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Lummi Island ferry relocation

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Author

Sarah Degenhart, Ryan Hessler, Megan Link, Anne Maertens, Matt Sturza, and Sarah Thomas



Environmental Impact Assessment



Lummi Island Ferry Relocation



Site Location Map

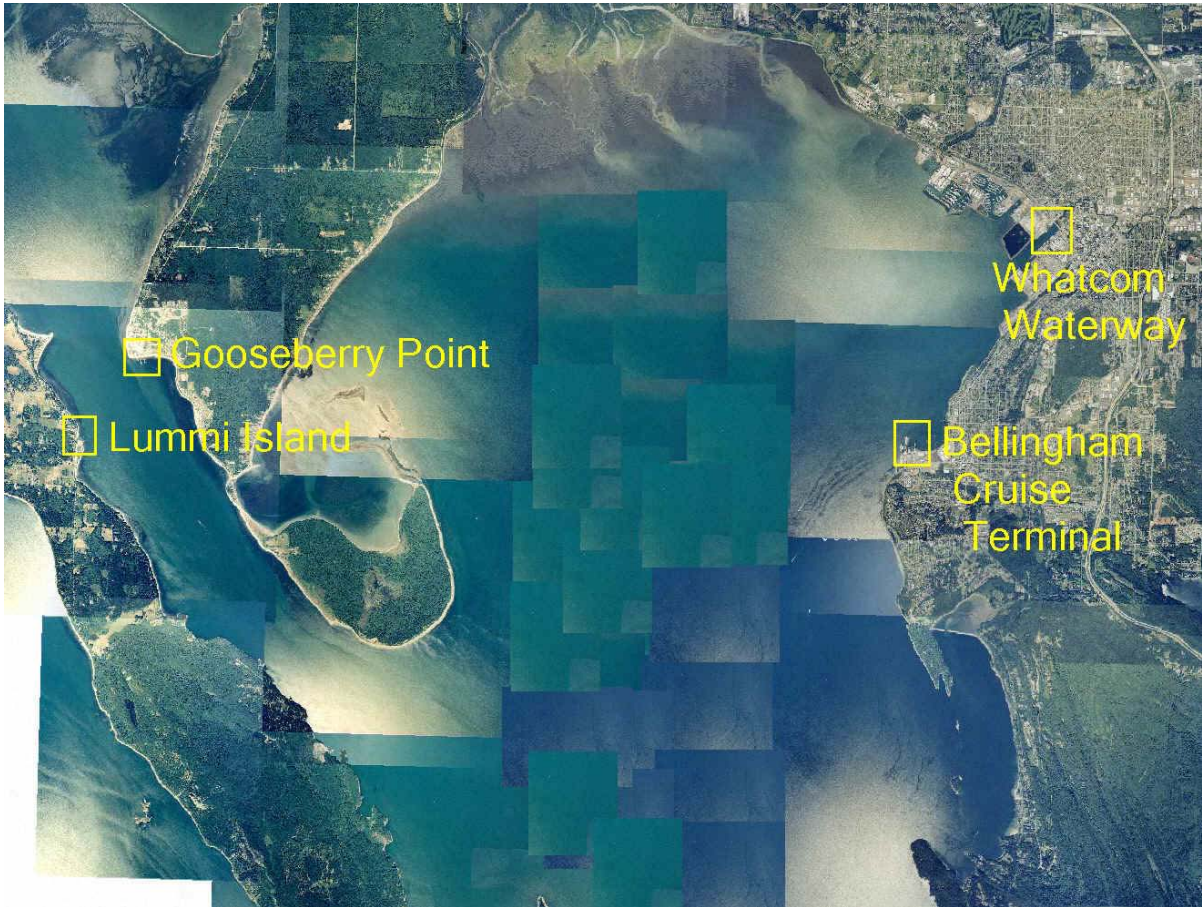


Figure 1. View of the Lummi Island Ferry docking sites at Lummi Island and Gooseberry Point and possible docking sites at Bellingham Cruise Terminal and Whatcom Waterway.

Photo and Cover Design by Ryan Hessler

Environmental Impact Assessment
Huxley College of the Environment


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Date 03/08/2010

March 8, 2010

Dear Concerned Citizen,

This Environmental Impact Assessment (EIA) has been composed by a group of Huxley students under the supervision of Dr. Leo Bodensteiner. Together, we have analyzed the proposed plan for the relocation of the Lummi Island ferry docks located on Lummi Island and Gooseberry Point. The end of a 25-year lease and the proposed removal of the Gooseberry Point dock spurred the possible relocation. Our discussion includes the current proposal and two alternatives for the ferry routes. The alternatives include the transfer to either the Bellingham Cruise Terminal or Whatcom Waterway. Existing conditions and impacts are outlined within the EIA.

The preferred course of action recommended by our team is the relocation of the Lummi ferry from the Gooseberry Point dock to the Bellingham Cruise Terminal.

This EIA summarizes the possible impacts of the project and alternatives on the built and natural environment. We trust this will offer insight into the environmental issues raised by the relocation of the ferry.

Sincerely,

The Lummi Ferry Relocation EIA Team

**Lummi Island Ferry Relocation
Environmental Impact Assessment,
Bellingham, WA**

**Prepared for:
Environmental Science 436
Professor Leo Bodensteiner
Western Washington University
Huxley College of the Environment**

**Prepared by:
Sarah Degenhart
Ryan Hessler
Megan Link
Anne Maertens
Matt Sturza
Sarah Thomas**

** This presentation 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 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

Lummi Island Ferry Relocation Environmental Impact Assessment

Description

The State Environmental Policy Act (SEPA) requires that adverse or significant actions to the environment should be documented. This environmental impact assessment is a result of those requirements. The format of those requirements is outlined in Chapter 197 – 11 in the Washington Administrative Code (WAC).

The proposed action includes the relocation of the ferry dock that facilitates transport from Lummi Island to Gooseberry Point to the Bellingham Cruise terminal.

The alternative action is to move the dock to the northern side of Whatcom Waterway, specified by the Whatcom County Public Works Ferry Relocation Feasibility Study (RH2 Engineering Inc., 2009).

Under the no action alternative, the dock at Gooseberry Point would remain in operation for the next five years, reducing operations to little or no service after that time period.

Location of Study Sites

Gooseberry Point is located on the southwest side of the Lummi Indian Reservation, just south of 2584 Lummi View Drive, Bellingham, WA 98226.

The Bellingham Cruise Terminal is located at 355 Harris Ave., Bellingham, WA 98225, with vehicle access west of 6th Street and east of 4th Street.

The Whatcom Waterway site is located west of 600 and 700 Roeder Ave., and it is adjacent to the Kodiak Fish Company (1000 C St., Bellingham, WA 98225).

Proposer

Huxley Environmental Impact Assessment Winter 2010 – ESCI 436

Lead Agency

Bodensteiner and the Students of ESCI 436 EIA
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Western Washington University
Bellingham, WA 98225

Contact

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Permits and Approvals

Permit	Permitting Agency
Section 10/Section 404 Permit ¹	United States Army Corps of Engineers
National Environmental Policy Act	U.S. Environmental Protection Agency ²
Essential Fish Habitat Concurrence	National Marine Fisheries Service, United States Fish and Wildlife Service
Endangered Species Act Concurrence	National Marine Fisheries Service, United States Fish and Wildlife Service
Section 401 Water Quality Certification ³	Washington State Department of Ecology
National Pollutant Discharge Elimination Construction General Permit ⁴	Washington State Department of Ecology
Coastal Zone Management Act Consistency	Washington State Department of Ecology
National Historic Preservation Act Section concurrence	Washington State Department of Archaeological Historical Preservation ⁶
Hydraulic Permit Approval ⁷	Washington Department of Fish and Wildlife
EPA Determination	City of Bellingham
Substantial Development Permit ⁸	City of Bellingham
Shoreline Conditional Use Permit ⁹	City of Bellingham
Grading and Building Permits	City of Bellingham
Fill and Grade Permit	City of Bellingham
Building Permit	City of Bellingham

(Source: Lummi Island Ferry Dock Relocation Feasibility Study by RD2 Engineers)

Permit Notes:

1. Locating a structure, excavating, or discharging dredged or fill material into water
2. Expected coordination with the Army Corps of Engineers
3. For projects that require excavation in/dischARGE dredge/fill material into water
4. Required if more than one acre is disturbed during construction
5. For projects with a federal connection within any of Washington's 15 coastal counties
6. The Army Corps of Engineers will conduct preliminary investigation; additional information may be required at the request of the Army Corps of Engineers
7. For work in waters of the State
8. Per the City of Bellingham Shoreline Masters Program
9. Per the City of Bellingham

EIA Authors

Sarah Degenhart: Air, Water
Ryan Hessler: Earth
Megan Link: Environmental Health, Public Services and Utilities
Anne Maertens: Transportation, Energy and Resources
Matt Sturza: Plants and Animals, Energy and Resources
Sarah Thomas: Land and Shoreline Use

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Acknowledgements

We would like to extend our thanks to the following people for their help and contributions:

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Date of Issue

March 8, 2010

Public Hearing

5 p.m. Monday, March 8, 2010
921 Cornwall Ave
Bellingham, WA 98225

TABLE OF CONTENTS

FACT SHEET	6
TABLE OF CONTENTS	10
GLOSSARY	12
LIST OF ACRONYMS AND ABBREVIATIONS	16
1. EXECUTIVE SUMMARY	17
1.1 Purpose.....	17
1.2 Site Description.....	17
1.3 Problem Description.....	17
1.4 Description of the Proposed Action and Alternative.....	18
1.5 Recommendation.....	18
1.6 Decision Matrix.....	19
2(a). Introduction	20
2(a).1 Purpose	20
2(a).2 Site Description.....	20
2(a).3 Problem Description.....	20
2(a).4 Description of the Proposed Action and Alternative.....	21
2(a).5 Recommendation.....	21
2(a).6 Decision Matrix.....	22
2(b). HISTORY OF THE PROJECT AREA	23
3. ELEMENTS OF THE NATURAL ENVIRONMENT	24
3.1 Earth.....	24
3.1.1 Geology.....	24
3.1.2a Soils.....	24
3.1.2b Sediments.....	25
3.1.3 Topography.....	26
3.1.4 Erosion/Enlargement of Land Area.....	27
3.2 Air.....	28
3.2.1 Air Quality.....	28
3.2.2 Odor.....	29
3.2.3 Climate.....	30
3.3 Water.....	30
3.3.1 Surface Water Movement/Quantity/Quality.....	30
3.3.2 Runoff/Absorption.....	31
3.3.3 Ground Water Movement/Quantity/Quality.....	32
3.3.4 Public Water Supplies.....	33
3.4 Plants and Animals.....	33
3.4.1 Flora.....	33
3.4.2 Fauna.....	35
3.5 Energy and Resources.....	36
3.5.1 Amount Required/Rate of Use/Efficiency.....	36
3.5.2 Nonrenewable Resources.....	37
3.5.3 Conservation and Renewable Resources.....	38
3.5.4 Scenic Resources.....	38

4. ELEMENTS OF THE BUILT ENVIRONMENT.....40

 4.1 Environmental Health.....30

 4.2 Land and Shoreline Use.....41

 4.2.1 Comprehensive Plans and Shoreline Master Plan.....41

 4.2.2 Housing.....42

 4.2.3 Light and Glare.....43

 4.2.4 Aesthetics.....44

 4.2.5 Recreation.....45

 4.2.6 Historical and Cultural Preservation.....46

 4.3 Transportation.....48

 4.3.1 Public Transportation – Waterborne, Rail and Bus.....48

 4.3.2 Vehicular Traffic & Parking.....50

 4.3.3 Movement/Circulation of People or Goods.....51

 4.4 Public Services.....52

 4.4.1 Fire, Police, Medical.....52

 4.4.2 Schools, Maintenance, Solid Waste.....53

5. ELEMENTS OF THE ENVIRONMENT NOT ADDRESSED.....56

6. REFERENCES.....57

7. APPENDICES.....63

LIST OF TABLES

Table 1. Gooseberry Point Soil Conditions.....64

Table 2. Bellingham Cruise Terminal Soil Survey.....66

LIST OF FIGURES

Figure 1. Site Location Map.....2

Figure 2. Gooseberry Point Soil Survey Map.....63

Figure 3. Bellingham Cruise Terminal Soil Survey Map.....65

Figure 4. Whatcom Waterway Soil Survey Map.....67

Figure 5. Lummi Island Kelp Bed Map.....68

Figure 6. Gooseberry Point Kelp Bed Map.....69

Figure 7. Lummi Island Eelgrass Bed Map.....70

Figure 8. Bellingham Cruise Terminal Eelgrass Bed Map.....71

Figure 9. Whatcom Waterway Eelgrass Bed Map.....72

Figure 10. Fairhaven Zoning Map.....73

Figure 11. Whatcom Waterway Zoning Map.....74

LIST OF APPENDICES

Appendix A: Soils.....63

Appendix B: Flora and Fauna.....68

Appendix C: Land and Shoreline Use.....73

GLOSSARY

Accretion (Coastal Management): the process of coastal sediments returning to the visible portion of a beach or foreshore following a submersion event; a sustainable beach or foreshore often goes through a cycle of submersion during rough weather then accretion during calmer periods; if a coastline is not in a healthy sustainable condition, then erosion can be more serious and accretion does not fully restore the original volume of the visible beach or foreshore leading to permanent beach or foreshore loss

Aerated stabilization basin (ASB): treatment systems found in many pulp mills; a slow pumping process where the contaminants are placed in holding cells in the waterway and bacteria is introduced to the water to essentially eliminate the waste, after the water is treated it is then filtered back into the existing waters

Aesthetics: the study of the mind and emotions related to the sense of beauty; the nature of beauty, art, and taste with the creation and appreciation of beauty

Ambient air: any unconfined portions of the atmosphere

Arterial roads: a moderate to high-capacity road that is immediately below a highway level of service

Bedrock: bottom layer; lowest stratum

Bioaccumulation: the accumulation of toxic substances that occur in the environment within a living organism

Bulkhead: a retaining wall constructed along shorelines with the purpose of controlling beach erosion

Carbon monoxide (CO): forms from partial oxidation of carbon-containing compounds; produced when there is not enough oxygen to produce carbon dioxide, like operating an internal combustion engine or stove in an enclosed space

Chlor-alkali plant: used to manufacture thousands of products including mercury, chlorine, caustic soda, citric acid, and high fructose corn syrup

Dredging: an excavation activity or operation usually carried out at least partly underwater, in shallow seas or fresh water areas with the purpose of gathering up bottom sediments and disposing of them at a different location

Dry dock: a structure for ships to be completely out of water with all parts of the hull accessible for painting, repairs, or general upkeep

Emissions: gas emitted into the air from industrial, chemical, or daily processes such as driving an automobile

Epiphytes: plants growing on or attached to another plant with no harm to its host

Erosion: the wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Ethnography: the gathering of empirical data on human societies and cultures; a qualitative research method used in anthropology and sociology

Fauna: total animal population that inhabits an area

Feeder bluffs: a coastal cliff or headland that feeds the beaches down current; as waves approach the bluff, they erode away sediment which then gets carried along the coastline and deposited across other beaches; the majority of the wave energy is concentrated at the base of the bluff, where it is most accessible for the wave action

Flora: vegetation assemblage that inhabits an area

Freshwater aquifer: underground layer of unconsolidated materials from which fresh groundwater can be extracted with wells

Greenhouse gas: gases whose absorption of solar radiation contributes to the greenhouse effect where infrared radiation is absorbed by molecules in the atmosphere

Groundwater: the supply of freshwater under the Earth's surface, usually found in aquifers that supply wells and springs

Holocene marine deposits: sediment deposits from the Holocene epoch, which is approximately 12,000 years ago

Impervious: not permitting penetration

Landfill: a dump; a site for the disposal of waste materials by burial

Lead: a heavy metal used in building construction, some batteries, bullets, and shot weights, and is part of many other materials

Lithic scatter: a distribution of cultural items that consists mostly of lithic (stone) materials

Loam: soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles

Macrovegetation: vegetation large enough to see with the naked eye

Mainland: a large landmass in a region with contrast to nearby islands

Maximum daily load: calculation of the maximum amount of a pollutant that a body of water or air can receive and still safely meet the water and air quality standards

Midden: dump sites for domestic waste; a term often used by archaeologists

Neptune: the Neptune soil series consists of very deep, somewhat excessively drained soils formed in coastal beach deposits that contain marine shells; found on marine ridges, spits, and terraces; used to define mesic Entic Haploxerolls

Net migration: the difference between immigration into and emigration from an area

Nitrogen dioxide (NO₂): an intermediate in the industrial synthesis of nitric acid; a toxic gas that is a prominent air pollutant

Odor: the property of a substance that activates the sense of smell; in this case the concentrations of chemicals that can be smelled

Outmigrate: to leave a region and settle into a different one

Ozone (O₃): an air pollutant with harmful effects on the respiratory system located in the lower atmosphere; the ozone layer in the upper atmosphere is beneficial because it prevents damaging ultraviolet light from reaching the Earth's surface

Particulate matter (PM): small particles of solid or liquid matter suspended in a gas or liquid, sources include the burning of fossil fuels, power plants, various industrial processes, dust storms, forest and grassland fires, sea spray, and volcanoes

Petroleum hydrocarbons: organic compounds known as crude oil; flammable mixtures

Phthalates: esters used in plastics with effects on the respiratory system and blood from chronic inhalation exposure

Piling: a post driven into the water's bottom for supporting a pier, wharf, jetty, dock, or float.

Polychlorinated biphenyls (PCB): group of very persistent chemicals that contain 209 individual compounds with harmful effects

Polycyclic aromatic hydrocarbons (PAH): chemical compounds occurring in coal, tar, and oil deposits produced as byproducts of fuel burning; identified as carcinogenic, mutagenic, and teratogenic

Potable water: water that is suitable for drinking and cooking

Primary production: production of organic compounds from carbon dioxide (CO₂); generation of biomass through photosynthesis

Riprap: rock or other material used to armor shorelines, streambeds, bridge abutments, pilings and other shoreline structures against scour, water or ice erosion

Salmonids: of, belonging to, or characteristic of the family Salmonidae, including salmon, trout, and whitefish

Scow: a barge carrying bulk materials in an open hold

Sedimentary rock: rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate; some wind-deposited sand is consolidated into sandstone

Semi permeable: only permeable to a slight degree

Semi-volatile organic compounds (SVOC): an organic compound that participates in atmospheric photochemical reactions

Sulfur dioxide (SO₂): produced by volcanoes, industrial processes, and the combustion of coal and petroleum

Topography: physical features of a region; the relief and contours of the land

Longshore transport: the movement of sediments along the coast parallel to the shoreline due to wave and shore interactions

Urban functions: functions that take place in urban settings such as finance, commerce, health, administration, etc.

Watershed: land and water within the confines of a drainage divide feeding a stream or river, including surface water, groundwater, vegetation, and human structures

ACRONUMS AND ABBREVIATIONS

ALS: Advanced Life Support

ASB: Aerated Stabilization Basin

BLS: Basic Life Support

CPTED: Crime Prevention through Environmental Design

DAHP: Department of Archeological and Historical Preservation

EIA: Environmental Impact Assessment

EMT: Emergency Medical Technician

GMA: Growth Management Act

IFA: Industrial First Aid

MM: Minor Medical

OFM: Office of Financial Management

PAH: Polycyclic Aromatic Hydrocarbon

PCB: Polychlorinated Biphenyl

PM: Particulate Matter

RR-I: Residential Rural Island

SMA: Shoreline Management Act

SMP: Shoreline Management Plan

SVOC: Semi Volatile Organic Compound

WDOE: Washington Department of Ecology

1. EXECUTIVE SUMMARY

1.1 Purpose

The purpose of this environmental impact assessment is to determine the positive and negative environmental impacts of moving the mainland ferry dock from its current location at Gooseberry Point on the Lummi Indian Reservation to other prospective areas within the city of Bellingham, WA. The assessment includes a proposed action, an alternative action and a no action alternative and was performed in accordance with the State Environmental Policy Act (SEPA).

The proposed action location for ferry operations is the Bellingham Cruise Terminal in the Fairhaven Neighborhood of Bellingham where the Alaska Ferry operates. The alternative action would locate the ferry operations to the Whatcom Waterway near downtown Bellingham where ferry passengers would have direct access to the urban functions of the city. If the no action is taken, ferry operations will continue from Gooseberry Point.

1.2 Site Description

The Gooseberry Point ferry dock is located at Gooseberry Point in northern Puget Sound of Washington State. It is also within the Lummi Indian Reservation boundaries. Lummi View Drive services the ferry terminal. The dock sits within Fisherman's Cove pointing in a southern direction. The Lummi Island Ferry, also known as the Whatcom Chief, typically approaches the site from the southwest. Additional docks exist on both sides of the ferry dock. A tribal fisherman boat ramp is located to the west of all three docks.

1.3 Problem Description

The Gooseberry Point Ferry Dock is located within the Lummi Indian Reservation; therefore, a lease is required between Whatcom County and the Lummi Nation for the ferry to operate. For 25 years, the two parties have operated under the understanding that a lease existed because an agreement had been signed. However, it has come to the attention of both parties that since the U.S. Department of Interior never signed the lease, the agreement was invalid. This is a requirement for all lease agreements on Indian Reservations. The unsigned lease agreement expired on Feb. 14, 2010, but an interim agreement was reached to continue ferry service after this date. The parties are currently negotiating a deal for a new 25-year lease, but the county is simultaneously assessing the possibility of relocating the ferry dock.

1.4 Description of the Proposed Action and Alternative

Proposed Action

The proposed action for the Lummi Island Ferry is to relocate the mainland dock to the Bellingham Cruise Terminal. The ferry would use the existing terminals at Lummi Island and Fairhaven. This project has large impacts on the community in that it would create a much longer trip for the islanders. An additional passenger-only ferry would be put in place to allow for more frequent trips for passengers without vehicles. However, the number of trips would be decreased for the Whatcom Chief due to longer sail time.

Alternative Action

The alternative action involves the relocation of the ferry to the Whatcom Waterway site. Under this alternative, a ferry terminal must be constructed to allow for docking. Parking lots and sufficient lighting will also be required at the site. These projects will call for efforts to mitigate construction related degradation of the environment, including impacts from underwater building, machinery and release of contaminated materials. The sediment in the area is already contaminated and construction will cause releases of the pollution. This action is not recommended because the construction of a ferry terminal would be a large expense and poses threats to the environment.

No Action Alternative

Taking no action in the matter would involve current operations in their current locations. The ferry would take passengers from the mainland at Gooseberry Point to Lummi Island. Keeping the ferry operating in this fashion would ensure more convenience for the island's residents and visitors because of the short distance traveled. Since the ferry has been functioning in this way for years it would be the simplest action; however, there is concern that a lease agreement will not be reached to continue the ferry operating as is. Additionally, there is concern that the Lummi Nation will build a Marina at the current docking location, ending normal service.

1.5 Recommendation

The authors recommend the No Action Alternative, which would entail the ferry continuing normal operations between Gooseberry Point and Lummi Island. There would be significantly less environmental impacts because the operations and the facilities are already established. Remaining at Gooseberry would also require much less diesel fuel annually. Socially, Lummi Island residents and visitors depend on the shorter ferry commute for everyday functions and services. The Proposed Action would be our second recommendation because of the convenience of the already existing infrastructure. The Alternative Action is the least feasible because of lack of existing infrastructure. Additionally, the ferry commute from Lummi Island is the longest of the three actions, requiring the most fuel and the most mitigation.

1.6 Decision Matrix

Elements of the Environment	Proposed Action	Alternative Action	No Action Alternative
Soils and Sediments	0	0	0
Erosion	0	0	0
Topography	0	0	0
Air	0-	0-	0
Odor	0	0	0
Climate	0	0	0
Surface Water Quality and Quantity	0-	0	0
Groundwater Quality and Quantity	0	0	0
Public Water Supplies	0	0	0
Flora	0	0+	0
Fauna	0	0-	0
Amount Required/Rate of Use/Efficiency	-	-	0
Nonrenewable Resources	-	-	0
Conservation and Renewable resources	0-	0-	+
Scenic resources	0	+	0
Environmental Health	0	0-	0
Land and Shoreline Use	0	0	0
Lights and Glare	0	0	0
Aesthetics	0	+	0
Historical and Cultural Preservation	+	0	-
Recreation	+	+	+
Public transportation-Waterborne/Air/Rail Traffic	+	0+	0
Vehicular Traffic/Parking	0-	0-	0
Movement Circulation of Goods and People	-	-	0
Public Service and Utilities	-	-	0
Fire, Police, Medical	-	-	0
School/Maintenance/Solid Waste	-	-	0

- = Negative Impact
0- = Slight Negative Impact

+ = Positive Impact
0+ = Slight Positive Impact

0 = No Impact

2(a) Introduction

2(a).1 Purpose

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2(a).6 Decision Matrix

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Soils and Sediments	0	0	0
Erosion	0	0	0
Topography	0	0	0
Air	0-	0-	0
Odor	0	0	0
Climate	0	0	0
Surface Water Quality and Quantity	0-	0	0
Groundwater Quality and Quantity	0	0	0
Public Water Supplies	0	0	0
Flora	0	0+	0
Fauna	0	0-	0
Amount Required/Rate of Use/Efficiency	-	-	0
Nonrenewable Resources	-	-	0
Conservation and Renewable resources	0-	0-	+
Scenic resources	0	+	0
Environmental Health	0	0-	0
Land and Shoreline Use	0	0	0
Lights and Glare	0	0	0
Aesthetics	0	+	0
Historical and Cultural Preservation	+	0	-
Recreation	+	+	+
Public transportation-Waterborne/Air/Rail Traffic	+	0+	0
Vehicular Traffic/Parking	0-	0-	0
Movement Circulation of Goods and People	-	-	0
Public Service and Utilities	-	-	0
Fire, Police, Medical	-	-	0
School/Maintenance/Solid Waste	-	-	0

- = Negative Impact
0- = Slight Negative Impact

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0 = No Impact

2(b) HISTORY OF THE PROJECT AREA

The Gooseberry Point ferry dock is located within the Lummi Indian Reservation. Historically, the Lummi Nation peoples inhabited Gooseberry Point and similar gradually sloped shorelines (RH2 Engineering 2009). It is expected that shell middens, posts, rectangular pits, cemeteries and other artifacts were buried beneath the asphalt on Gooseberry Point. The Lummi have traditionally fished Hale Pass for salmon, crab and other fish. Clams and oysters have also been gathered at the tidelands. Gooseberry Point is located within the usual and accustomed fishing areas for the Lummi Nation. Rights to fish these areas were reaffirmed by the Boldt Decision (United States v. Washington, 1974).

Permanent settlement came to Lummi Island in 1871 (Friends of the Island Library 1998). Transportation originally ranged from canoes to steamboats. The first car ferry was a scow towed by a steamer. In 1926, Lummi Shore Road was completed, which connected Gooseberry Point to Bellingham. In the same year the road was completed, the “Central,” a ferry owned by Whatcom County, began making scheduled runs to and from the Gooseberry Point to Lummi Island and could carry up to six small Model-T Ford cars. In 1929, the slightly larger “Chief Kwina” replaced the Central. By 1962 the current “Whatcom Chief” began service between Lummi Island and Gooseberry Point (Friends of the Island Library 1998).

Fairhaven was one of three pioneer settlements on Bellingham Bay that was merged into the City of Bellingham soon after 1900. This area was once a thriving fishing, lumbering, and coal mining community. Fairhaven resembled a compete city with identifiable residential communities, a retail core, rail, ship and truck transportation centers, and a heavy industrial area. The city of Bellingham was expected to become the terminus for the Great Northern Railway and Fairhaven would have been its hub. Today, the Bellingham Cruise Terminal exists in location of a former industrial fish canning operation that was the largest supplier in the United States when Bellingham experienced its only explosive growth in approximately 1910(City of Bellingham (B) 2006).

Between 1963 and 2001 Georgia Pacific, a paper and pulp company, operated a pulp mill at Whatcom Waterway. In 1965 a Chlor-Alkali facility was built to bleach and pulp wood fiber(Friends of the Island Library 1998). As a result, waste-containing mercury was discharged into the bay. Beginning in 1971, pretreatment features were installed to reduce the amount of mercury released. In compliance with the Clean Water Act, an Aerated Stabilization Basin was built to provide secondary treatment of pulp in 1979, and all direct discharges were ended. Georgia Pacific closed the mill in 2001. Since the plant’s closure, the city of Bellingham and the Port have formed a partnership to redevelop the property (Stoner et al. 2010).

3. ELEMENTS OF THE NATURAL ENVIRONMENT

3.1 EARTH

3.1.1 Geology

Existing Conditions

The Bellingham area was formed by various glacial deposits derived from the advance and retreat of the Cordilleran Ice Sheet approximately 12,000 years ago. A general description of the geological units encountered within the area include bedrock, sediment drift from the Nooksack River and beach deposits consisting of fine to medium sand mixed with shell and wood fragments. The underlying bedrock includes fractured sandstone, siltstone and shale, which come mainly from the Chuckanut Formation. The depth of the bedrock varies along the shoreline but is usually present at 30 to 60 feet below the ground surface. Sediment drift from the Nooksack river contains a non-stratified mixture of pebbles, silt and clay material (Port of Bellingham (B), 2008).

3.1.2a Soils

Existing Conditions

Soil composition at Gooseberry Point consists of sandy-skeletal, mixed and mesic Entic Haploxerolls, which is also known as Neptune. This composition is common along marine ridges, spits and terraces. The surface contains very gravelly, sandy loam. Increased depth yields extremely gravelly loam with coarser sand. Clays generally permeate throughout all depths. Permeability of water throughout the soil is very good and drains quickly. Average annual precipitation is 30 to 40 inches. Slopes range from 0 percent to 3 percent. Appendix A contains a soil map of the area of interest (United States Department of Agriculture, 1992).

Soil composition at Bellingham Cruise Terminal and Whatcom Waterway is considered urban land. Urban land consists of areas covered by streets, buildings, parking lots and other structures that obscure soils and make identification unfeasible. The average annual precipitation is approximately 35 inches. Slopes range from 0 percent to 3 percent. Appendix A contains a soil map of the area of interest. (United States Department of Agriculture, 1992).

Proposed Action

Impacts: Minimal impact to soils would occur from Lummi ferry use considering the majority of land has been previously urbanized and there is an existing ferry terminal (Figure 3). Appendix A contains a soil map of the area of interest (United States Department of Agriculture, 1992).

Alternative Action

Impacts: Minimal impacts to soils would occur from the Lummi ferry because the majority of the land has been previously urbanized (Figure 4). Adding new pavement to the area would likely be necessary before any new construction took place. Any overturned soils related to ferry construction would require treatment if removed from site because the soils were previously contaminated by the Georgia Pacific Paper Mill. Appendix A contains a soil map of the area of interest (United States Department of Agriculture, 1992).

No Action Alternative

No additional impacts exist to soils if ferry use continues at current location.

3.1.2b Sediments

Existing Conditions

The low-laying site area at Gooseberry Point is a beach bar that lies at approximately 10 feet in elevation. The width of the bar is about 1,300 feet at its widest point, which is approximately 400 feet west of existing ferry dock. Sediments on the beach bar have drifted to this location because of longshore transport. A dock repair and improvement program performed by HWA Geosciences in 2006 required borings of beach deposits in the area. The borings encountered Holocene marine deposits consisting of loose, silty sand and soft clays. The thickness of the clays varied from 37 feet to 76 feet and was measured below the mud-line. Very dense glacial deposits were discovered underneath the overlaying beach sediments (RH2 Engineering Inc, 2009).

The Bellingham Cruise Terminal site in Fairhaven sits on previously filled land. Riprap has been installed along the majority of shoreline and reduces the impact of approaching waves and varying tides, which ultimately slows erosion. A ferry terminal already exists at the Fairhaven location with no engineering modification necessary for Lummi ferry use (Abart, 2010). There is a small site of sediment contamination next to the terminal that was capped by the Port of Bellingham and made into a parking lot. A ground water intercept drain has been installed to reroute runoff and ensure the groundwater does not become contaminated (Gouran, 2010).

The Whatcom Waterway site was created by filling tidelands and shoreline with dredged materials on either side of the mouth of Whatcom Creek. Riprap and waterline bulkheads are installed throughout most of the site. Sediments may become liquefiable during a seismic event, which may yield loss of support to built structures (Gouran, 2010).

Proposed Action

Impacts: More robust structural design may be necessary for new construction, and

sub-grade improvements may be required for certain structures; however, no new construction is currently required.

Alternative Action

Impacts: More robust structural design is necessary for new construction, and sub-grade improvements may be required for certain structures. The waterway and Georgia-Pacific site are listed as a cleanup site. Any operation disturbing existing site soils, sediments or groundwater may require special analysis, monitoring and material disposal (RH2 Engineering Inc, 2009).

Mitigation: Driving piles into Whatcom Waterway for a ferry pier may re-suspend contaminated sediments. Containment methods would be necessary to mitigate further contamination of waterway.

No Action Alternative

No additional impacts would occur to sediments if ferry use continues at the current location.

3.1.3 Topography

Existing Conditions

Established on west side of Lummi reservation, the existing ferry terminal includes a pier with a bulkhead and pilings in place. Vehicle holding lanes and a small gravel parking area are available to accommodate ferry riders. The entire site is approximately 5.6 acres, with approximately 400 feet of shoreline. The site is mostly paved and includes native and non-native grass type vegetation (RH2 Engineering Inc, 2009). Aside from general maintenance and upkeep, no new construction is required at the established Gooseberry Point ferry terminal.

The existing Bellingham Cruise Terminal includes a pier with placed pilings. There are vehicle-holding lanes, a fully paved parking lot along with a smaller unpaved gravel lot. The area is predominantly industrial and the entire site is approximately 3.3 acres with roughly 500 feet of shoreline. The majority of site is paved and includes native and non-native grass type vegetation. Small trees and shrubs have been planted for aesthetic value.

Whatcom Waterway is approximately 51 acres in size with roughly 4,800 feet of shoreline. The lot is mostly paved with some areas containing only dirt and gravel. Riprap and bulkheads (now degraded) have been placed along the shoreline to contain the area and are used to reduce the impact of approaching waves and varying tides. The area is predominantly industrial with existing vegetation consisting of native and non-native grasses and shrubs (Port of Bellingham (B), 2008). Colony Wharf is currently using the immediate area surrounding the proposed site of the new pier for boat

storage and maintenance. Barges transport rock from the rock quarry on Lummi Island and offload just west of the site.

Proposed Action

Impacts: Minimal impacts to topography would occur at the existing terminal considering the site is fully developed.

Alternative Action

Impacts: No established ferry docking system is in place. New construction would be required to replace the current bulkheads and install pilings for a pier. The depth of the waterway is sufficient for ferry use because it is already an established waterway for the quarry barges. No extra dredging should be required for ferry specific use.

No Action Alternative

No additional impacts would occur to the topography if ferry use continues at the current location.

3.1.5 Erosion/Enlargement of Land Area

Existing Conditions

Erosion usually occurs during the winter months following flooding from a storm surge. Buildup of sediment generally restores the shoreline during the calmer spring and summer months. No drastic change to the shoreline is expected as long as sediment is still being supplied from the existing beaches and feeder bluffs (RH2 Engineering Inc, 2009).

Riprap offsets most erosion problems at the Fairhaven site. Drainage for freshwater runoff is already in place.

Riprap and bulkheads offset most erosion problems at the Whatcom Waterway site.

Proposed Action

Impacts: Buildup of sediments within the harbor may require dredging but it is not a large concern because the water currents carry the sediments away from the terminal. Also, dredging maintenance would already be required for the Alaska Ferry.

Alternative Action

Impacts: Erosion/accretion of sediments within the waterway may require dredging, but established practices will ensure a dredged waterway regardless of a ferry terminal. Development of the area will likely require further pavement throughout. Erosion

problems are always a concern with new construction (i.e. increased runoff over a newly paved parking lot).

Mitigation: The increased freshwater runoff due to increased pavement use would require the incorporation of a drainage system with an oil/fuel separator or possibly a semi-permeable paved lot similar to lots found at the ferry terminal on Orcas Island.

No Action Alternative

Impacts: Sediment buildup may cause the waters in the terminal area to become shallow, which would require dredging.

3.2 Air

3.2.1 Air Quality

Existing Conditions

The Federal Clean Air Act and National Ambient Air Quality Standards regulate air quality for harmful pollutants. Standards include established concentrations, exposure time and occurrence frequency in the ambient air. The Air Quality Index score is based on data gathered from USGS, EPA and local authorities. The major air pollutants considered are lead, nitrogen dioxide, ozone, particulate matter (PM₁₀/PM_{2.5}), carbon monoxide and sulfur dioxide. Ozone, particulate matter and sulfur dioxide are the only prominent contaminants, but they are in minimal concentrations. Particulate matter is considered to be the most harmful air pollutant to human health and is common at each site due to the increased automobile traffic (Ersys, 2010).

Despite these setbacks, Bellingham has a “good” ambient air rating, which is the best rating possible. This good standing is mainly a result of the area’s low-density rural, forested areas and open marine waters with prevailing wind patterns ensuring through air mixing (Stewart, 2009).

The Gooseberry Point area is somewhat affected by the Cherry Point BP oil refinery and the Ferndale industrial area. There have been recorded emissions from these sites, but the records show no violation of the EPA standards.

Proposed Action

Impacts: Particulate matter is higher at this site than the others due to the high volume of automobile, rail, maritime and bus transit. Increased particulate matter would occur from more traffic to and from the ferry. Although this would have an impact, the area is already a high-traffic environment so it would not be significant.

Alternative Action

Impacts: The industrial area already has sources of air pollutant emissions that contribute a small amount of pollution to the ambient air. Particulate matter in the air would amplify due to the increased automobile and marine traffic to the area. Construction of a new ferry terminal would pose threats to the air quality by emitting greenhouse gasses (Stoner, 2010).

No Action Alternative

Impacts: There would be no further impacts to the area.

3.2.2 Odor

Existing Conditions

Northwest Clean Air Agency's (NWCAA) definition of odor is any substance that can be detected by smell and/or taste (NWCAA (A), 2007). NWCAA odor nuisance regulation 535.3 states that anyone who causes or allows for odor from any source that possibly interferes with another property owner's use and pleasure of his or her property must control and reduce the odors to a minimum. Regulation 535.4 explains that odor emissions are detrimental to people and their property. No one should cause or allow odorous air contaminants if detrimental to the safety, health or welfare of any person or causes damage to any property (NWCAA (B), 2010).

In Whatcom, Skagit and Island Counties there are more than 425 types of registered air pollution sources including refineries, gas stations, coffee roasters, spray booths, rock crushers, hospitals, boat builders and dry cleaners. At each site, odors from automobile and maritime traffic are present (NWCAA (C), 2010).

Wind directions around Lummi Bay and Hale Passage are from the south and southwest the majority of the year, leaving the area relatively unaffected by emissions from the refineries in Cherry Point and Ferndale.

Proposed Action

Impacts: Ferry operations at Fairhaven would slightly increase odor but land and sea breezes reduce some of the possible odors in the surrounding areas.

Alternative Action

Impacts: Since there has been industrial work in the area, odor has been an issue throughout history, but the ferry would slightly increase these odor problems. Increased odor complaints could arise due to the traffic and actual construction of a ferry terminal.

No Action Alternative

Impacts: There would be no additional odors in the ambient air.

3.2.3 Climate

Existing Conditions

Bellingham is a mid-latitude, West Coast city with a mild, maritime climate. Topographical features function to moderate the wet, mild climate. Average temperatures range from 45 to 60 degrees Fahrenheit (F) in spring and fall, 30 to 50 degrees F in winter and 60 to 80 degrees in summer. Elevated at 68 feet above sea level, the annual precipitation is 38 inches of rain. This amount of rain keeps soils moist throughout the year, preventing dust from contributing to the existing air pollution. Winds generally move from the southwest to the northeast because of the Olympic and Cascade mountain ranges, the Pacific Ocean, Puget Sound and surrounding lowlands. The direction of winds and location in proximity to the bay prevents major temperature changes in Bellingham (City-Data, 2010).

Proposed Action

Impacts: Emissions of greenhouse gasses near the terminal could potentially contribute to climate change.

Alternative Action

Impacts: Along with added automobile traffic to the area, the ferry relocation requires the development of a terminal. These acts will emit greenhouse gasses possibly causing climate change.

No Action Alternative

Impacts: Continuing ferry service will have no impact to climate.

3.3 WATER

3.3.1 Surface Water Movement /Quantity/Quality

Existing Conditions

Surface currents vary due to wind stress in Bellingham Bay. Most winds originate in the south, pushing water towards the northern part of the bay with return flow along the Lummi Peninsula, Portage Island and Lummi Island shoreline. During fair-weather, winds push currents to the east and south along the eastern shoreline. These currents generally range between 0.04 to 0.06 meters per second, at times exceeding 0.4 meters

per second (Fitzpatrick et al, 2006). Hale passage is located between Gooseberry Point and Lummi Island and has currents that run up to 2 knots (Mueller, 2006). Some contamination is located in the area due to long-term operational impacts of the ferry. Storm water also impacts the channel (RH2 Engineering Inc., 2009).

Proposed Action

Impacts: There has been documented contamination in Bellingham Bay near Fairhaven. Sampling has found the presence of heavy metals, polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), phthalates, polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (Washington Department of Ecology (A), 2010). The site is part of the Bellingham Bay Demonstration Pilot Cleanup because of the contamination levels. Having more maritime traffic could potentially increase these pollutants (Reid Middleton, 2008).

The waterway from Lummi Island to the Bellingham Cruise Terminal would be affected by the added marine traffic, although not significantly because of the large size of the bay and the currents in the bay. Water quality would decrease closest to the terminal because there is not as much water movement near shore to allow polluted waters to mix with clean waters.

Alternative Action

Impacts: Whatcom waterway is contaminated with mercury as a result of Georgia Pacific's past chlor-alkali plant. These contaminants were deposited between 1965 and 1971 and the site is also currently part of Bellingham Bay Demonstration Pilot Cleanup. While more water traffic at the site will have impacts, the water has already been harmed from industrial practices so the impact will not be substantial. Another source of pollutants would come from the construction of a new ferry terminal (Washington Department of Ecology (A), 2010).

No Action Alternative

Impacts: Since the ferry has been in this area for several decades, there will be no considerable impact from keeping it in its current location. Continuous use of the ferry will decrease the surface water quality due to the repeated traffic and oil depositions.

3.3.2 Runoff/Absorption

Existing Conditions

The Nooksack River discharges into Lummi and Bellingham Bay. The river is fed from precipitation, glacial and snowmelt from Mt. Baker, and adjacent peaks during summer months.

Lummi River tributaries flow into the Lummi delta at a yearly average rate of 17 inches from an average drainage volume of 2,000 acre-feet. There are also slight chances of agricultural runoff in the rainy seasons because of the prevalence of standing water in nearby fields (Fawell et al, 2007).

Proposed Action

Impacts: Increased ferry movements will have no impacts on runoff in the area.

Alternative Action

Impacts: Relocating the ferry to Whatcom Waterway will have no impact on the runoff or absorption.

No Action Alternative

Impacts: No known impacts will occur under the no action alternative.

3.3.3 Ground Water Movement /Quantity/Quality

Existing Conditions

A freshwater aquifer is located on the Lummi Peninsula, and the intrusion of saline marine waters is increasing around Gooseberry Point. The chlorine content of the two public supply wells at Gooseberry Point has been increasing gradually since the 1960s. Management of groundwater on the island is necessary to prevent further groundwater contamination (Stark, 2008).

Proposed Action

Impacts: Testing around the Bellingham Cruise Terminal has shown contamination in the soils and groundwater. Petroleum hydrocarbons and dissolved arsenic are present and in concentrations that could exceed standards under Washington state's cleanup laws. Further contamination would result from the increased ferry traffic throughout the bay and near the terminal (Washington Department of Ecology (D), 2010).

Alternative Action

Impacts: Groundwater discharge in Whatcom Waterway discharges to the surface waters of Bellingham Bay and Whatcom Creek. The flow consists of precipitation within the central waterfront area and seepage from the aerated stabilization basin (ASB). Gradients are mostly toward the Whatcom and I&J Waterways, with the ASB affecting the gradients nearest it. It has been determined that the groundwater does not correspond to sediment source control problems. There is sufficient groundwater contamination from the historical GP building, the Roeder Avenue Landfill site, the

Colony Wharf site, the Chevron site and the Olivine Uplands site (Fitzpatrick et al, 2006).

The site is largely contaminated to this date. Adding daily ferry traffic to the area will only increase pollution to the groundwater.

No Action Alternative

Impacts: No significant impacts will occur at this site.

3.3.4 Public Water Supplies

Existing Conditions

Lake Whatcom Water and Sewer District supplies over half of Whatcom County with drinking water. Other residents receive water from small public water systems or directly from the lake. The watershed surrounding Lake Whatcom and the middle fork of the Nooksack River feeds water into Lake Whatcom (Lake Whatcom Cooperative Management, 2010).

Reservation aquifers contribute to over 95 percent of the potable water used by Lummi Island residents. These aquifers are subject to saltwater intrusion from every direction due to the proximity to marine waters (Fawell, 2007).

Proposed Action

Impacts: No expected impacts would occur under the proposed action.

Alternative Action

Impacts: There would be no harm to public water supplies if the ferry were relocated and/or if a terminal were built.

No Action Alternative

Impacts: Keeping the ferry at this location could impose threats to the water supplies by contributing sediment to the saltwater intrusion already present.

3.4 Plants and Animals

3.4.1 Flora

Existing Conditions

Two general types of marine flora are present at or near the three sites. Kelp beds are

located at the ferry terminal on Lummi Island and south of the terminal at Gooseberry Point (WDOE)(Figure 4). They are not found at the Fairhaven terminal or the Whatcom Waterway. Both floating (primarily *Nereocystis luetkeana*) and non-floating species occur in Puget Sound. Kelp typically requires high salinities, low temperatures, a hard substrate to attach to and depths less than 20 meters (Mumford, 2007). These conditions are not always met at the Fairhaven site or the Whatcom Waterway, which explains the low density of kelp. Where present, kelp is an enormous source of primary production (Duggins, et al. 1989), which is an important source of carbon in near shore food webs. It can also be an excellent source of refuge habitat for juvenile fish species and invertebrates.

Eelgrass beds (*Zostera marina*) are found at Gooseberry Point and the Lummi Island terminal (WDOE) (Figures 5 & 6). The plant is not present directly at the Fairhaven site, but beds are located north and south of the site (Figure 7). Eelgrass is absent at Whatcom Waterway as well, but a patchy bed is found northwest of the site (Figure 8). It grows in sediments ranging from mud to sand and requires clear water and depths appropriate for necessary sunlight. Human induced activities, such as construction, can cause habitats to become shaded, which limits the amount of light needed for primary production. Excess nutrient blooms can cause plankton blooms or growth of epiphytes, also reducing light exposure. Metals, crude oil and low oxygen levels are also known to impact eelgrass. Dredging removes the beds and the substrate required for growth. A wide variety of organisms use eelgrass as shelter such as sea anemones, marine worms, snails, limpets, crabs, birds and fish. High densities of invertebrates make these important feeding grounds. In particular, juvenile salmon use the beds as nursery habitat during their outmigration to the ocean (Mumford, 2007).

Proposed Action

Impacts: The current ferry dock at Fairhaven is equipped to receive both the Whatcom Chief and a passenger ferry. No additional construction will be required. Additionally, neither eelgrass nor kelp is present at the site, so no impacts to marine plants are anticipated.

Alternative Action

Impacts: Construction would be needed to build a ferry dock; however, marine plants are not currently present at this site. Eelgrass near the waterway is unlikely to be adversely impacted by development.

No Action Alternative

Impacts: Patchy eelgrass beds exist at the Gooseberry Point ferry dock. No impacts are anticipated if ferry service continues as long as no additional construction occurs. The Lummi Tribe has plans for a marina, which will require moving the ferry dock north. The increase in shading from a new dock is likely to cause adverse impacts to eelgrass beds.

Mitigation: While no impacts are anticipated for the Fairhaven or Whatcom Waterway sites, possible mitigations could improve habitat for marine flora. If a new dock is built at Gooseberry, mitigation will likely be necessary to ensure significant losses to eelgrass beds do not occur. Transplantation efforts for eelgrass have been generally unsuccessful (Carlisle, 2004; Stamey, 2004). Using seeds deployed via buoys is a new technique, but it has not been tested in the Puget Sound (Pickerell et al., 2006).

3.4.2 Fauna

Existing Conditions

Gooseberry Point, Bellingham Cruise Terminal and Whatcom Waterway serve as habitat for a variety of organisms including fish, invertebrates and birds. Forage fish are an important food source for larger resident predators such as Chinook salmon and Great Blue Herons. This group consists of Pacific Herring (*Clupea Pallasii*), Surf Smelt (*Hypomesus pretiosus*) and Sand Lance (*Ammodytes hexapterus*) (Penttila, 2007). The Cherry Point herring stock, one of the largest and most unique in Washington state, is known to spawn at Gooseberry point (Bargman, 2001). Pacific Herring lay their eggs on macrovegetation, which makes it an important part of their habitat (Penttila, 2007). While herring typically migrate into deeper waters after hatching, Surf Smelt and Sand Lance remain in the near shore environment most of their lives. Instead of using vegetation, these fish more commonly lay eggs directly onto small sand sized grains.

Shellfish such as Manilla and Littleneck clams, as well as Dungeness and Red Rock crab, are commercially harvested at and near Gooseberry Point. These species are present at Fairhaven and Whatcom Waterway, but pollution concerns prohibit recreational harvest. Crabs depend on eelgrass beds for juvenile rearing habitat (Mumford, 2007). Birds such as Great Blue Herons (*Ardea herodias*), Bald Eagles (*Haliaeetus leucocephalus*), Peregrine Falcons (*Falco peregrinus*) and Gulls, as well as migratory waterfowl, are all present at times. To protect eagles, an 800-foot nest buffer exists at Gooseberry Point (RH2 Engineering, 2009).

Salmonids are of special concern because they migrate through and use habitat at all three sites. Outmigrating juveniles require eelgrass beds for refuge and food. The Nooksack River, Padden Creek, Chuckanut Creek and Whatcom Creek all contain naturally reproducing salmon populations. In addition Bellingham Technical College operates a hatchery approximately a half mile upstream of the waterway. The hatchery raises and releases Chum (*Oncorhynchus keta*), Coho (*Oncorhynchus kisutch*), Pink (*Oncorhynchus gorbuscha*), and Steelhead trout (*Oncorhynchus mykiss*). Chinook, Steelhead and Bull trout (*Salvelinus confluentus*) are also listed as threatened under the Endangered Species Act, which indicates that if trends continue, these species will become endangered.

Proposed Action

Impacts: The current ferry dock at Fairhaven is equipped to receive both the Whatcom Chief and a passenger ferry. No additional construction will be required. There are not any significant anticipated impacts to fish or wildlife at this site.

Alternative Action

Impacts: Most construction is in place, but a ferry dock would need to be built. Construction would involve driving pilings into the substrate, which will disturb sediments containing mercury to the surface. Forage fish habitat at Whatcom Waterway is largely absent, therefore few adverse impacts will occur, but any organisms present will be affected by the increased toxicity. Salmonids are unlikely to be affected because they are not resident and construction of a dock will not impede migrations.

No Action Alternative

Impacts: Forage fish and juvenile salmon habitat is in place, but no additional construction is expected to occur. If a new dock is built, impacts to eelgrass beds will adversely affect these species. Continuation of ferry service will not further degrade any fish or wildlife.

3.5 Energy and Resources

3.5.1 Amount Required/Rate of Use/Efficiency

Existing Conditions

The Whatcom Chief uses 53,000 gallons of diesel fuel to make approximately 11,800 round trips annually. Additionally, the vehicles transported by the ferry use an unknown amount of gasoline and diesel. The round trip is approximately 1.5 miles, which means the ferry gets around 3 miles per gallon using diesel fuel (Hilsinger, 2010).

Proposed Action

Impacts: Relocating the dock to the Bellingham Cruise Terminal would increase the total diesel consumption to approximately 106,080 gallons between the Whatcom Chief and the San Juan Cruises passenger ferry. The passenger ferry would use 50 gallons per round trip, running six trips per day, six days per week (no service on Fridays) (Schmidt, 2010). At this rate, the passenger ferry would consume 93,600 gallons of diesel fuel per year.

The Whatcom Chief would have to travel between 3-5 miles from Fairhaven to Lummi Island (Hilsinger, 2010). At 3 miles per gallon, traveling four, 10-mile rounds trips per

day, two days per week (assuming vehicle transport is scaled back as Abart predicted), the Whatcom Chief would consume up to 12,480 gallons of diesel fuel per year. That is about 30 gallons per round trip. Hilsinger wrote that the ferry would also need to travel faster through open water, which could reduce the Whatcom Chief's miles per gallon and increase the overall consumption to more than 106,080 (2010).

Alternative Action

Impacts: Moving the dock to Whatcom Waterway would likely increase the round trip to approximately 12 miles. That makes the Whatcom Waterway sailing distance 20 percent farther than the Fairhaven location, which means the San Juan Cruises passenger ferry would consume (93,600 x 1.2=) 112,320 gallons of diesel, and the Whatcom Chief would use (12,480 x 1.2=) 14,976 for a total of 127,296 gallons of diesel consumed annually (Abart, 2010).

No Action Alternative

Impacts: If the ferry were to continue as is, it would continue to use 53,000 gallons of diesel annually. There is a chance that ferry service would be scaled back, which would reduce the amount of fuel consumed by an unknown amount.

3.5.2 Nonrenewable Resources

Existing Conditions

Traveling from Gooseberry Point to Lummi Island, the Whatcom Chief consumes diesel fuel, which is a nonrenewable resource. Additionally, some nonrenewable minerals were likely used to build the Whatcom Chief as well as the docking structures. Maintaining the Whatcom Chief also uses nonrenewable resources, like petroleum lubricating oils used for the motor and other machinery.

Proposed Action

Impacts: The use of nonrenewable resources for the Fairhaven location would be similar, but overall, the rate at which they are used would increase dramatically between the two ships. The consumption of diesel would almost double because there would be two boats operating through open water. However, relocating to this site could reduce the number of vehicles being transported, ultimately reducing the number of cars on the road, which could reduce overall fuel consumption. The amount that would be saved is unknown, so it is uncertain if the savings would balance out the increase in diesel fuel used for the boats.

Alternative Action

Impacts: Relocating to Whatcom Waterway would cause the largest consumption of nonrenewable resources. Not only would the most diesel be required from this location,

but the construction activities involved in building a new docking structure would also consume nonrenewable fuels, oils and minerals. Like the Fairhaven site, this could possibly reduce the number of vehicles being transported and driven, especially because people who work in downtown Bellingham would not have to travel far, but the savings is unknown.

No Action Alternative

Impacts: Remaining at Gooseberry Point would have the least impact of the three action options. The Whatcom Chief would still consume diesel fuel at around 53,000 gallons per year, but no additional fuel would be consumed for construction or another boat.

3.5.3 Conservation and Renewable Resources

Existing Conditions

Salmon, forage fish and shellfish are harvested both recreationally and commercially at or near Gooseberry Point, Fairhaven and Whatcom Waterway. The Lummi Tribe commercially and ceremonially harvests salmon, Dungeness crab (*Metacarcinus magister*) and other shellfish throughout Bellingham Bay and Hale Pass as part of their rights to usual and accustomed fishing grounds (RH2 Engineering 2009). Salmon, crab and forage fish are all caught recreationally inside Bellingham Bay. Whatcom Waterway in particular supports a popular sport fishery for hatchery-raised salmon returning to the Bellingham Technical College operated hatchery.

Proposed Action

Impacts: Ferry service to the Fairhaven dock will not impact any user group's ability to harvest or the species' themselves.

Alternative Action

Impacts: Recreational fishing occurs well upstream of where the ferry dock would be built. As a result, no impacts to the resources or the harvesters are anticipated.

No Action Alternative

Impacts: There are no impacts to any of the harvestable fish species at Gooseberry point. However, the ferry impacts the tribal fisherman's ability to catch salmon and crab. Continued ferry service will continue to impact this.

3.5.4 Scenic Resources

Existing Conditions

Bellingham Bay provides an aesthetically pleasing view to many residents and tourists

to the area. The site at Fairhaven is developed, but Whatcom Waterway remains mostly undeveloped for human use. While tidelands are closed to the public at Gooseberry point, drivers and ferry passengers have a pleasant view.

Proposed Action

Impacts: The Fairhaven site is well developed, so ferry service should have no impacts.

Alternative Action

Impacts: Currently the site has a low aesthetic quality due to its industrial heritage. Developing Whatcom Waterway for ferry service will impact the scenic quality of the site positively.

No Action Alternative

Impacts: Continuing ferry service will have no impacts to the scenic quality of Gooseberry Point.

4. ELEMENTS OF THE BUILT ENVIRONMENT

4.1 Environmental Health

Existing Conditions

Environmental conditions involving noise with the current Lummi Island to Gooseberry Point ferry center around the noise produced by the Whatcom Chief and the cars that are transported aboard the ferry. This includes noise crossing the waterway and idling in the dock as well as cars idling when preparing to board the boat and disembarking the vessel. All of these are considered motor vehicle noise and are considered non-significant under WAC 173-60-040. Potential releases into the environment affecting public health are negligible, mostly involving possible spills into the water due to cars leaking oil or other fluids. These are present in everyday conditions and are not dependent on ferry services (WDOE (B) 2010) except with possible discharge into the water due to the ferry traveling between docks.

Proposed Action

Impacts: Noise by the ferry in the Bellingham Cruise Terminal in Fairhaven is insignificant due to the existing ferry dock location and use as well as the surrounding area consisting of the Amtrak station and railroad tracks. Additionally, areas surrounding the ferry terminal are industrial with little environmental noise impact being generated then what is already in existence (Port, 2008). There is no significant risk of potential toxic or hazardous releases into the environment affecting public health (Gouran, 2010; Port, 2008).

Alternative Action

Impacts: Since there is no infrastructure in Whatcom Waterway to accommodate for the Whatcom Chief or any ferry, construction of a dock as well as ferry lanes for cars would have to occur (Gouran, 2010). Additionally, parking for cars would also have to be constructed. Due to the temporary nature of construction noises, they are not considered significant. The ferry itself would contribute little noise to the conditions already present in the area (Port, 2010). A new dock would need to be built to accommodate for the Whatcom Chief or another passenger ferry from Lummi Island. This procedure would directly affect the sediments in the waterway site because of pile driving, which are currently contaminated with mercury (Port, 2008). Unsettling the contaminated sediment could increase the level of toxicants in the bay, which could increase the toxicity levels found in local fish and shellfish due to *bioaccumulation*. Because people eat these resources, there could be temporary adverse effects. No dredging is anticipated as being required for the dock (Gouran, 2010). Because of the proposed location on Whatcom Waterway for the ferry dock, land on the central waterfront site would be required for the adjoined ferry lane facilities (Gouran, 2010). Issues regarding this site include previous landfill, petroleum contamination and

boatyard operation contaminants but would likely only create a cement/asphalt cap for the area.

Mitigation: The creation of an improved drainage system for the central waterfront site due to the increased impervious pavement created by new ferry terminal facilities.

No Action Alternative

Impacts: Reduced ferry service to Gooseberry Point via the Whatcom Chief would reduce the noise level caused by the ferry but may be increased due to the usage of a passenger ferry. The noise caused from cars idling would be reduced because the vehicle ferry service would be cut back, and the Whatcom Chief would be transporting fewer vehicles. But with decreased vehicle service, many people may choose to park on the Lummi reservation, which would provide similar noise scenarios as those that already exist while the Ferry is in *dry dock*. A passenger only ferry could increase the demand for bus transportation services to the area, which could affect current noise levels but are considered non-significant (Port, 2008). There is no significant risk of potential toxic or hazardous releases into the environment affecting public health.

4.2 Land and Shoreline Use

4.2.1 Comprehensive Plans and Shoreline Master Programs

Current Conditions

Whatcom County

The ferry dock located on Lummi Island follows the Whatcom County Comprehensive Plan but also adheres to the policies and strategies of the Lummi Island Subarea Plan. This plan seeks to preserve the natural environment through a “Rural Landscape,” as defined by the Growth Management Act (GMA). The ferry’s location on the northern half of the island is zoned as Rural Residential Island (RR-I). The RRI zone is essentially a mixed-use rural zone that allows for residential and agricultural uses. Conditional use permits also permit outright and limited commercial activities; however, most commercial activities are concentrated close to the ferry dock (Whatcom County (B), 2009).

Lummi Nation Planning

The location of the ferry dock is designated Mixed Use by the Lummi Reservation Zoning Map. However, as the area is leased by Whatcom County Public Works, it is also designated Urban under the Whatcom County Shoreline Masters Program (Whatcom County (A), 2008). Urban shoreline areas provide for intensive development of water oriented commercial, transportation, and industrial uses and accommodate mixed use developments such as those consisting of urban density residential, commercial and industrial uses. However, the must protect existing shoreline ecological functions and processes and restore shoreline ecological functions in areas that have been previously degraded(Whatcom County (B), 2008).As stated at the Lummi Nation Council Meeting

in February 2010, Lummi Native Reservation has future plans of building a marina adjacent to the current ferry docking location (Jefferson, 2010).

City of Bellingham

The Bellingham Cruise Terminal area is designated Planned Marine Industrial zone (1B) in the City of Bellingham Comprehensive Plan (City of Bellingham (C), 2006) (Figure 10). This Zoning regulation allows for mixed uses compatible with the Fairhaven Business District (City of Bellingham B, 2006). Uses permitted within 1B area must be marine related but could possibly be commercially developed if further marine industrial expansion fails to materialize, as subject to the State of Washington Shoreline Management Act (SMA) (City of Bellingham (B), 2006). As of November 2007, the Whatcom Waterway has been managed by local city and port authorities who are working together to formulate the “New Whatcom” Master Development Plan (Port of Bellingham (C), 2010). As of March 2010, the area is primarily occupied by industrial and commercial business operations (Figure 11). The master development plan seeks to develop the area into a Mixed-Use area, which allows for light industrial, commercial and residential uses with conditional permits (City of Bellingham, (B) 2006). This plan will incorporate a healthy shoreline habitat along Bellingham Bay and a new marina (Port of Bellingham (B), 2008).

Proposed Action

Impacts: No impacts to existing City of Bellingham Comprehensive Plan or Fairhaven Neighborhood Plan. Zoning in this area will not have to be changed in order to accommodate the Lummi Island Ferry

Alternative Action

Impacts: No impacts to existing City of Bellingham Comprehensive Plan or Central Business District Neighborhood Plan. However, locating the ferry dock at New Whatcom will require consideration of the plans set forth by the City of Bellingham and the Port of Bellingham.

No Action Alternative

Impacts: Given that the no action alternative will keep the ferry dock in its current location, no impacts are expected. If the Lummi Indian Nation continues with plans to build a marina at the current docking site location the dock may need to be relocated at that time.

4.2.2 Housing

Current Conditions

The main function of the ferry is to transport people and vehicles from Lummi Island to the mainland where they work, attend school and participate in other urban functions. The Washington State Office of Financial Management (OFM) estimates Lummi Island to have a total population of approximately 2,524 people, with a total of 815 housing units (State OFM (C), 2009). Forecasts for the total household for all of Whatcom County to be approximately

77,833 based on 2002 GMA county projections (State OFM (A), 2009). According to the Lummi Island Subarea Plan, the human population on Lummi Island shows a growth trend since 1966 (Whatcom County (A), 2008). Lummi Island Subarea housing planning must take into account Washington State Office of Financial Management estimates for Whatcom County, which is estimated to experience net migration of approximately 13,111 people between the years of 2010 and 2015 (State OFM (E), 2009). Similar population growth is forecasted for the following twenty years in Whatcom County. The growth in housing and human population numbers on Lummi Island will lead to an increased need for transport of people to the mainland.

Washington State Department of Financial Management estimates Lummi Nation populations to be approximately 4,340 people (State OFM (B), 2009). The area at Gooseberry Point is also estimated to have 1,875 residential dwellings (State OFM (B), 2009). Residential housing is present near the Dock just several hundred feet to the northeast.

As of 2009, the city of Bellingham is estimated to have 34,782 housing units within the city's Urban Area (State OFM (D), 2009). It is also estimated to have a total population of 76,130 residents (State OFM (A), 2009). According to the Bellingham's Planning Department and the Washington State Office of Financial Management (City of Bellingham (A), 2006; State OFM (E), 2009), the City's population will increase by another 24,217 people, or to 113,055 persons, by the year 2022 assuming all Urban Growth Areas are incorporated (City of Bellingham A, 2006). This is equal to an annual average increase of 1.9 percent per year over the 14-year planning period from 2007 to 2022-see table (City of Bellingham (A), 2006). This population increase will put added pressure on land resources needed for future population growth.

Proposed Action

Impacts: The relocation of ferry operations to the Fairhaven site will not have any effect on housing within the Fairhaven Neighborhood Subarea. Housing in this particular area would not be in accordance with City of Bellingham Comprehensive Plan or City of Bellingham Shoreline Master Program. However, the Fairhaven Location could provide for population growth on Lummi Island. As established in interview with Whatcom County Public Works (Abart, 2010), if the ferry were to dock at Fairhaven there would be an option to lease another ferry for the transportation of people. The additional transportation opportunities to the island may increase the appeal for residency on the island.

Alternative Action

Impacts: The relocation of the ferry to Whatcom Waterway will put restrictions on the city's plans to provide housing through mixed-use in the New Whatcom subarea. Future housing establishments will have to work in coordination with the ferry and its associated land uses (i.e. parking lots, holding areas, roadways, and buildings). This may present problems as the City of Bellingham continues to grow and more infill is required to remain in accordance with GMA standards of urban growth.

No Action Alternative

Impacts: Keeping the mainland ferry dock at the current location will not have any impact on housing.

4.2.3 Light and Glare

Current Conditions

The Whatcom Chief has several lights fixed to the water vessel. In addition, there are red lights attached to crossing arms at the ferry entrances of docking locations. The Lummi Island, Gooseberry Point, and Fairhaven locations also have light poles near the holding areas and on adjacent buildings. Fairhaven also has lighting poles in the parking lots and outside the observation deck. These lights uphold Whatcom County SMP to minimize light (Whatcom County (B), 2009). The lowest level lighting possible is required in Shoreline areas, but must be in compliance with Safety and Crime Prevention through Environmental Design (CPTED) standards (Whatcom County (B), 2008). According to the Whatcom County SMP, lighting within shorelines and on lands adjacent to shorelines can have an adverse impact on the ecological function if not properly managed, most notably, the migration patterns of salmonids and terrestrial species (Whatcom County (B), 2008). For that reason, lighting is minimized within shorelines and this is especially true for the ferry with its close proximity to the water (Whatcom County (B), 2008).

Proposed Action

Impacts: Any lighting required for ferry operation is already in place at the Fairhaven location because of the established presence of the Alaska Ferry. No additional lighting is needed for this area, nor will the lighting at present be affected. Relocating the ferry to Fairhaven may bring more vehicles that produce light, but the impact would be minimal because cars already frequent the area.

Alternative Action

Impacts: The land adjacent to the potential ferry dock site at the Whatcom Waterway does have lighting already in place. However, lighting installation would be appropriate in the ferry dock, holding area, and parking areas associated with ferry transportation in order to protect travelers as stated by CPTED. There would be minimal impacts associated with the additional lighting to this area from cars as well as the ferry operations because other boats and cars already operate around the potential docking site.

No Action Alternative

Impacts: There would be no impacts to current lighting at Lummi Island or Gooseberry point from keeping ferry operations as they are at current.

4.2.4 Aesthetics

Current Conditions

There are currently no aesthetics at the Lummi Island and Gooseberry Point ferry locations. There are native and non-native grasses on both sites; however, no aesthetic improvements have been made. Like the current docking sites areas, Whatcom Waterway does not have any aesthetic additions. Because past and present uses, there have not been any such improvements to the land. The Bellingham Cruise Terminal does have aesthetic improvements. The area has flowerbeds with perennial flowers such as daffodils, bunch grasses and small trees. There are also small trees positioned as parking medians in the parking lot. In addition, there is a habitat restoration area just north of the terminal with a host of native plant species.

Proposed Action

Impacts: There would be no impacts to the aesthetics at the Proposed Action location. Aesthetics are already installed in this area in this location.

Alternative Action

Impacts: The relocation of ferry operations to the Whatcom Waterway location would have a positive impact on aesthetics in the area. The area does not have any aesthetics currently in place and could be installed at the discretion of Whatcom County Public Works department.

No Action Alternative

Impacts: There would be no impact on aesthetics with the no action alternative.

4.2.5 Recreation

Current Conditions

The ferry travels through the waterways in Bellingham Bay, which is noted for several recreation activities such as sailing, fishing and clamming (Port of Bellingham (B), 2009). The Whatcom County Comprehensive Plan does not officially list the ferry as a recreational activity; however, the increased number of passengers in the summer months demonstrates recognition of Lummi Island's recreational activities (RD2 Engineers, 2009). Recreational development along the shoreline can include, but is not limited to, "parks, trails, open spaces, beaches, boat or other watercraft rentals, fishing piers, aquariums, view platforms and over-water boardwalks" (Whatcom County (C), 2009). The recreational activities at all locations are generally encompassed by these activities. However their availability differs from location to location.

Recreation activities on Lummi Island are limited, but there is one public (Whatcom County-owned) shoreline access site just north of the ferry dock (Whatcom County (A), 2009). The park site consists of a viewing deck, picnic table and stairs to the rocky beach that access a

public tideland (Whatcom County (A), 2009). Other marine related recreational activities on the island include privately owned boat launches and charter sailboat rentals. Other recreational activities include scenic driving, bicycling, walking, bird watching, and hiking. Another attractive recreational activity on Lummi Island is educational farm tours offered on a local farm.

Recreational activities at Gooseberry point are designated to Tribe members, however are very similar to those on Lummi Island. The parcels of land surrounding the ferry dock are used for docking fishing boats and clamming.

There are several recreational activities associated with the ferry terminal in Fairhaven. The terminal is the Alaska State Ferry's southern starting point for the Alaska Marine Highway System (Port of Bellingham (A), 2010). The ferry travels from Bellingham to as far the Aleutian Islands of Alaska and docks every Friday year round. The operation consists of two ferry vessels, but one goes to dry dock during the winter (Gouran, 2010). Other water-oriented recreational activities near Fairhaven include the Victoria San Juan Cruises, a passenger ferry that operates ferries to Victoria and San Juan offering whale watching tours, private charters, and cracked crab cruises (VSC, 2009). Another recreational activity in the immediate vicinity of the ferry terminal is Marine Park. The 300-foot wide sand and cobble beach at Marine Park "provides valuable habitat functions to a broad array of marine and terrestrial wildlife including Endangered Species Act (ESA)-listed salmon" (Port of Bellingham (B), 2010). In addition, the Bellingham Cruise Terminal Observation Deck has benches and seasonal outdoor seating for people to take in the waterfront view offered at Fairhaven (Port of Bellingham (A), 2010).

The city of Bellingham offers many recreational activities through trails, parks, open spaces and other facilities (City of Bellingham (A), 2010). City facilities include the aquatic center, sports complexes and community meeting rooms that host several classes, activities and community meetings events. Marine Heritage Park is one of the City's most notable recreational features and is located off of Whatcom Creek within close proximity to Whatcom Waterway. Recreational activities enjoyed here include scenic views all year round and musical events in the summer (City of Bellingham (D), 2010). Whatcom creek is also noted for recreational fishing activity in fishing season.

Proposed Action

Impacts: The Proposed action will have a positive impact on recreational activities in the area. Bringing the ferry to this location will give Lummi Island residents better access to the recreational resources offered at the Bellingham Cruise Terminal and in the Fairhaven neighborhood. Also, as the ferry does undergo increases in transporting passengers, people may come to Fairhaven specifically to recreate. Although Fairhaven may experience positive impacts from the relocation of the ferry dock to the proposed action site, recreation activities throughout the bay may experience restrictions as the ferry passes through the water and creates wakes. Fishing, clamming, and sail boats will have to be cautious of such conditions.

Alternative Action

Impacts: Impacts similar to proposed action. Lummi Island residents would have better access to recreational activities offered in downtown Bellingham. In addition, the recreational plans for the New Whatcom subarea set forth by the City of Bellingham and the Port of Bellingham will have to coordinate with the ferry operations and required land use for the dock, holding area, and parking lot. The New Whatcom plan seeks to put a marina to the south of the potential docking area where the ferry would enter Whatcom Waterway. The marina entrance would need to be relocated so that other recreational marine activities would not be interrupted by ferry operations.

No Action Alternative

Impacts: The no action alternative will not have any impacts on the recreational activities at Lummi Island or Gooseberry Point.

4.3.6 Historical and Cultural Preservation

Current Conditions

The current dock location at Gooseberry Point is located on Tribal lands of historical importance. As noted in the Whatcom County Public Works Ferry Relocation Feasibility study (RD2 Engineers, 2009), “archaeological remnants of the original Native American occupation at Gooseberry Point and later Euro-American settlement have been found very close to the area.” As the Washington state Department of Archeological and Historical Preservation (DAHP, 2010) records indicate, as many as 33 archaeological investigations have been conducted around Gooseberry Point. Results from these studies and other surveys have identified 13 sites with historic remnants ranging from shell middens to sparse lithic scatters. The county’s study also notes that “cultural resources and a rich ethnographic record indicate there is a high probability for encountering prehistoric or historic Native American cultural resources” throughout the Bay, but resources have been identified to be buried below asphalt at Gooseberry Point (RD2 Engineers, 2009). There is also a potential of cultural resources to be under fill below the wharves in Bellingham, especially near the mouths of the creeks and streams.

The Fairhaven Historic District is roughly bounded by 10th and 13th Streets, Columbia and Larrabee Avenues and serves as a historical area of significance due to its thirteen primary buildings. These buildings are oriented along the main intersecting streets of Fairhaven and date from the district “speculative boom” in 1890 to the period of the First World War. Two of three secondary structures were constructed after the historic period, in 1919 and 1929 (DAHP, 2010). Among the primary structures is the “Terminal Building” at Harris and 11th street. This building is thought to be the oldest structure of Fairhaven and is a part of both the Washington and National register for historical sites (DAHP, 2010). Built in Fairhaven’s business center in 1889, this two story commercial structure has two storefronts (DAHP, 2010). “Early in its history one of the store served as the ‘Sideboard’ barbershop and a saloon occupied the ground floor store on the corner” of Harris and 11th Street (DAHP, 2010). It

should also be noted that cultural remnants associated with the history of the area were buried along the southeast shore of Bellingham Bay and some may still exist today (RD2 Engineers, 2009).

According to the Washington State department of Archeological and Historical Preservation, Whatcom Waterway is also in close proximity to a host of historically significant sites. Built in 1913 the Citizen's Dock was located at the head Bellingham Bay's "first important waterway" and signified the historical background of the area. Puget Sound's *Mosquito* Fleet once visited the area and Citizen's Dock was Bellingham's central link with that transportation system as a passenger terminal and freight warehouse (DAHP, 2010). This building was removed in 2008 due to lack of structural integrity, however several other buildings marking history of the area still remain today. Among them is the Great Northern Railroad building, built in 1927 at the foot of D Street as the Burlington Northern Passenger Station (DAHP, 2010). The establishment of this station was thought to bring about a significance of Bellingham as a transportation hub similar to New York due to the city's location along the coast and close position to Canada (DAHP, 2010).

Another historically significant building near Whatcom Waterway is the "Company Store" built at the beginning of the Fraser River gold rush in 1858(DAHP, 2010). The building's significance period ranges from its establishment to 1922. From 1858 to1863 the building served as a "Store/warehouse", foled by the Whatcom County Courthouse until 1900, and a G.A.R. meeting hall until 1922 (DAHP, 2010). All of these buildings are registered for Washington State and National Archeological and Historical Preservation. There are also buildings that are pending recognition by the State Register. Two buildings are located on the same infill area on C street of the Central Waterfront District are recognized as historical by Washington State DHAP (2010). The first is the Bellingham Builders Supply Company building that more is commonly known as the Industrial Electric Machine Co. this commercial building was built around 1935. The second is the Kodiak Fishing Company Building classified as Modern and built in 1920. There is also a potential for the presence of cultural resources at Whatcom Waterway. "Items associated with early settlement and industry around Bellingham Bay, such as bottles, cans, machine parts, remnant pilings or domestic items" could be littered along the shoreline but may be more specifically related to the history of the area (RD2 Engineers, 2009).

Proposed Action

Impacts: There are no impacts to the historical preservation in the Proposed Action location. As mentioned in the Historical Background section, Fairhaven was developed with the expectation of becoming the western finishing point of the Great Northern Railway and having the ferry located here will increase Fairhaven's function as a transportation hub in the Pacific Northwest, thus preserving its historical significance.

Alternative Action

Impacts: As mentioned above, cultural resources are most likely present near creeks and

streams. As the location at Whatcom Creek has been altered by landfill so any resources may have already been disturbed but there is potential for their existence today. Driving piles into the waterway could disturb any such cultural artifacts beneath the infill. The historical buildings mentioned above are not in any location that would need to be altered for ferry operations. Roads already exist between the relocation site and the historic buildings located on the same infill area. It is important to note that the GP site adjacent to the waterway to the east does house several historical buildings from previous land use as an industrial site. If those buildings are restored or demolished, ferry operations may be put on hold to prevent any danger to ferry passengers (Gouran, 2010).

No Action Alternative

Impacts: The continued use of the ferry dock at Gooseberry Point may lead to a need for a new parking lot. Installing a new parking lot could disturb cultural artifacts buried beneath it.

4.3 Transportation

4.3.1 Public Transportation -- Waterborne, Rail and Bus

Existing Conditions

The Whatcom Chief transports up to 100 passengers and 20 vehicles from Lummi Island to Gooseberry Point and back several times every day. The Whatcom Chief began servicing Lummi Island residents and visitors in 1962, which means the ship is approximately 47 years old. The round trip, which takes less than 20 minutes under normal conditions, is made 38 times per weekday, 19 times on Saturdays and 18 times on Sundays and Holidays. The Whatcom Chief makes approximately 11,800 round trips per year, consuming 53,000 gallons of diesel annually. Each round trip consumes roughly 4.5 gallons of diesel. In 2008, the ferry transported 216,838 passengers and 123,285 vehicles (Whatcom County Public Works Department, 2007).

Loading docks and parking are available on both sides of the ferry route. Arterial roads connect passengers to Whatcom County, including children who attend school in Ferndale and residents who work in Whatcom County. There is a bus stop on the Gooseberry Point side to transport ferry passengers to Bellingham.

Proposed Action

Impacts: By relocating the ferry to dock at the Alaska Ferry Terminal in Fairhaven, the sail time for the Whatcom Chief would increase to 50 minutes one way under ideal conditions. This would limit the round trips to approximately six at most per day (Abart, 2010). The Whatcom Chief's roll would shift to become a vehicle-based ferry with the ability to carry passengers. Its vehicle carrying capacity would also be cut back to 16-18 vehicles for safety and docking purposes. The Whatcom Chief's runs will likely be cut back to four round trips per day, two days per week (Abart, 2010). At 30 gallons per round trip, the Whatcom Chief would consume 12,480 gallons of diesel per year.

Meanwhile, San Juan Cruises would be commissioned to run an additional ferry used to carry passengers only. This San Juan Cruises ferry, which could carry approximately 60 passengers, would sail for approximately 30 minutes one way using 50 gallons of diesel fuel per round trip (Schmidt, 2010). The San Juan passenger ferry would run six trips per day, six days per week (no service on Fridays). At this rate, the ship would consume 93,600 gallons of diesel fuel per year. Both the Whatcom Chief and the possible San Juan Cruise ships are compatible with the existing docks in Fairhaven and on Lummi Island. Between the two ships, total annual diesel fuel consumption would nearly double to 106,080 gallons per year.

The drop in demand for vehicle transport would mean a drop in driving overall. While some islanders may rent parking in Fairhaven from private vendors, many people who work in Bellingham would likely take the bus, which stops just a few hundred yards from the terminal. Other alternative transportation services near the terminal, besides Whatcom Transit Authority buses, are Greyhound and Amtrak, which have routes going north through Vancouver and south through Seattle, as well as the Alaska Ferry, which has service to Alaska.

Alternative Action

Impacts: Relocating the ferry to Whatcom Waterway would increase the travel time to approximately 70 minutes under ideal conditions. Like the proposed action, this would make the Whatcom Chief primarily a vehicle ferry, and another passenger-only ferry would be added to run daily. The passenger ferry would make six trips per day or fewer. The passenger ferry would take approximately 40 minutes to make a one-way trip from Whatcom Waterway to Lummi Island.

While the Lummi Island docking area would be sufficient on that side of the trip, there are no docking structures in place in the Whatcom Waterway area. Along with docks, parking lots and roads would need to be constructed. There is bus service available through the Whatcom Transit Authority a few hundred yards from the possible docking site on Holly Street.

Mitigation: Additional bus routes may need to be added to accommodate increased number of foot passengers transported to Fairhaven or the Whatcom Waterway site. This would need to be determined if there was an unreasonable increase in ridership.

No Action Alternative

Impacts: No additional impact would take place on public transportation.

4.3.2 Vehicular Traffic & Parking

Existing Conditions

The Whatcom Chief transports vehicles for a small fee relatively quickly from Lummi Island to Gooseberry Point. Several Island residents transport their vehicles on the ferry in order to drive to work in Bellingham or the surrounding area. Other islanders leave a car in the Gooseberry parking lot year round and use it for mainland driving only.

Proposed Action

Impacts: If moved to Fairhaven, the number of transported vehicles is expected to drop significantly. Ferry service for vehicles will be very limited, so many residents will have to either turn to public transportation to get to work, school, etc., or they will have to rent permanent parking space in Fairhaven from private landowners (Abart, 2010).

Relocating the ferry to Fairhaven will significantly cut down on the drive time and distance for many islanders who work in Bellingham. For those who work in Ferndale, the driving distance will be increased by 5 miles, but the drive time will decrease by five minutes, according to Google Maps.

Traffic Congestion may increase during the peak ferry hours, such as the worker commuting hours, but will be limited as the ferry will only dock six times per day at the Fairhaven location.

Alternative Action

Impacts: Much like relocating the Fairhaven location, docking the ferry at the Whatcom Waterway would reduce the overall number of vehicles being transported. Those who commute to downtown Bellingham would have access to a bus or could bike or walk to work. Ferndale commuters would drive nearly the same distance to Ferndale as they would from Gooseberry Point; however, they would reduce their drive time by 10 minutes, according to Google Maps.

Unlike Fairhaven, private parking would be scarcer, and it is undecided whether or not the Port of Bellingham would provide long-term parking. Parking lots would have to be built if the Port were to provide parking.

No Action Alternative

Impacts: There are no expected impacts under the no action alternative.

4.3.3 Movement/Circulation of People or Goods

Existing Conditions

The Lummi Island Ferry is used to transport a fuel truck twice per week to provide Lummi residents with fuel to power their homes. The ferry is used to remove trash from the island and transport food for Beach Elementary School. The ferry is also on call

for emergency situations.

The ferry runs almost every 20 minutes from 5:40 a.m. to midnight on weekdays, carrying islanders or visitors who wish to go from the island to the mainland or vice versa.

Proposed Action

Impacts: Trash and fuel services would still be offered if the ferry was relocated to Fairhaven, but the longer sail time would likely increase the cost of these goods and services (Abart, 2010). Beach Elementary School would also likely continue to have food transported via the ferry. The continuation of emergency ferry services has not been decided, but the longer ferry ride would make emergency services difficult to ensure.

Because there would be only six passenger round trips per day and vehicle service as little as two days per week, islanders would have much fewer trips to choose from, which could make the circulation of people or goods significantly more limited.

Alternative Action

Impacts: The relocation to Whatcom Waterway would have the similar impacts on the circulation of people or goods as relocating to Fairhaven (see above).

No Action Alternative

Impacts: No adverse impacts are expected from the no action alternative.

4.4 Public Services

4.4.1 Fire, Police, Medical

Existing Conditions

Current public services to Lummi Island from Gooseberry Point through the ferry are numerous, with the ferry itself being considered a main transportation service provided at cost to the county (Abart, 2010). Lummi Island possesses its own resident fire department, Whatcom County Fire District 11 (WCFD11, 2010), with a staff of 27 volunteers ranging from firefighters dedicated primarily to fire response to those with emergency medical technician (EMT) and industrial first aid (IFA) training as well as one general physician (WCFD11, 2010). Fire services on the island are based on a system of mutual aid from neighboring districts, with response times for additional help taking approximately 20 to 30 minutes. This allows for a significant portion of WCFD11 resources to be used in an intensive initial firefighting effort.

Emergency medical services on the island are also responded to by the fire department. The current system used to service the community is based off of three main categories of medical calls: Minor Medical (MM), Basic Life Support (BLS) and Advanced Life Support (ALS). MM cases are usually treated at home or they are transported by private vehicle to the hospital. BLS cases involve ferry transport to Gooseberry Point and eventually St. Joseph Hospital. Due to the use of an ambulance and volunteers, certain resources are taken out of commission for the rest of the island for a short period of time, but it is not considered significant because of the short ferry trip as well as the low emergency call volume on the island. ALS cases are either transported by ALS ambulance or by helicopter (Airlift Northwest) to a treatment facility (WCFD11, 2010). Police service on the island is available through the Whatcom County Sheriff's office with officers coming over if a crime is committed or a call is made requiring police response.

Proposed Action

Impacts: Services and utilities would be negatively impacted by the longer ferry trip, approximately fifty minutes to the Bellingham Cruise Terminal, because of less frequent trips during the day. Fire services may not receive mutual aid fast enough, requiring their services to be adjusted from an intensive initial firefighting effort to a conservative approach focused on protecting resident's lives and exposures. Medical services would be significantly impacted by a longer ferry trip, with volunteers accompanying medical emergencies being out of island service for longer periods of time, which puts people at risk of services being needed but having services unavailable (WCFD11, 2010). Patients with severe conditions that require immediate medical transport risk having the helicopter transport unavailable with the only alternative being a longer ferry trip to a mainland hospital. Other alternatives include coastguard and sheriff boats but those carry the risk of difficult patient transfers to and from the boat. Weather can also cause delays in transportation with the use of smaller boats to transport patients or the Whatcom Chief having to travel over rougher, more open waters (WCFD11, 2010). Similarly, if police services were required immediately on the island, they would not be able to arrive for over an hour.

Alternative Action

Impacts: Impacts are similar to the proposed action with trips to Whatcom Waterway taking slightly longer than to the Bellingham Cruise Terminal. If a ferry terminal were to be constructed, problems involving traffic congestion could affect daily activities at Sanitary Services Company, which is located just off of Roeder Avenue

Mitigation: The creation of traffic revisions, such as lights, to control the flow of traffic leaving the new ferry terminal and prevent significant congestion of main roads used by Sanitary Services Company.

No Action Alternative

Impacts: Impacts are similar to the proposed action, with ferry service to Gooseberry Point to be reduced significantly within five years and possibly shut off after that time period, especially by the Whatcom Chief. This would create very little vehicle service to the island, significantly reducing the capacity of the fire department and EMT staff to respond to emergencies on the island (WCFD11, 2010).

4.4.2 Schools, Maintenance, Solid Waste

Existing Conditions

County maintenance on the Island is controlled by Whatcom County Public Works. These maintenance measures primarily include road services and those related to the Lummi Island ferry. Electrical and cable repair services provided by outside companies require transport on the ferry for their service trucks. The Whatcom Chief also accommodates a twice-weekly fuel truck delivery (Abart, 2010). Communication to the Island in the form of mail is handled through the US Postal Service, with a post office located on the island for distribution. This service requires the to transport mail to and from Lummi Island in relation to the mainland.

Garbage and recycling on the island is scheduled through Sanitary Service Company for a weekly pickup and also requires ferry service (Abart, 2010). School services on the island are in the form of Beach Elementary School, which is part of the Ferndale School District and offers educational services for kindergarten through sixth grade. Some teachers and administrative personnel require ferry services to the island (Beach, 2010). Middle school and high school services are located on the mainland in the Ferndale school district and require ferry service as well as a school bus.

Other governmental services include the library on Lummi Island, a branch of the Whatcom County Library System. The library provides historical archives of the island, catalogue access to the library system, general library materials, a meeting space and adult/children's educational programs (FOIL, 2010). The ferry provides no significant public services/utilities, other than passenger and vehicle transport, to Gooseberry Point

Proposed Action

Impacts: Schools would be significantly affected because the district ownership would change from Ferndale to Bellingham since the Bellingham Cruise Terminal is located with the Bellingham School District. This would create conflict over ownership and management of the on-island Beach Elementary as well as the status of middle and high school students currently enrolled in the Ferndale School District. Teachers at Beach Elementary who do not reside on the island may have trouble reaching the island to continue teaching classes because the trips would be longer and in severe weather, the ferry will not run.

The library could receive reduced circulation services (FOIL, 2010). Maintenance vehicles would not be able to respond to emergency situations as quickly, or possibly at all, if weather were severe, to restore vital utilities to the island. Transportation of general maintenance services will take much longer and may have to be scheduled for trips to Lummi Island due to decreased ferry trips per day, or they may be cancelled because of in-climate weather conditions. This also affects the twice-weekly fuel truck delivery as well as garbage and mail services, which also may not be able to make the island trip on days with severe weather (Abart, 2010).

Alternative Action

Impacts: Impacts are similar to those of the proposed action.

No Action Alternative

Impacts: Transportation of large vehicles used for maintenance services and utilities like garbage may be negatively impacted by the possible reduced service of the Whatcom Chief and future non-existent ferry service. Similarly, propane fuel trips to the island would be negatively impacted. Mail and library circulation could possibly be transported using private industry instead of the Whatcom Chief (Abart, 2010). Other economic goods transported to the island through the Whatcom chief would be significantly reduced with fewer ferry trips to choose from and would likely have to find other avenues of transport to the island.

5. ELEMENTS OF THE ENVIRONMENT NOT ADDRESSED

- Floods
- Plants and animals
- Unique species
- Risk of explosion
- Agricultural crops
- Traffic hazards
- Parks or other recreational facilities
- Water/storm water

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7. APPENDICES

Appendix A. Soils

Gooseberry Point Soil Survey Map



Figure 2: Soil survey map of the Gooseberry Point ferry dock. Soil Survey map # 37, soil #111, United States Department of Agriculture.

Table 1: Description of #111 soil conditions present in Gooseberry Point courtesy of United States Department of Agriculture.

Map Unit Description: Neptune very gravelly sandy loam, 0 to 3 percent slopes—
Whatcom County Area, Washington

Whatcom County Area, Washington

111—Neptune very gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 0 to 20 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 days

Map Unit Composition

Neptune and similar soils: 85 percent
Minor components: 3 percent

Description of Neptune

Setting

Landform: Spits, marine terraces
Parent material: Fluviomarine deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water capacity: Very low (about 2.3 inches)

Interpretive groups

Land capability (nonirrigated): 4s

Typical profile

0 to 10 inches: Very gravelly sandy loam
10 to 27 inches: Extremely gravelly loamy sand
27 to 60 inches: Extremely gravelly sand

Minor Components

Hovde

Percent of map unit: 3 percent
Landform: Terraces

Data Source Information

Soil Survey Area: Whatcom County Area, Washington
Survey Area Data: Version 6, Sep 22, 2009



Figure 3: Soil Survey Map of the Bellingham Cruise Terminal site in Bellingham. 171 indicates an urbanized land. Soil Survey map #44, soil #171 courtesy of the U.S. department of agriculture 1992.

Table 2: Description of type #171 soil conditions, present at Bellingham Cruise Terminal and Whatcom Waterway courtesy of United States Department of Agriculture.

Map Unit Description: Urban land—Whatcom County Area, Washington

Whatcom County Area, Washington

171—Urban land

Map Unit Composition

Urban land: 85 percent

Minor components: 2 percent

Description of Urban Land

Interpretive groups

Land capability (nonirrigated): 8

Minor Components

Labounty

Percent of map unit: 1 percent

Landform: Depressions

Whitehorn

Percent of map unit: 1 percent

Landform: Depressions

Data Source Information

Soil Survey Area: Whatcom County Area, Washington

Survey Area Data: Version 6, Sep 22, 2009



Figure 4: Soil Survey Map of the Whatcom Waterway site in Bellingham. 171 indicates an urbanized land. Soil Survey map #38, soil #171 courtesy of the U.S. department of agriculture 1992.

Appendix B. Flora and Fauna

Lummi Island Kelp Bed Map

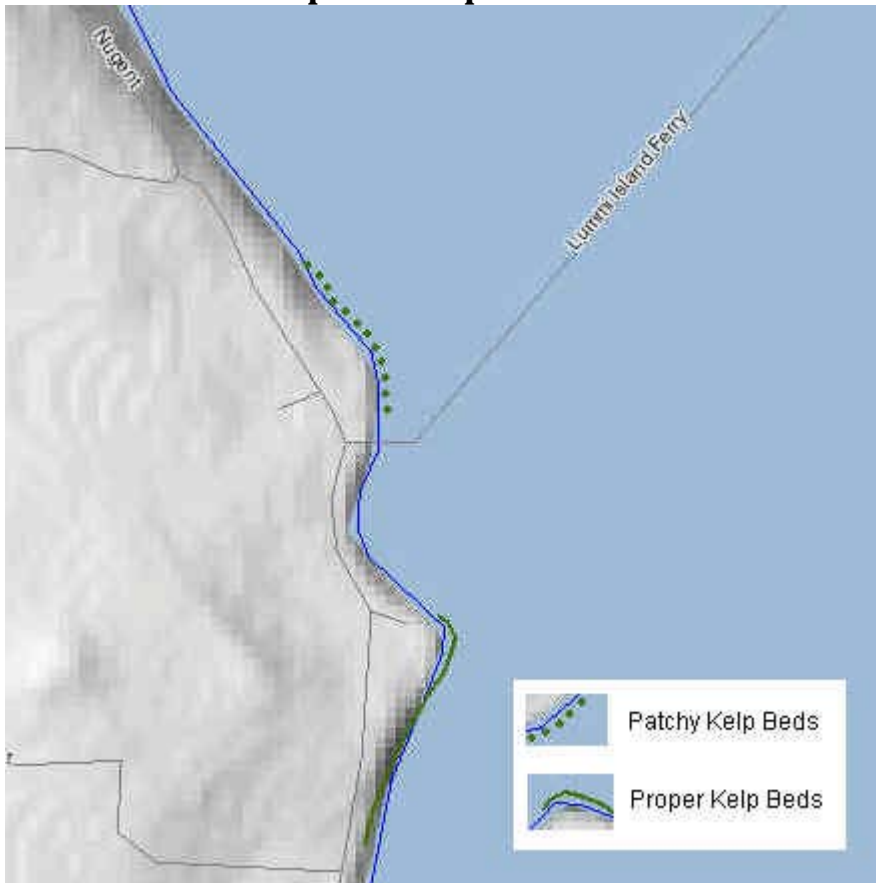


Figure 5: Map of Lummi Island ferry landing. Areas of patchy kelp beds are located just north of the ferry dock. Areas of proper (well established) kelp beds are located further south.

Gooseberry Point Kelp Bed Map



Figure 6: Map of Gooseberry Point showing patchy eelgrass beds surrounding the ferry dock with proper eelgrass beds to the south and proper/patchy eelgrass beds to the north. Maps courtesy of the Washington State Department of Ecology coastal atlas survey 2000.

Lummi Island Eelgrass Beds Map



Figure 7: Map of the Lummi Island ferry landing. Areas of proper eelgrass beds are to the north and south of the ferry dock, with patchy and proper eelgrass beds extending up and down the shoreline. Maps courtesy of the Washington State Department of Ecology coastal atlas survey 2000.

Bellingham Cruise Terminal Eelgrass Beds Map

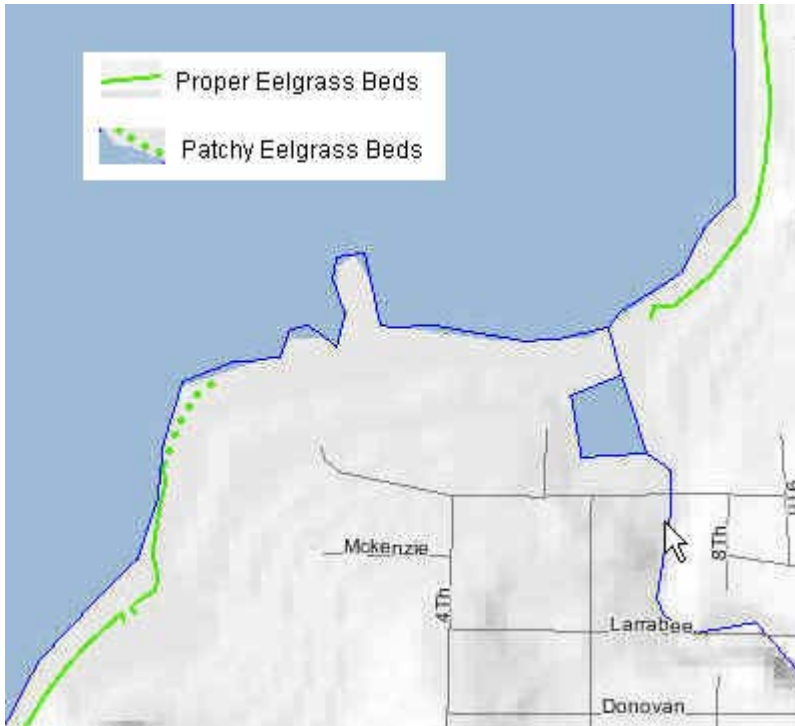


Figure 8: Map of the the Bellingham Cruise Terminal site showing patchy eelgrass locate south, with proper eelgrass located farther northeast an southwest of the proposed ferry location. Maps courtesy of the Washington State Department of Ecology coastal atlas survey 2000.

Whatcom Waterway Eelgrass Map



Figure 9: Map of the the Whatcom Waterway site showing patchy eelgrass located north of the proposed ferry location. Maps courtesy of the Washington State Department of Ecology coastal atlas survey 2000.

Appendix C. Land and Shoreline Use

Fairhaven Zoning Map

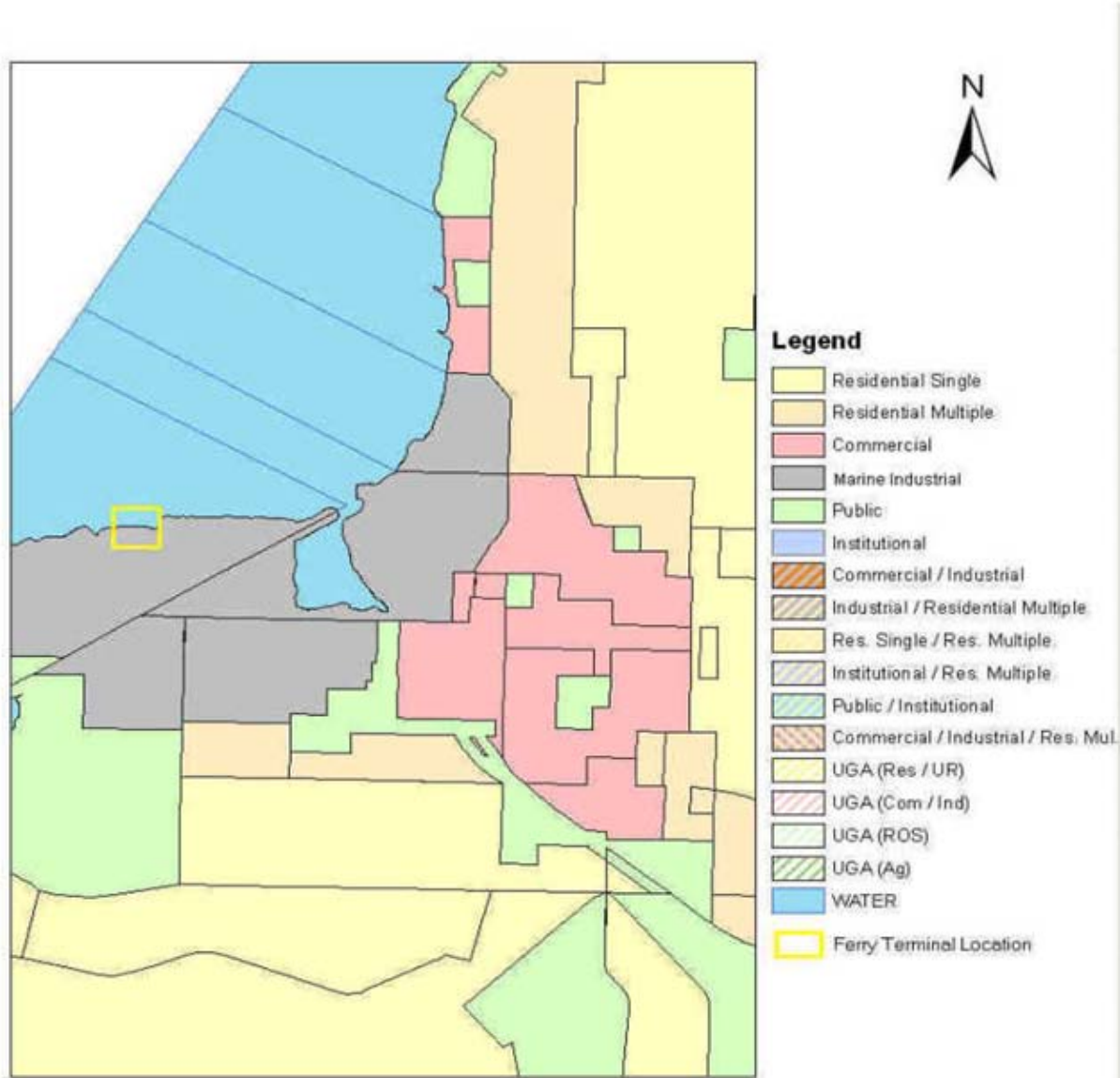


Figure 10: Zoning map of the Fairhaven ferry site location and the surrounding areas circa 2009.

Figure 10: Zoning Map of Fairhaven ferry site location and the surrounding areas circa 2009.

Whatcom Waterway Zoning Map



Figure 11: Zoning map of Whatcom Waterway and the surrounding areas circa

Figure 11: Zoning Map of Whatcom Waterway and the surrounding areas circa 2009.