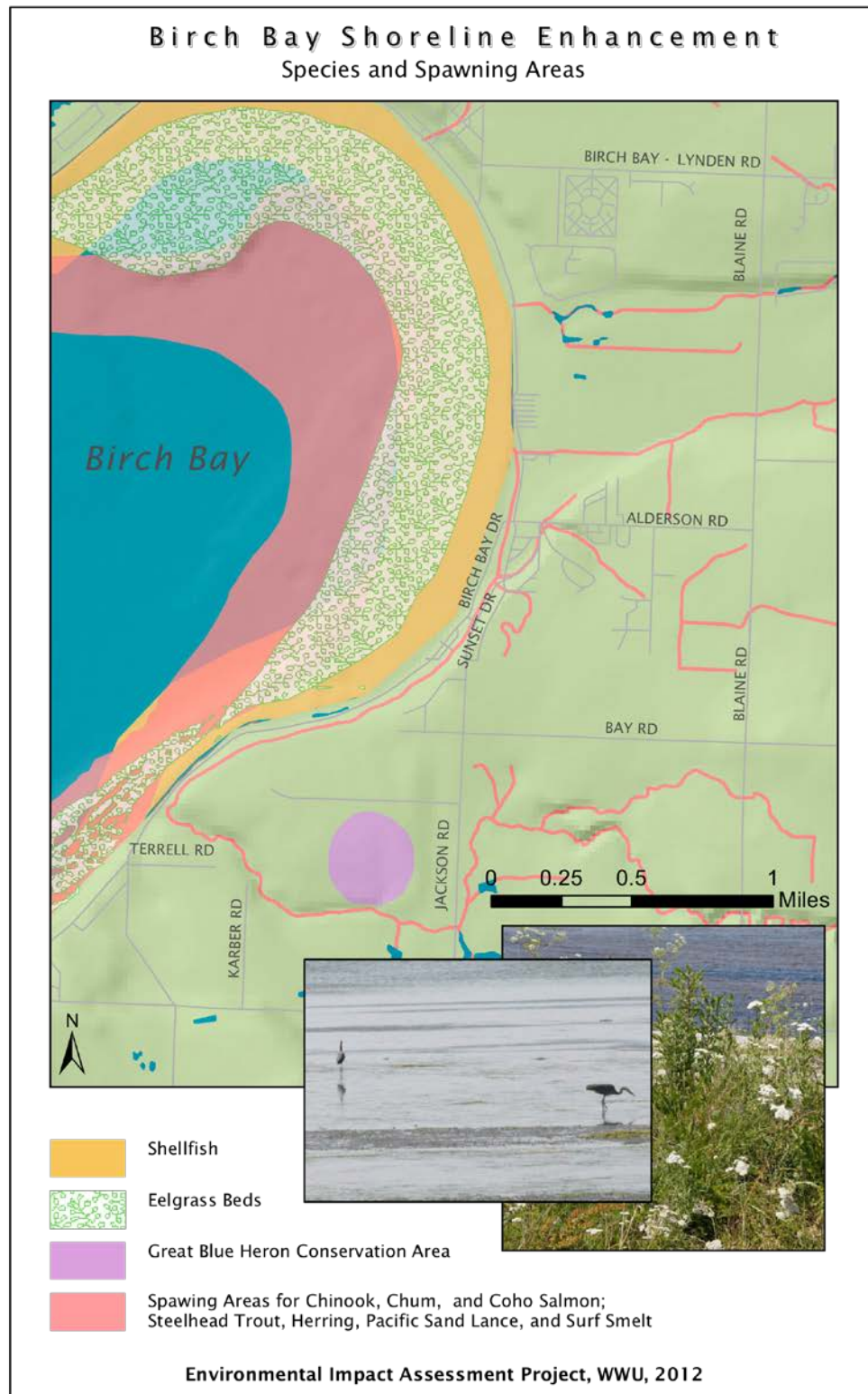


Figure 9. Species and spawning areas

## **Proposed Action**

The proposed action would remove the current shoreline vegetation and in its place would be the rain garden that will run between the pedestrian path and the bike lane. The rain garden is planned to contain only native plant species. The rain garden is designed to aid in stormwater management. Along the landside of the proposed project, a plant strip will be planted with native species as well.

## **Construction Impacts**

Removal of the plants along the waterside of the proposed project will temporarily disturb some habitat for birds and organisms residing in the soils. The disruption could also cause temporary unstable soils near the beach that could be moved by surface runoff into the bay.

## **Operational Impacts**

Since the vegetation being planted is native vegetation, there will be no impacts after project construction. Although without purposeful removal of invasive species, invasive plants could affect the new raingarden.

## **Mitigation**

The installation of native plant vegetation is thought to be self-mitigating because native plant species are meant to handle coastal processes and will not out compete other vegetation along the shoreline.

## **Level of Significance**

The impact on vegetation in the area will be below a level of significance.



## **Alternative Action**

### **Construction Impacts**

The purposeful removal of all of the invasive shoreline vegetation will have similar impacts as the proposed action. Temporary bank destabilization and sediment loading into the bay would be significant impacts that could be experienced.

### **Operational Impacts**

The targeted removal of all invasive vegetation along the shoreline in the alternative action would prevent future growth of invasives along the shoreline that disrupt the natural coastal profile of sand and appropriate vegetation.

### **Mitigation**

The removal of invasive plants and installation of native vegetation is thought to be self-mitigating. Native plant life along the shoreline will help with flood control and runoff management. Plants and their roots trap water as it comes down from the watershed, using some for their tissues while the rest is lost to evapotranspiration.

### **Level of Significance**

The impact on vegetation will be below a level of significance.

## **No Action**

If no action is taken, the invasive vegetation will continue to out compete the native vegetation and will not maintain a natural coastal profile that could protect the shoreline.

## **2.5 Animals**

### **Existing Conditions**

The existing site is home to birds, fish, mammals, and shellfish, some of which are threatened or endangered under the Endangered Species Act (ESA). Birds that are found at this site include the bald eagle, Great Blue Heron, and resident/migratory species of both ducks and geese. Although the Bald Eagle is not currently listed on the endangered species list, it is considered to be threatened, and is sensitive to becoming an endangered species in the near future. The Birch Bay project includes a portion of Birch Bay that stretches from the mouth of Terrell Creek to Rogers Creek mouth and is divided into two shoreline areas. All of which are considered to be within the hunting and nesting range for Bald Eagles. Bald Eagles generally hunt and feed within ten miles of their nesting sites. Great Blue Herons also use this area to nest and raise their young. There is an important Great Blue Heron rookery in the tidal flats of Birch Bay (Appendix D).

The project site is home to salmon and trout that live in this area through all stages of their lives. Fish such as pacific sand lance, pacific herring, and surf

smelt are all considered to be forage fish, an important part of the food chain. Steelhead trout have been considered threatened on the endangered species list since May of 2007. The near shore portions of Birch Bay are used heavily during winter months as a home and foraging area for both Chinook salmon and bull trout. The migration route of many fish species includes the proposed project site and some near shore fish such as Chinook, chum, and pink salmon can be found in this area during certain life stages. These salmon tend to be juveniles and stay within this shallow area in order to escape predators and feed on plankton and other small organisms found in the shallow waters of Birch Bay until they are prepared to swim out to sea as adults. Herring, Pacific sand lance, and surf smelt all have been documented to spawn in the proposed project site.

Pacific herring spawn in the shallow waters of Birch Bay, which include both the intertidal and subtidal zones; up to approximately ten feet deep. Pacific herring deposit their eggs directly onto marine vegetation including eelgrass. Surf smelt spawn year around and deposit their eggs onto coarse sand and pea gravel that ranges from one to seven millimeters in size. The eggs of the pacific sand lance are deposited onto a wider range of substrate types and sizes than the surf smelt, and can spawn using fine sand or gravel up to thirty millimeters in size. The documented surf smelt spawning area is limited to the northwest corner of the bay, which is outside of the enhancement area.

Marine biotoxins hold the greatest concern to shellfish in this area and are a direct result of polluted runoff. An accumulation of toxins can cause depletion in shellfish populations. Currently all of the ten test sites for water quality have met the standards within Birch Bay. Shellfish found here include Dungeness crab, horse clam, butter clam, native littleneck, and manila littleneck clams. Mammals such as coyote, fox, deer, otter, beaver, weasel, muskrat, mink, skunk, Northern Water Shrew, bat, mice, and other rodents are all native to Birch Bay area.

## **Proposed Action**

### **Construction Impacts**

The proposed action will have adverse effects to the fish and shellfish during the time of in-water construction. In-water construction includes work water ward of the ordinary high water line. Juvenile salmon and forage species such as herring, pacific sand lance, and surf smelt that spawn in the proposed project site would be impacted during this period of construction. Vibrations from construction along with temporary turbidity could both cause adverse impacts to species found in this area. Long-term habitat improvements are considered to be part of this project's outcomes including beach nourishment and ecosystem improvements.

### **Operational Impacts**

Once construction is complete and the in water work is finished, direct impacts on salmon and shellfish in the area will be lessened but the effects on animals will remain above a significant level. This will be due to poor water quality and effects on sediment habitat, which is correlated with aquatic health (Washington State Department of Natural Resources, 2012). Sediment habitat can be affected

by recreational activities like paddle boarding, canoeing, and shellfish harvesting; these activities can crush sediment habitat, vegetation, and animals. These impacts will persist while humans remain in the area - meaning clams, salmon, surf smelt, and other aforementioned aquatic species will be continually impacted.

### **Mitigation**

With construction restricted to 'windows' as defined by the state and federal regulatory agencies, and best management practices used, the effects to species within the project area can be reduced. Construction windows intend to protect species of fish, and the timing of this construction should not include the times in which construction work in salt water in Whatcom County is prohibited. Those times are listed below:

- Salmon rearing areas: March 15-June 14
- Herring spawning area: February 1-June 14
- Surf smelt spawning areas: Potentially year around

Work windows should be determined after beach surveys are implemented to determine site-specific information that will identify the species of concern within this project area. Section 7 of the Endangered Species Act (ESA) requires fish and wildlife services to determine effects on both threatened and endangered species in this area.

In order to minimize the adverse effects on species within the project area, the following should be implemented:

- Requiring ecological studies and beach surveys prior to applying for required permits
- Limiting in-water work to certain windows
- Requiring the best management practices to be implemented during construction
- Limited staging and stockpiling of construction equipment to designated non-sensitive areas
- Requiring the use of specific substrate materials on the water side that provide suitable spawning habitat for forage fish
- Requiring monitoring during and following construction to ensure that mitigation performance standards are met

### **Level of Significance**

After mitigation, the impacts to species within this area will reach a level below significance. The use of construction windows, limiting the stockpiling of equipment, and the impact offset of using substrate materials known to be suitable for spawning fish will decrease the impacts to below a level of significance.

### **Alternative Action**

#### **Construction Impacts**

The alternative action construction will be the same as the proposed action. The in-water construction would still have disturbing vibrational effects on aquatic

species and possible interference with spawning seasons of fish like salmon and herring.

### **Operational Impacts**

The differences between the alternative action and the proposed action will not alter the operational impacts. Water quality, the impacts of beachfront activity, and sedimentation will still impact the environment.

### **Mitigation**

The work windows for the alternative action will be the same, with the intention of protecting spawning fishes and other aquatic life. The windows will be:

- Salmon rearing areas: March 15-June 14
- Herring spawning area: February 1-June 14
- Surf smelt spawning areas: Potentially year around

The other suggested mitigation measures including specific substrate usage and beach surveys will also stay the same. Refer to mitigation measures for the proposed action for each specific mitigation.

### **Level of Significance**

After mitigation, the impact on animals in the area will be below a level of significance. The improvement of the beach by beach nourishment and removal of armored structures will help to restore more natural and healthy sedimentation processes.

### **No Action**

The No Action alternative would result in continued degradation and erosion of the shoreline, which would negatively impact the aquatic life and waterfowl in and around Birch Bay. Sedimentation would remain the largest concern along with water quality.

## **2.6 Environmental Health and Noise**

### **Existing Conditions**

As mentioned in section 2.3 Air, asphalt application and particulate from dumping the sand and gravel mixture both have potentially negative impacts on environmental and human health. Asphalt fumes can result in higher rates of headache, skin rash, sensitization, fatigue, reduced appetite, throat and eye irritation, cough, and skin cancer. Additionally if the asphalt is overheated or comes into contact with oxygen, spark or flame explosions can occur (<sup>3</sup>Philip Williams & Associates, Ltd. 2007).

Particulate from the gravel sand mixture disturbs marine bottom sediments and can also contain some heavy metal contamination such as mercury or tin. This is disruptive to flora and fauna both terrestrial and aquatic.

In the case of an explosion or negative impacts to health the services needed would be Whatcom County Fire Protection District #21, Whatcom County Sheriff's Department, and St. Joseph Hospital in Bellingham, WA.

**Proposed Action**

**Construction Impacts**

Due to the presence of dump trucks for the sand gravel mixture and vehicles for laying asphalt noise during construction will increase. Chapter 173-60 of the Washington Administrative Code (WAC) specifies maximum environmental noise levels. These limits apply in all areas of the State of Washington. The limits are based on the environmental designation for noise abatement (EDNA) of the noise source and the receiving property. In general, the EDNA designations conform to zoning ordinances can be seen in Table1, and Figure 2 (EPA 2012.; Hessler, D. Hessler Associates, Inc, 2003).

**Operational Impacts**

After the constructional phase the noise will return to ambient average levels or EDNA class A. No off-site sources impacting environmental health will affect the proposal or conditions after the project is completed.

- Residential Zones – Class A EDNA
- Commercial Zones – Class B EDNA
- Industrial Zones – Class C EDNA

State of Washington  
Maximum Permissible Environmental Noise Levels (dBA)

EDNA of Noise Source	Maximum Level at Receiving Property (dBA)		
	EDNA Class A	EDNA Class B	EDNA Class C
Class A	55	57	60
Class B	57	60	65
Class C	60	65	70

**Table 2. Maximum Permissible Environmental Noise Levels (dBA)**

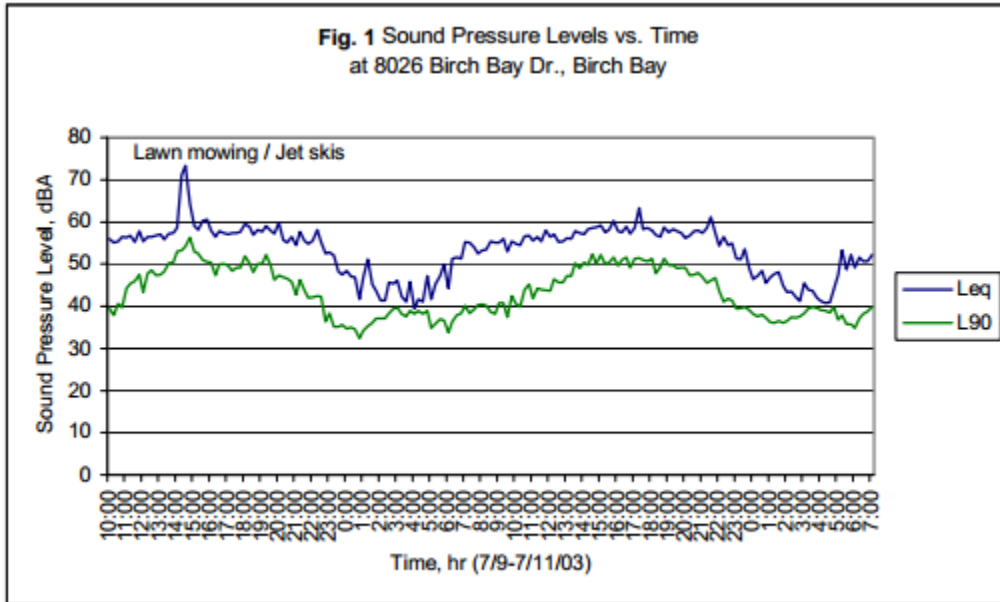


Figure 10. Sound Pressure Levels in Birch Bay

**Mitigation**

No measures are proposed to mitigate noise. Environmental health will be mitigated via best practices during construction and is a byproduct of the project.

**Level of Significance**

Underneath the proposed action the impact on air is below the level of significance.

**Alternative Action**

**Construction Impacts**

During the construction phase due to the introduction of road and shoreline enhancement vehicles, noise along Birch Bay Drive will increase. As outlined in transportation section 3.2 peak traffic (vehicular and pedestrian) times vary. By constructing during the times with the least traffic the impacts of noise will be lower as there are fewer receptors (Philip Williams & Associates, Ltd. 2007).

**Operational Impacts**

After the constructional phase noise will return to the average noise levels for Birch Bay.

**Mitigation**

As the effects on environmental health and noise are temporary, there are no purposed mitigation measures at this time.

### **Level of Significance**

Underneath the alternative action the impact on air is below the level of significance and is in fact the same as the proposed action.

### **No Action**

Under the No Action alternative the shoreline would remain unnatural and erosion would continue to occur, negatively impacting environmental health. Without the construction of the road and berm, noise would remain at the current baseline experienced in Birch Bay on a daily basis. The erosion along the shoreline is of a greater concern as it is an ongoing impact whereas increased noise from construction would only be temporary. In this sense impacts on environmental health would be significant and impacts on noise would be below the level of significance.

## **2.7 Energy and Natural Resources**

### **Existing Conditions**

The existing site has specific types of sand and gravel that are native to this area. Energy utilities are currently overhead and include electrical, telecom, and cable. Power lines have been considered to have a negative visual impact to this area.

### **Proposed Action**

#### **Construction Impacts**

The proposed action would require construction and implementation of electrical and telecommunications utilities underground. Phase III and IV of the proposed project suggests moving overhead energy and utilities underground as far landward as possible. Natural resources found native to the Birch Bay area will be used to restore the natural morphology processes, and therefore are not considered to have a significant impact.

#### **Operational Impacts**

The removal of local sediment from the headlands in Birch Bay could lead to erosion in the headlands. Along the project site, however, no energy sources or natural resources will be significantly impacted.

#### **Mitigation**

Mitigation for the proposed action could be through the purchase of renewable energy credits produced by the power company that supplies the proposed project site.

### **Level of Significance**

After mitigation the level of impact should be below the level of significance.

### **Alternative Action**

#### **Construction Impacts**

Impacts from construction will still be limited to the removal of sediment from the Birch Bay headlands, which could cause some temporary erosion.

**Operational Impacts**

Under the alternative action there would be no impact other than erosion in the headlands.

**Mitigation**

Mitigation measures would be the same as those suggested for the proposed action.

**Level of Significance**

Under the alternative action, the level of impact would not be of significance.

**No Action**

The No Action alternative would have no impact on the environment at the site as no sediment would be removed from the Birch Bay headlands.



## Section 3

### The Built Environment



## 3.1 Land and Shoreline Use

### Existing Conditions

Currently, the land area adjacent to Birch Bay Drive is zoned for mostly residential with some commercial use and has been designated an unincorporated urban growth area by Whatcom County (Figure 11). The zoning of the area includes resort commercial and urban residential with a medium density of six units per acre (Whatcom county comprehensive plan map, 2012).

Under the Shoreline Management Program, the project includes several environmental designations including: Shoreline Residential, Urban Resort, Urban and Aquatic (seen in Appendix E) (Appendix F = delineates shoreline access). There is some recreational beach use including kayaking and paddle boarding. Only one building is directly on the shoreline within the project site and alterations to this building will not be included in the proposed project.

The shoreline in Birch Bay has beach protection measures to help prevent beach erosion by long shore transport in the form of groins. Riprap, seawalls, and bulkheads are also in place. The beach has already been subject to beach nourishment because of the erosional processes and naturally narrow shoreline. The waves that come to Birch Bay are from the northwest to southwest with the largest waves coming from the northwest. The wave action is important as it is a part of the transportation of sediment down the coastline and contributes to changing coastal shape over time. The beach at Birch Bay currently consists of gravel, cobbles, and sand some of which will be removed for the construction of the gravel berm (<sup>1</sup>Philip Williams & Associates, Ltd., 2002).

The current seawalls pose challenges in terms of beach construction and flood mitigation. The seawalls are meant to protect the homes from significant water level increases, but can worsen the effects by facilitating spillage of debris over the top of the seawall and onto property. The seawall also stops large debris like driftwood and this collects near the seawalls on the beach or in the worst conditions will launch the driftwood onto private property.

### Proposed Action

#### Construction Impacts

In the Central Reach of the project the shoreline will be significantly impacted by removal of fill and the current coastal structures, namely, the groins that lie perpendicular to the beach. The placement of a gravel berm will be followed by beach nourishment. There could be temporary beach destabilization from the removal of the entire fill and removal of riprap and bulkhead structures. The proposed action will not have a significant impact on land use in Birch Bay. The area being renovated is not adding or removing area for further development on land.

#### Operational Impacts

With the restoration of the area, there could be increased recreational use on the

waterside and the landside. More biking, walking, and waterfront activities like boating, kayaking and paddle boarding could take place. This human interaction with the environment will change the amount of use the shoreline receives. The activity could induce more erosion on the beach and cause sedimentation in the water. However, the removal of the groins, bulkheads, and riprap and replacement of these with the berm could improve flood control.

With the construction of a shoreline and nearshore area relative sea level rise (RSLR) must be considered because it could alter the success of the project. Sea levels are projected to rise in Puget Sound by about 7.5 inches per year or it could occur at a rate of about a 1 inch per year (<sup>1</sup>Philip Williams & Associates, Ltd., 2002).

### **Mitigation**

To reduce the impacts on the shoreline, mitigation measures include: the removal of coastal structures and the replacement of beach nourishment to assist in restoration of natural coastal processes, best management practices (WCC 16.08) during construction and continual monitoring during and after construction of shoreline habitat and health. The berm that will be put in place is also meant to aid in restoration of coastal processes, and, along with the rain garden, could help to mitigate the amount of sediment that will go into the water. This project will require a Whatcom County Substantial Development Permit because of the work occurring within the vicinity of the shoreline.

### **Level of Significance**

Impacts on land use will be below a level of significance however environmental impacts on shoreline use will not be mitigated below a level of significance. While removal of the groins aid in shoreline restoration, shoreline erosion will still occur due to increased use by recreation, but it will be occurring in a more natural process because of the grading of the beach. Overall there will not be significant impacts to the shoreline.

### **Alternative Action**

#### **Construction Impacts**

The shoreline will be significantly impacted through the construction of the berm, pedestrian and bike pathways, plant strip, rain garden, pathway lighting, signage, and the removal of invasive species. Temporary disruption of the natural beach processes such as wave action and sedimentation will occur.

#### **Operational Impacts**

Increased recreation will occur after the enhancement and restoration of the shoreline leading to increased use of the shoreline and landside. Activities along the waterfront may cause sedimentation in the water and erosion of the beach.

#### **Mitigation**

The best management practices during construction will be enforced. There will be continual monitoring of the shoreline's health after construction.

**Level of Significance**

Construction of designated beach access points will help to mitigate beach erosion and protect the important rain garden. With the removal of invasive shoreline vegetation and planting of native vegetation, better coastal processes will be in place.

**No Action**

If No Action is taken, the shoreline and land near the proposed site will continue to be minimally protected by aging beach protection structures, storm drains will continue to be inadequate, and beach access will remain minimal.

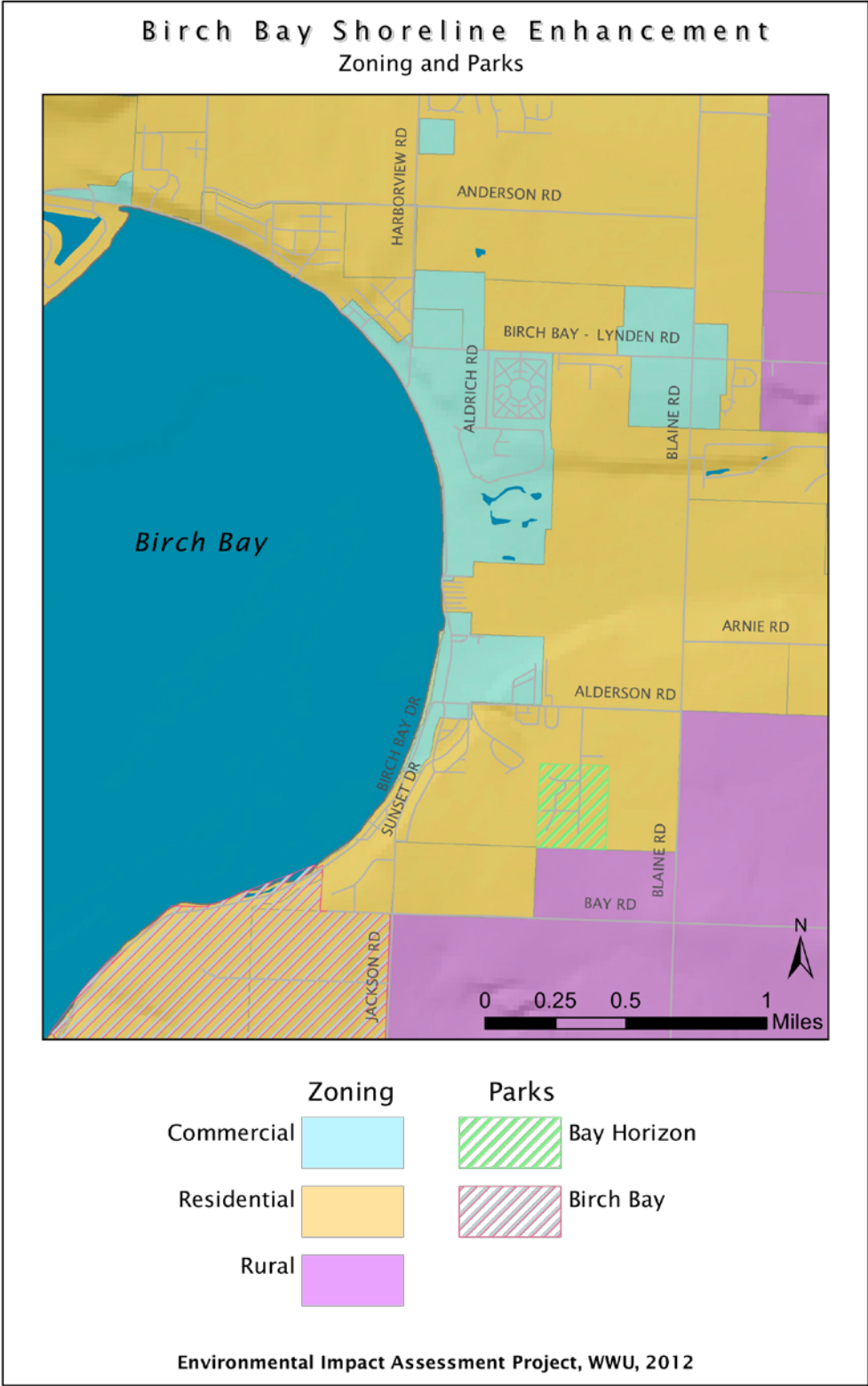


Figure 11. Zoning and parks in Birch Bay

## 3.2 Transportation

### Existing Conditions

Birch Bay Drive hugs the shoreline of Birch Bay along approximately 2 miles of the proposed restoration site. The speed limit along the drive is currently 25 mph but some citizens voiced concerns about speeding.

The site is not currently served by public transit, although Whatcom Transit Authority does operate within Birch Bay. The Route 55 stop is about 1 mile from the restoration site and the local Dial-A-Ride, which operates Monday -Saturday, is available via advanced booking (Whatcom Transit Authority 2012). Rideshare options including vanpools are also available to residences of Birch Bay. The Rideshare program is intended for those users who are not served well by the fixed route service, or desire a more flexible commuting option. The employees must comply with the State's Commute Trip Reduction (CTR) program. WTA assists by providing employer outreach programs. Paratransit is provided by the WTA for those individuals who are not able to use the traditional fixed route services. These users are typically people with disabilities or seniors. This type of transit is required under the federal Americans with Disabilities Act (ADA) and provides standards for paratransit, which includes a policy that passenger capacity constraints are not allowed (Transpo. 2008).

Currently there are 98 marked parking spots along Birch Bay Drive and under the proposed action; more parking spots could be added as long as the new spots did not interfere with private property rights. There is also a chance that some parking spaces may be eliminated but at this time, the plan regarding parking spaces remains uncertain.

Birch Bay Drive receives between 130 and 650 vehicles per hour (vph) during peak traffic volume periods, which translates to around 1,000 to 5,000 or more vehicles per day (Appendix G). The volume of traffic varies from day to day. During the workweek, Monday and Fridays have the highest levels of traffic whereas Tuesday, Wednesday, and Thursday volumes are lower. Saturday and Sunday receive higher than average levels of traffic especially along the resort portion of Birch Bay Drive (Transpo. 2008).

### Proposed Action

#### Construction Impacts

Impacts during the construction of the bike lane coupled with the undergrounding of utilities will put a significant strain on transportation efficiency in Birch Bay. Birch Bay drive is a main corridor of transportation from southern Birch Bay by Alderson Road and northern Birch Bay just past Cottonwood Beach as seen in Appendix G (Transop. 2008).

The presence of gravel or asphalt trucks along this road will reduce permeability from North to South Birch Bay in addition to putting addition strain on adjoining arterials such as Blaine, Bay and Lincoln Roads. As these roads pass through

residential areas, those living along those streets will be subject to increased traffic volumes.

The right of way along Birch Bay Drive will be surveyed before road construction. This survey has not been completed and the impacts to residences remain uncertain. Mailboxes may be moved closer to private property and front lawns may shrink or swell depending on the establishment of the right of way along Birch Bay Drive.

### **Operational Impacts**

After construction Birch Bay Drive will return to its normal state of functionality with the addition of two 5ft bike lanes on either side of the road. The bike lanes installed will be full bike lanes and not enhanced shoulders as those seen near the mouth of Terrell Creek in Southern Birch Bay. This should increase the safety for both motorized and self-powered methods of transport (i.e bikes, skateboards, rollerblades, etc...) as each have a lane large enough to operate safely. The more people utilizing the bike lanes or walking along the top of the berm will reduce the amount of traffic on Birch Bay Drive. With less traffic density comes an increased level of safety for the community involved, which is a positive impact.

### **Mitigation**

As part of the project plan, a berm will be constructed on the waterside of Birch Bay Drive. This will mitigate the issues of flooding and debris deposited along the road during storm or flooding events. The road itself will receive general maintenance, as needed which is outlined in WAC 222-24-050. Apart from general maintenance, the improvements to the road will be self-mitigating.

### **Level of Significance**

The restoration of Birch Bay Drive is within the scope of the Birch Bay Community Plan. After the construction impacts have taken place, the impact on transportation will be below the level of significance.

### **Alternative Action**

#### **Construction Impacts**

Peak traffic times should be considered during the construction phase as some time periods attract more vehicles than others. Road construction limited to weekdays will reduce congestion overall as those times have a lower traffic volume. Low traffic volume months are the winter months and the high traffic volume months are the summer months when the normal day-to-day travel is supplemented with vacation and resort related travel. It is not unusual to have double the amount of traffic on a summer weekend day than on a winter weekend day (Transpo. 2008).

#### **Operational Impacts**

Apart from considering peak traffic times during the construction phase, operational impacts for the alternative are non-existent.

### **Mitigation**

The alternative for transportation is self-mitigating.

### **Level of Significance**

As with the proposed action, the No Action alternative will remain under a level of significance.

### **No Action**

Under the No Action alternative, improvements to Birch Bay Drive will not occur. The area would remain in its current condition, with the current road in place. The environmental impact of the No Action alternative would cause continued safety risks due to deposited debris along Birch Bay Drive during flood events. Repairing the Drive from debris damage is more expensive to mitigate than maintaining the berm. In this case impacts on transportation will be significant.

## **3.3 Public Services**

### **Existing Conditions**

Birch Bay is in the jurisdiction of the Whatcom County Fire Protection District #21, Whatcom County Sheriff's Department, and Blaine School District. The closest hospital is St. Joseph Hospital in Bellingham, WA. Birch Bay Drive offers easy emergency vehicle access to the site.

### **Proposed Action**

#### **Construction Impacts**

Construction is expected to have a non-significant impact on public service needs.

#### **Operational Impacts**

When completed, the project is expected to result in a marginal impact on public service due to an increase in visitors and use of the site by the public. A small increase in service may be required but accessibility changes are unlikely.

### **Mitigation**

The marginal increase in demand for public services is unlikely to require mitigation.

### **Level of Significance**

Impacts on public services will be below a level of significance.

### **Alternative Action**

#### **Construction Impacts**

Construction is expected to have a non-significant impact on public service needs.



### **Operational Impacts**

As with the proposed action, the alternative project is expected to result in a small impact on public service due to an increase in visitors and public use of the site. An increase in service may be required but accessibility changes are unlikely.

### **Mitigation**

Construction is expected to have a non-significant impact on public service needs.

### **Level of Significance**

Impacts on public services will be below a level of significance.

### **No Action**

The No Action alternative is not expected to change the demand for public services.

## **3.4 Utilities**

### **Existing Conditions**

Water and sewer services are provided by the Birch Bay Water and Sewer District (Appendix H). It operates a wastewater treatment plant just south of Birch Bay State Park. On the site there are port-a-potties, street lamps connected to utility poles and a few overflowing garbage cans. One phone booth is across the street from the site. For a detailed map of utilities districts in Birch Bay see Appendix H.

### **Proposed Action**

#### **Construction Impacts**

During the construction phase additional port-a-potties may need to be provided. In addition, temporary lighting will need to be provided when the utility poles are removed.

#### **Operational Impacts**

The proposed action intends to remove the utility poles and move utility services underground. The state of the street lamps following their removal has not been addressed and no new lamps plans have been presented. No physical restroom structure has been proposed despite a potential future increase in demand.

#### **Mitigation**

Demand for restroom facilities may require a permanent structure to be built.

#### **Level of Significance**

Impacts on utilities will be below a level of significance.

### **Alternative Action**

#### **Construction Impacts**

Port-a-potties may need to be provided during the construction phase. In addition, temporary lighting may need to be provided while permanent lighting is installed.

### **Operational Impacts**

With the addition of lighting, the alternative action reduces the impacts found in the proposed action. However, a lack of planned restrooms remains as an impact.

### **Mitigation**

The addition of garbage and recycling stations will require a maintenance crew to be appointed. Demand for restroom facilities may require a permanent structure to be built.

### **Level of Significance**

Impacts on utilities will be below a level of significance.

### **No Action**

The no action alternative is not expected to change the demand for public services.

## **3.5 Recreation**

### **Existing Conditions**

Birch Bay is a popular beach destination for both local residents and Canadian tourists. There is small dirt path that runs parallel to Birch Bay Drive and receives heavy foot traffic during the summer months. It offers a few park benches as well as access points to the beach. During low tide the beach provides opportunities for clamming and crabbing for those with recreational licenses. However, there are signs located at primary clamming areas that warn visitors of the presence of toxic shellfish during times of higher marine biotoxins.

Much of the bay consists of sand flats, which provide shallow waters that provide a safe and calm environment for swimmers and kayakers. Paddle & Pedal Adventures provides recreational equipment rentals for those who wish to go biking, kayaking, paddleboarding or a ride on a scooter.

### **Proposed Action**

#### **Construction Impacts**

During construction recreational activities will be limited and temporarily displaced.

#### **Operational Impacts**

The enhancement of Birch Bay is in part, an improvement to recreational activities. The beach will be widened to both protect Birch Bay Drive and provide additional recreational space. The current dirt path will be replaced with a more

pedestrian friendly route and designated bike lanes will be put added to Birch Bay Drive.

#### **Mitigation**

Mitigation of impacts should include construction during low recreational use months.

#### **Level of Significance**

Impacts on recreation will be below a level of significance.

#### **Alternative Action**

##### **Construction Impacts**

Construction impacts will be similar to those in the proposed action with recreational activities potentially being displaced for a longer period of time.

##### **Operational Impacts**

The alternative action builds upon the benefits of the proposed action by providing additional improvements to both waterside and landside recreation with improvements to beach access and safety.

#### **Mitigation**

As with the proposed action, mitigation of impacts should include construction during low recreational use months.

#### **Level of Significance**

Impacts on recreation will be below a level of significance.

#### **No Action**

With No Action there will be no adverse construction impacts. Current conditions will remain the same and would not receive the benefits this proposed action offers.

### **3.6 Aesthetics**

#### **Existing Conditions**

There is currently only one building directly on the waterfront of Birch Bay, where the project will reach. This building was once a restaurant but has gone out of business and is now vacant. This building is privately owned and therefore it is not Whatcom County's decision as to what to do with it. All other structures are located across the street and do not block any view or take away any aesthetic value.

#### **Proposed Action**

##### **Construction Impacts**

No structures are proposed to be built that would obstruct or alter any views. Construction and related noise and traffic will take away aesthetic value but this

is a temporary impact.

### **Operational Impacts**

Birch Bay will have an increased aesthetic value with more open areas, a wider beach, and more places for recreation. The pedestrian and bike pathways will be visually pleasing and allow for greater accessibility throughout the area.

### **Mitigation**

No measures are proposed to reduce or control aesthetic impacts.

### **Level of Significance**

Impacts on aesthetics will be below a level of significance.

## **Alternative Action**

### **Construction Impacts**

Construction will take away aesthetic value due to noise and vehicle traffic but this impact is temporary.

### **Operational Impacts**

The aesthetic value will be increased through many ways. Areas will be more open and will allow for more recreation. Signage and greater accessibility to the shoreline will allow for ease of navigation throughout the community. Removal of invasive vegetation gives increased diversity in plant life, making a more visually pleasing shoreline.

### **Mitigation**

No measures are proposed to reduce or control aesthetic impacts.

### **Level of Significance**

Impacts on aesthetics will be below a level of significance.

## **No Action**

The aesthetic conditions of Birch Bay and its shoreline will remain as they are.

## **3.7 Housing**

### **Existing Conditions**

Houses run parallel with Birch Bay Drive and are separated from the shoreline by the roadway. The land along Birch Bay Drive is zoned as urban residential with a medium density of six units per acre and resort commercial (Whatcom county comprehensive plan map, 2012). 54% of the homes in Birch Bay are owned, 12% are rented, and 32% are not occupied (Birch bay, wa real estate).

### **Proposed Action**

#### **Construction Impacts**

Whatcom County does not propose to eliminate or develop any housing units.

For external impacts upon residents see section 2.6 regarding noise.

#### **Operational Impacts**

Increased levels of pedestrian traffic may occur resulting in increased noise and high levels of activity.

#### **Mitigation**

No measures are proposed to reduce or control housing impacts.

#### **Level of Significance**

Impacts on housing will be below a level of significance.

### **Alternative Action**

#### **Construction Impacts**

The alternative action does not involve the construction or elimination of any housing.

#### **Operational Impacts**

Increased levels of pedestrian and vehicle traffic may occur resulting in higher levels of activity.

#### **Mitigation**

No measures are proposed to reduce or control housing impacts.

#### **Level of Significance**

Impacts on housing will be below a level of significance.

### **No Action**

Housing units will remain the same, none will be constructed or eliminated.

## **3.8 Light and Glare**

### **Existing Conditions**

Street lamps are currently attached to utility poles that line the shoreline of Birch Bay. These street lamps are not considered to be an environmental hazard and are necessary for the safety of cars and pedestrians at night.

### **Proposed Action**

#### **Construction Impacts**

Street lamps are currently attached to the utilities, which are proposed to be placed underground. The proposal does not mention whether these lights will remain or if new lighting will be constructed in replace of the current lighting once the utilities go underground. Whatcom County Public Works is looking for community input on the issue.

#### **Operational Impacts**

No off-site sources of light or glare will affect the proposal or conditions once the project is completed.

**Mitigation**

No measures are proposed to reduce or control light and glare impacts.

**Level of Significance**

Impacts on light and glare will be below a level of significance.

**Alternative Action**

**Construction Impacts**

Removal of existing street lamps that are attached to utilities and construction of solar powered lighting along pedestrian pathways will cause temporary disturbances.

**Operational Impacts**

Solar powered lighting along pathways will give opportunity for sustainable and efficient energy for long term use.

**Mitigation**

No measures are proposed to reduce or control light and glare impacts.

**Level of Significance**

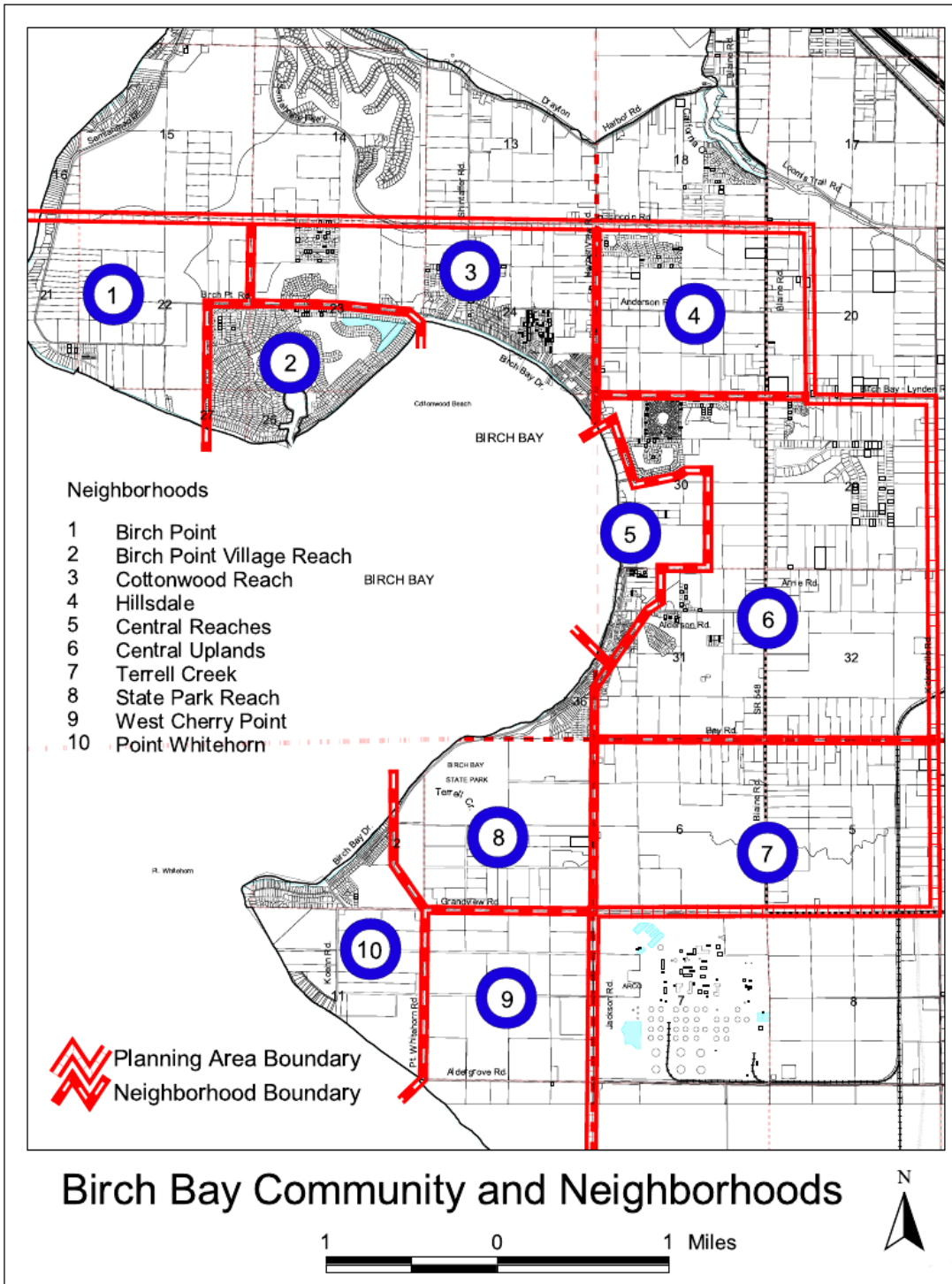
Impacts on light and glare will be below a level of significance.

**No Action**

No change will occur, street lamps will remain attached to utility poles.

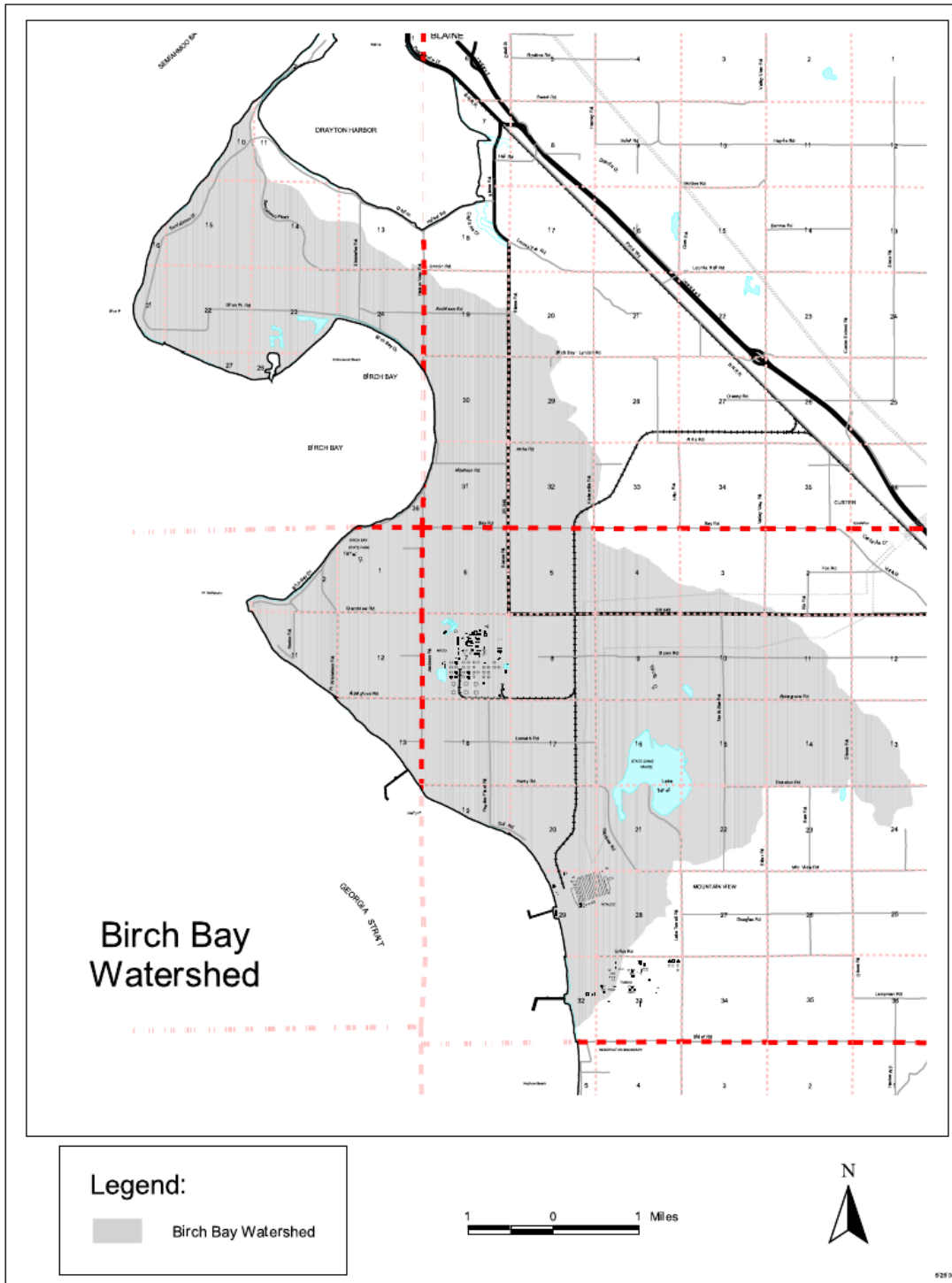


# Appendix A

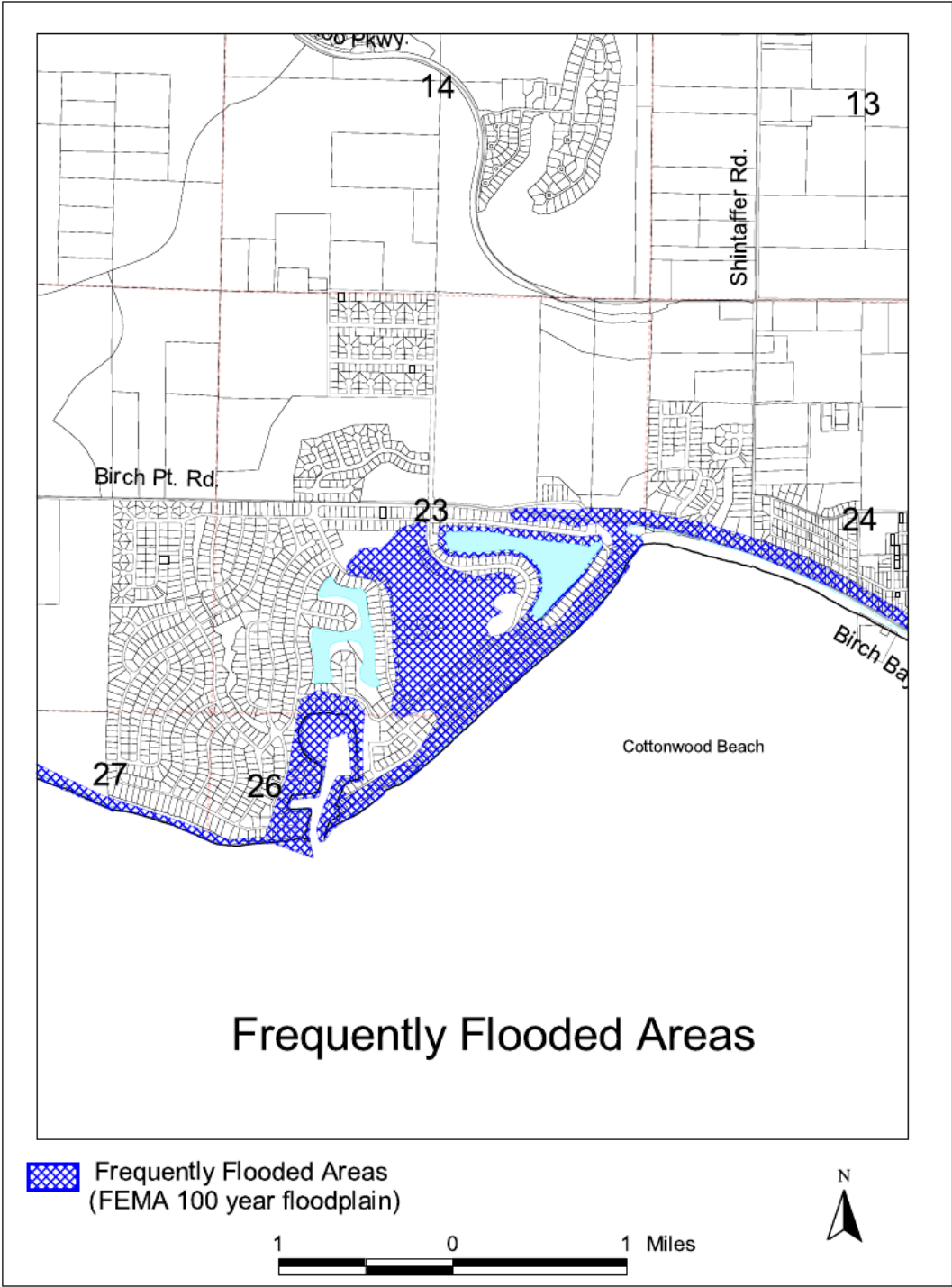




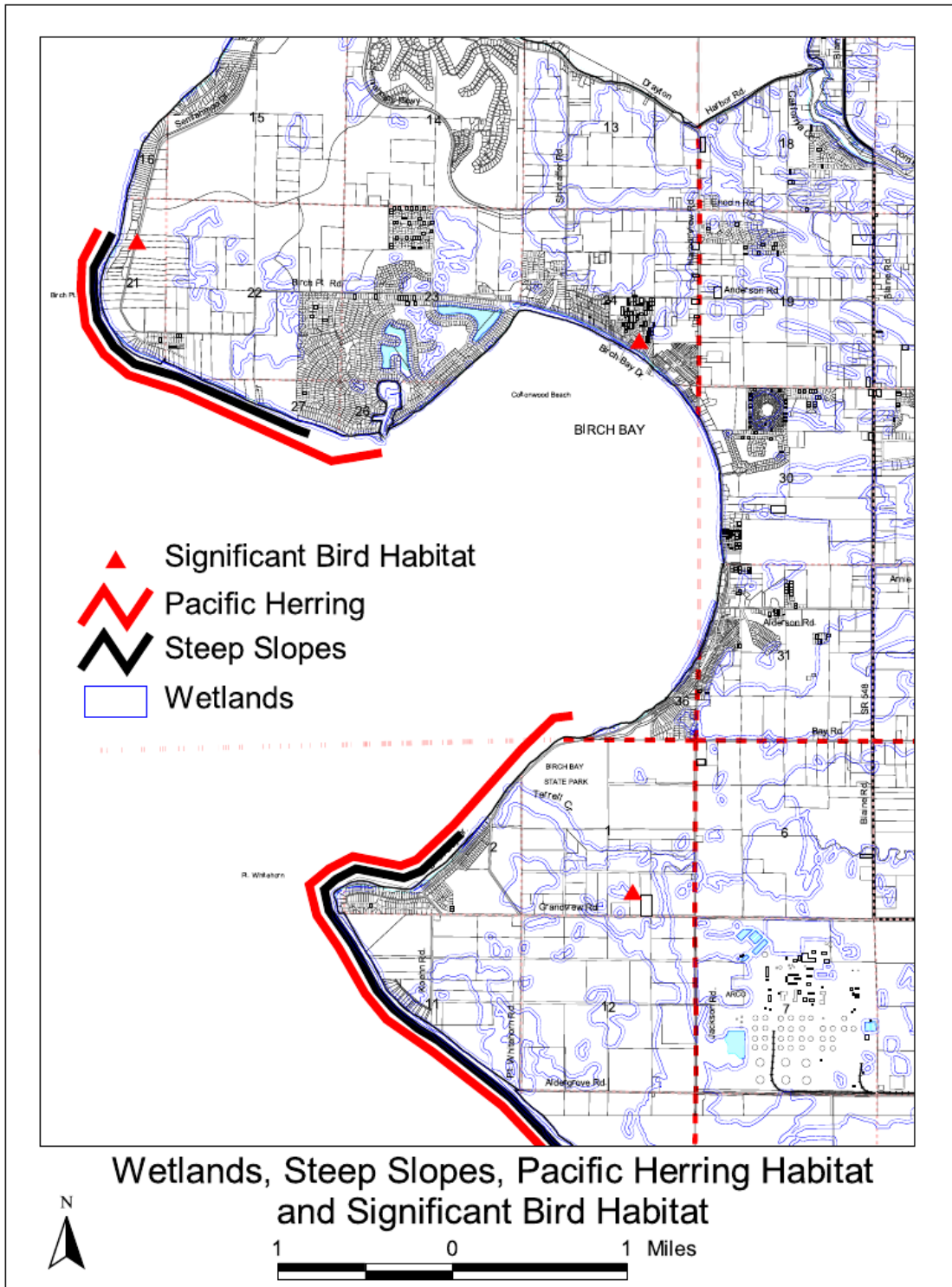
# Appendix B



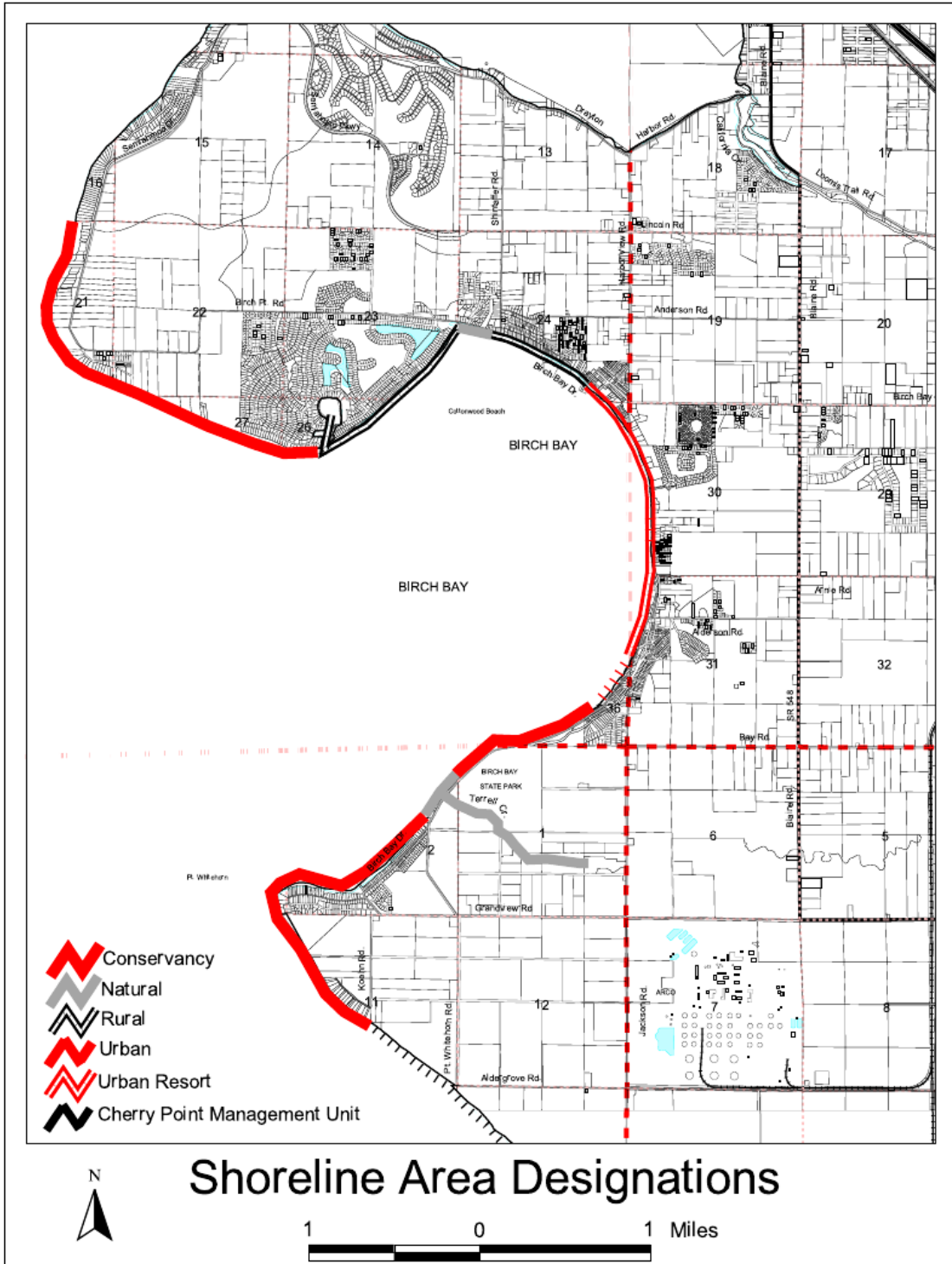
Appendix C



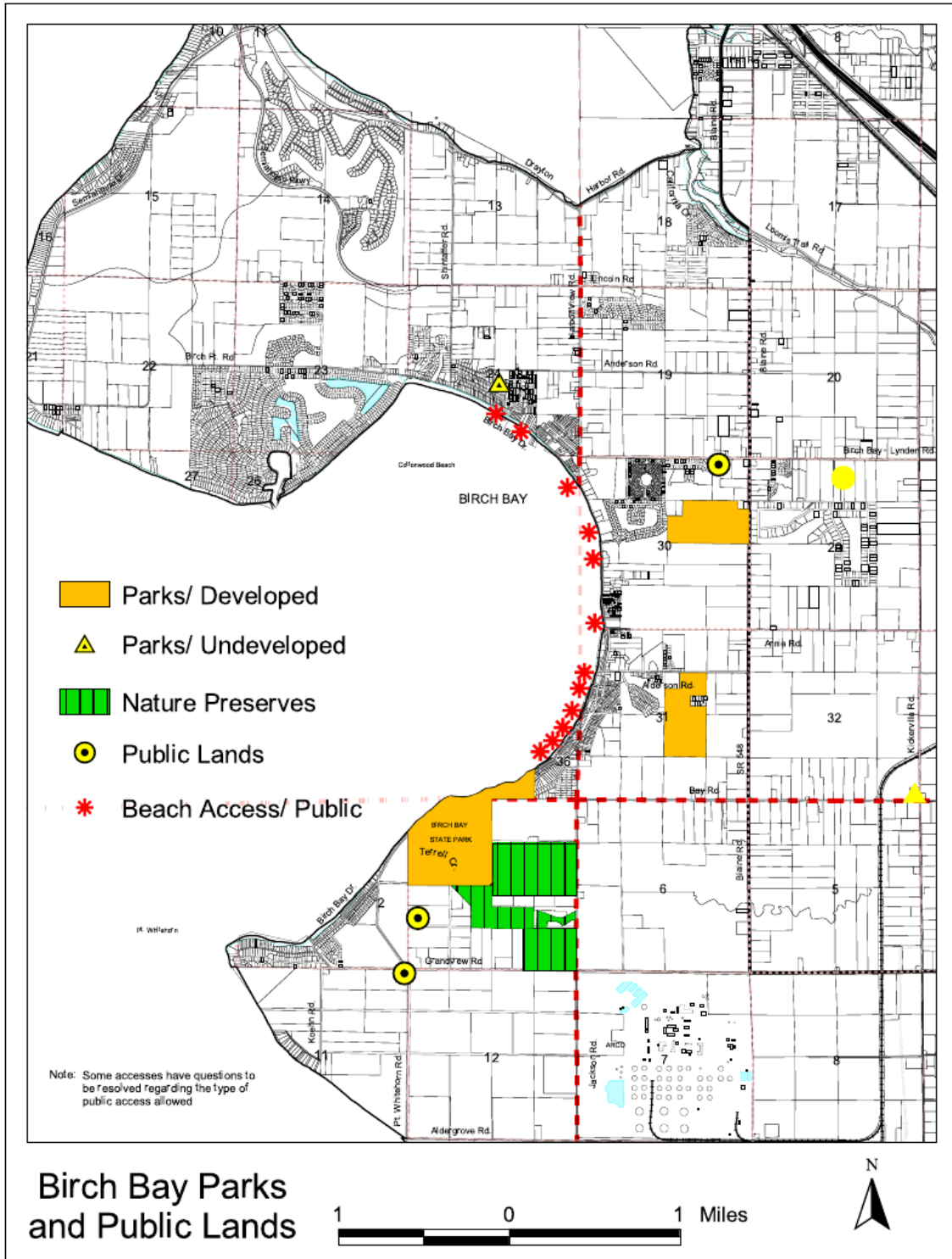
Appendix D



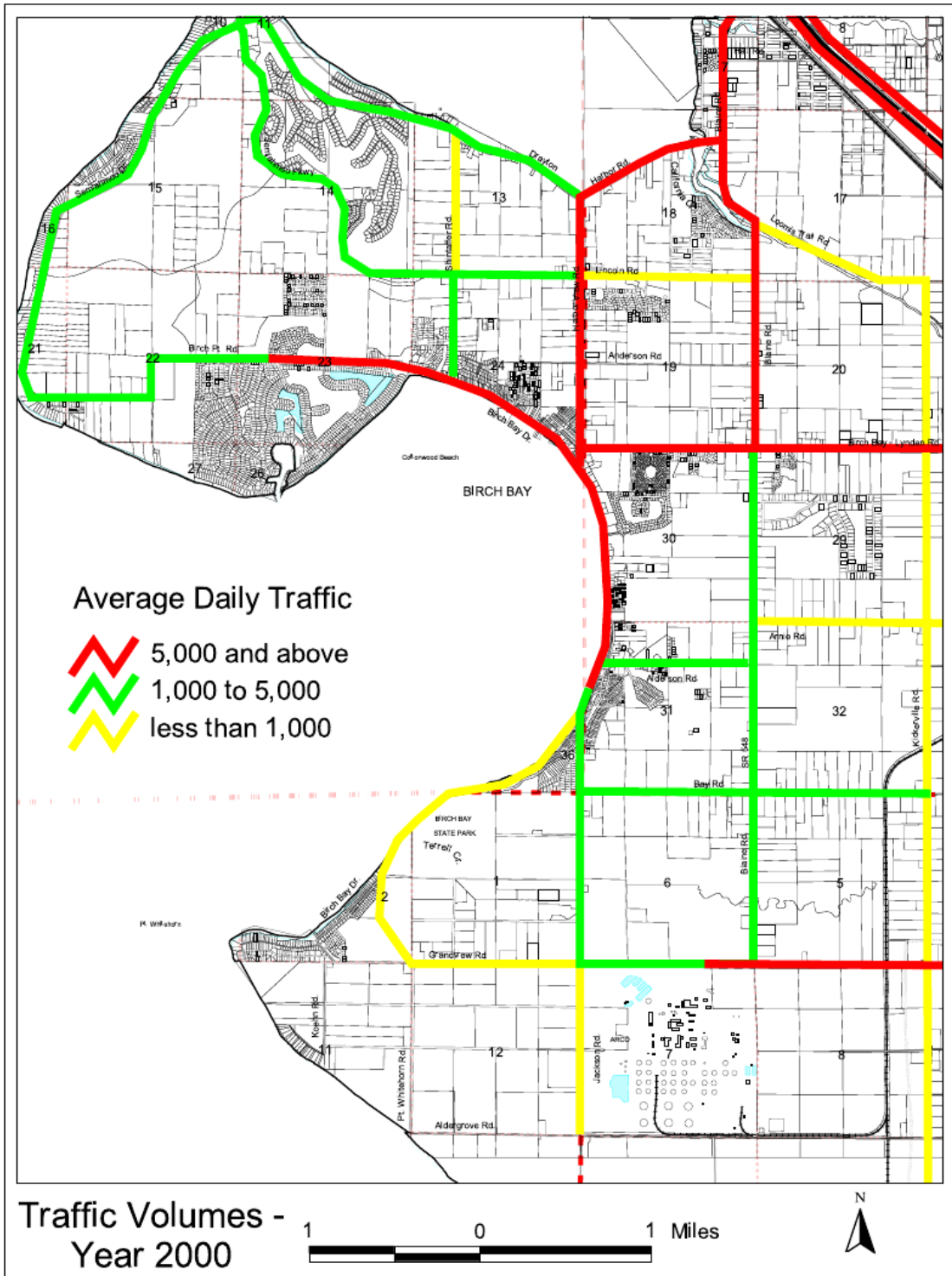
Appendix E



# Appendix F



# Appendix G





## References

- Balisky, L., Hoyt, B., Koops, G., , , Otten, K., Sparks, S., & Thompson, A. (2006). *Birch bay community plan and urban design recommendations*. Informally published manuscript, Huxley College, Western Washington University, Bellingham, Retrieved from [http://www.whatcomcounty.us/pds/planning/birchbay/bbcplan\\_urban\\_des\\_rec.pdf](http://www.whatcomcounty.us/pds/planning/birchbay/bbcplan_urban_des_rec.pdf)
- Bauer , W. (n.d.). *Birch bay shore resource analysis*. Retrieved from [http://www.birchbayinfo.org/images/BirchBayShoreResourceAnalysis\\_1975.pdf](http://www.birchbayinfo.org/images/BirchBayShoreResourceAnalysis_1975.pdf)
- Birchbayinfo*. (n.d.). Retrieved from <http://www.birchbayinfo.org/shorelinerestorationberm.html>
- Birch bay, wa real estate*. (n.d.). Retrieved from [http://www.coldwellbanker.com/real\\_estate/home\\_search/wa/Birch Bay](http://www.coldwellbanker.com/real_estate/home_search/wa/Birch Bay)
- CH2MHILL. CH2MHILL, (2006). *Birch bay comprehensive stormwater plan* . Retrieved from website: [http://www.whatcomcounty.us/pds/planning/birchbay/bbcsp\\_final.pdf](http://www.whatcomcounty.us/pds/planning/birchbay/bbcsp_final.pdf)
- Coastal processes* . (n.d.). Retrieved from [http://www.nature.nps.gov/views/kcs/coastalg/html/ET\\_Processes.htm](http://www.nature.nps.gov/views/kcs/coastalg/html/ET_Processes.htm)
- Department of Ecology. (2012). *Birch bay project: Response for determination of substantial environmental degradation*. Retrieved from website: [http://www.thenorthernlight.com/static/files/DOEWCBermProjectApprovalLetter\\_5-9-12.pdf](http://www.thenorthernlight.com/static/files/DOEWCBermProjectApprovalLetter_5-9-12.pdf)
- Environmental Protection Agency, (n.d.). *Lecture*
- ESA Adolfson ESA Adolfson , (2007). *Birch bay watershed characterization and watershed planning pilot study*. Retrieved from website: [http://www.whatcomcounty.us/pds/naturalresources/specialprojects/pdf/birchbay\\_pilot\\_study\\_finalclean.pdf](http://www.whatcomcounty.us/pds/naturalresources/specialprojects/pdf/birchbay_pilot_study_finalclean.pdf)
- Hessler, D. Hessler Associates, Inc, (2003). *Additional noise monitoring results* (1671-080603-A). Retrieved from website: [http://www.efsec.wa.gov/bpcogen/Adjudications/prefiled/24.4A\(DMH-4\).DOC.PDF](http://www.efsec.wa.gov/bpcogen/Adjudications/prefiled/24.4A(DMH-4).DOC.PDF)
- Kask Consulting Inc. Whatcom County, (2004). *Birch bay community plan: Whatcom county* . Retrieved from website: <http://www.co.whatcom.wa.us/pds/pdf/planning/projects/birchbay/finalplan/b-inside.pdf>



Kurpis, L. (n.d.). *Endangered species in washington*. Retrieved from <http://www.endangeredspecie.com/states/wa.htm>

National Research Council. Federal Facilities Council, Board on Infrastructure and the Constructed Environment. (2007). *reducing construction costs: Uses of best dispute resolution practices by project owners, proceedings report*. Retrieved from The National Academies Press website: [http://www.nap.edu/openbook.php?record\\_id=11846&page=19](http://www.nap.edu/openbook.php?record_id=11846&page=19)

Nooksack Recovery Team. (n.d.). *Birch bay & terrell creek state of the watershed report* . Retrieved from [http://www.co.whatcom.wa.us/pds/naturalresources/criticalareas/updates/downloads/pdf/bb\\_terrellcrk\\_watershed\\_report.pdf](http://www.co.whatcom.wa.us/pds/naturalresources/criticalareas/updates/downloads/pdf/bb_terrellcrk_watershed_report.pdf)

Perlman , H. (09, March 2012). *The effects of urbanization on water quality: erosion and sedimentation* . Retrieved from <http://ga.water.usgs.gov/edu/urbansed.html>

<sup>1</sup>Philip Williams & Associates, Ltd. Philip Williams & Associates, Ltd., (2002). *Draft report: birch bay shoreline improvement plan and conceptual design* (1627.03). Retrieved from website: [http://resources.wcog.org/projects/birchbay\\_bermreport.pdf](http://resources.wcog.org/projects/birchbay_bermreport.pdf)

<sup>2</sup>Philip Williams & Associates, Ltd., & ESA Adolfson with Coastal Geologic Services, Philip Williams & Associates, Ltd., (2006). *Birch bay shoreline enhancement phase I* (1859). Retrieved from website: [http://www.birchbayinfo.org/images/Birch\\_Bay\\_Shoreline\\_Enhancement\\_Phase\\_1\\_Report.pdf](http://www.birchbayinfo.org/images/Birch_Bay_Shoreline_Enhancement_Phase_1_Report.pdf)

<sup>3</sup>Philip Williams & Associates, Ltd., ESA Adolfson, Inc., Coastal Geologic Services, & David Evans & Associates, Inc., Philip Williams & Associates, (2007). *Birch bay shoreline enhancement phase 2A conceptual cost Estimate* (1859.01). Retrieved from website: [http://www.co.whatcom.wa.us/pds/pdf/planning/birch\\_bay\\_shore\\_enhncmnt\\_ph2A\\_text\\_figs.pdf](http://www.co.whatcom.wa.us/pds/pdf/planning/birch_bay_shore_enhncmnt_ph2A_text_figs.pdf)

Project for Public Spaces, (2008). *How to turn a waterfront around*. Retrieved from website: [http://walkthewaterfront.org/documents/pps\\_turn\\_waterfront.pdf](http://walkthewaterfront.org/documents/pps_turn_waterfront.pdf)

Schwartz, J. (2012, April 25). Birch bay pedestrian facility moves forward. *The northern light* . Retrieved from [http://www.thenorthernlight.com/news/article.exm/2012-04-25\\_birch\\_bay\\_pedestrian\\_facility\\_moves\\_forward](http://www.thenorthernlight.com/news/article.exm/2012-04-25_birch_bay_pedestrian_facility_moves_forward)

Stroebe, E. Whatcom County Public Works-Natural Resources, (2010). *Final birch bay/terrell fecal coliform and nutrient monitoring project quality assurance project plan* . Retrieved from website:  
[http://whatcomshellfish.whatcomcounty.org/birch/documents/BirchBayWQ\\_QAPP\\_final.pdf](http://whatcomshellfish.whatcomcounty.org/birch/documents/BirchBayWQ_QAPP_final.pdf)

Texas Department of Insurance, Division of Workers' Compensation. (2006). *Asphalt safety* (HS05-047A (1-06)). Retrieved from website:

Tideflex. (n.d.). *Stormwater & wastewater collection/dischage*. Retrieved from  
<http://www.tideflex.com/tf/index.php/content/view/228/368/>

Transpo. Whatcom County, (2008). *Draft birch bay transportation planning study*. Retrieved from website:  
<http://www.co.whatcom.wa.us/pds/plan/current/projects/semiahmoowest/pdf/pr6.2.pdf>

United States Environmental Protection Agency, (2012). *Birch bay, wa air quality*. Retrieved from website: <http://www.usa.com/birch-bay-wa-air-quality.htm>  
<http://www.tdi.texas.gov/pubs/videoresource/stpasphalt.pdf>

United States. Minerals Management Service. Alaska OCS Region, United States. Dept. of the Interior. (1985). *Norton basin sale 100 final environmental impact statement* (MMS 85-0085). Retrieved from website:  
[http://books.google.com/books?id=xzERAAAAYAAJ&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0](http://books.google.com/books?id=xzERAAAAYAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0)

US Department of Agriculture, Natural Resource Conservation Service. (1992). Published soil surveys for Washington. Retrieved from website:  
[http://soils.usda.gov/survey/printed\\_surveys/state.asp?state=Washington&abbr=WA](http://soils.usda.gov/survey/printed_surveys/state.asp?state=Washington&abbr=WA)

Washington State Department of Ecology (n.d.). *Functions and values of wetlands* . Retrieved from  
<http://www.ecy.wa.gov/programs/sea/wetlands/functions.html>

Washington State Department of Health. (n.d.). *Shellfish safety information*. Retrieved from <http://ww4.doh.wa.gov/gis/mogifs/biotxin.htm>

Washington State Department of Natural Resources. (2012). Preventing impacts to important aquatic habitats . Retrieved from  
[http://www.dnr.wa.gov/ResearchScience/Topics/AquaticHabitats/Pages/aqr\\_preventing\\_impacts\\_to.aspx](http://www.dnr.wa.gov/ResearchScience/Topics/AquaticHabitats/Pages/aqr_preventing_impacts_to.aspx)

Washington State Legislature. (1999). *Wac 399-30-034*. Retrieved from website:  
<http://apps.leg.wa.gov/wac/default.aspx?cite=399-30-034>

Whatcom County , GIS Services. (2012). *Whatcom county comprehensive plan map*. Retrieved from website:  
<http://www.whatcomcounty.us/pds/planning/gis/gismaps/zoning.jsp>

Whatcom Transportation Authority. (2012). *55 cordata/wcc/blaine/birch bay*. Retrieved from [http://www.ridewta.com/route\\_55](http://www.ridewta.com/route_55)

World Media Group. (n.d.). *Birch bay, wa air quality*. Retrieved from <http://www.usa.com/birch-bay-wa-air-quality.htm>