NEW WHATCOM REDEVELOPMENT PROJECT

PLANTS AND ANIMALS TECHNICAL REPORT

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DECEMBER 14, 2007

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1 INTRODUCTION

The New Whatcom Redevelopment Project site contains both upland and aquatic habitat, and the following discussion addresses each aspect separately. The Project site has been historically used as a marine industrial site, with existing in-water and over-water industrial port infrastructure and upland facilities. The existing site is currently heavily utilized as a marine industrial site and includes high levels of development and industrialization in both the upland and aquatic environment.

1.1 Affected Environment

1.1.1 Upland

The upland portions of the Redevelopment Areas are dominated by existing streets, paved areas and buildings. Upland area is primarily influenced by the area's history as a maritime industrial and shipping center on Bellingham Bay and includes extensive industrial maritime infrastructure. Upland habitat is limited to small, discontinuous patches of disturbed areas that are dominated by weedy vegetation. Portions of the Redevelopment Areas include limited, narrow bands of shoreline vegetation. Area 10 contains the most undeveloped upland, but consists of weedy vegetation growing on a landfill.

Terrestrial wildlife that may be present in the Project Area and vicinity is limited to those species typically observed in the Bellingham urban environment, including various songbirds, gulls, crows and ravens, as well as raccoon (*Procyon lotor*), black-tailed deer (*Odocoileus hemionus* ssp. *columbianus*), opossum (*Didelphis virginiana*), and possibly coyote (*Canis latrans*). See the Bellingham Bay Comprehensive Strategy, Whatcom Waterway Cleanup Site Draft Supplemental Environmental Impact Statement (Whatcom Waterway SEIS; Ecology 2006) for more details on terrestrial plants and wildlife potentially present.

1.1.2 Aquatic

Aquatic habitat is present in the Project Area, which consists of Bellingham Bay, Whatcom Waterway, I & J Waterway, and Whatcom Creek. Habitat in Bellingham Bay and I & J Waterway is typical of nearshore marine habitat, and includes intertidal habitat (+8 ft MLLW to -4 ft MLLW), shallow subtidal (-4 ft MLLW to -10 ft MLLW), and subtidal habitat (below -10 ft MLLW). Whatcom Waterway is the mouth of Whatcom Creek and forms an estuary where fresh water from Whatcom Creek enters Bellingham Bay. This estuary provides important habitat for aquatic species, including migratory salmonids continuing up Whatcom Creek.

Aquatic conditions in the Redevelopment Areas also consist of urban habitat consistent with the area's history as a maritime industrial and shipping center on Bellingham Bay. The Redevelopment Areas include over 2.5 miles of shoreline, from the western side of the mouth of I & J Waterway, around the ASB perimeter, into Whatcom Waterway to Roeder Avenue bridge, then along the eastern shore of Whatcom Waterway south to the southern extent of the Cornwall Landfill. The majority of the shoreline contains bulkheads, pile-supported overwater pier structures, wharfs, riprap, or combinations of these to facilitate maritime operations. Limited sloped shoreline exists at the head of I & J Waterway, around the perimeter

of the ASB (waterward of the riprap breakwater), at the log pond, and in the vicinity of the Bellingham Shipping Terminal/Cornwall Landfill site.

1.1.2.1 Fish and Wildlife

Aquatic wildlife species that may be present in the Redevelopment Areas are listed in Table 1. See the Whatcom Waterway SEIS for more details on aquatic plants and wildlife potentially present.

Table 1. Species potentially using aquatic habitat in the Redevelopment Areas

Fish species	**Birds**	**Marine mammals**	**Crab**
Surf smelt	brant	Harbor seal	Purple crab
Sand lance	snow goose	Sea lion	Graceful crab
Pacific herring	mallard	Killer (orca) whale[1]	Red rock crab
Chinook salmon[1]	widgeon	Gray whale	Dungeness crab
Chum salmon	green-winged teal	Harbor porpoise	**Shrimp**
Coho salmon	pintail	**Bivalves**	Pink shrimp
Pink salmon	scoter	Butter clam	Coonstripe shrimp
Cutthroat trout	golden eye	Littleneck clam	Dock shrimp
Steelhead[1]	Glaucous-winged gull	Horse clam	Spot shrimp
Bull trout[1]	Pigeon guillemonts	Soft-shell clams	**Aquatic vegetation**
Numerous groundfish species	Bald eagle	Cockles	Eelgrass
	Peregrine falcon	Geoducks	**Macroalgae**
	Marbled murrelet	Oysters	Green algae

[1]**Federal Threatened or Endangered Species**

1.1.2.2 Threatened and Endangered Species

Under the ESA, a species likely to become extinct is categorized as "endangered." A species likely to become endangered within the foreseeable future is categorized as "threatened."

- **Bald Eagle:** The bald eagle was removed from the Endangered Species list on June 28, 2007, effective August 9, 2007. Bald eagle has been included in this document due to the recent delisting. Bald eagle nest sites occur in the Nooksack River delta along the shoreline and in inland areas of the Lummi Peninsula, approximately 4 miles from the Project Area. There are also nests along Chuckanut Bay and the shoreline of Portage Island (approximately 3.5 and 6 miles from the Project site, respectively). Nesting eagles generally forage within 10 square miles of their nest site. Thus, while the Project site does not have eagle nests, it may provide foraging habitat.
- **Marbled Murrelet:** The U.S. Fish & Wildlife Service has listed marbled murrelet as "threatened". Open water concentrations of marbled murrelets have been recorded in the central portion of Bellingham Bay. The species forages year round in waters generally less than 90 feet deep, sometimes congregating in well-defined areas where food is abundant. These birds generally do not utilize shallower waters less than 30 feet deep. Marbled murrelets reportedly feed on a wide variety of prey, including sand lance, Pacific herring, and other marine taxa

such as crustaceans. Murrelets nest in old growth or mature forest composed of conifers, including Douglas fir, western red cedar, Sitka spruce, and western hemlock. There are no known nest sites along the shoreline of Bellingham Bay.

- **Chinook Salmon:** The National Marine Fisheries Service (NMFS) has listed the Puget Sound chinook salmon as a "threatened" species. Two races of chinook salmon (spring and fall) are found in Bellingham Bay. Fall chinook is the most common run of chinook salmon observed in Puget Sound. Juvenile fall chinook generally emigrate to the estuary between February and August as sub-yearlings (within the first year after being spawned) or as yearlings. Individual fish may only use Bellingham Bay for a period of days to a few weeks before heading into the greater Puget Sound estuary.
- **Steelhead:** On June 11, 2007, National Oceanic and Atmospheric Administration (NOAA) finalized listing of Puget Sound steelhead (*Oncorhynchus mykiss*) as a "threatened" species (NOAA 2007). Winter steelhead are present in Squalicum, Whatcom and Padden Creeks, indicating that steelhead use the Project site as a migratory path.
- **Bull Trout:** Bull trout are listed by USFWS as a threatened species under the ESA. Bull trout likely use the Whatcom Waterway as a refuge and rearing area.
- **Southern Resident Killer (Orca) Whales:** On November 15, 2005, the National Oceanic and Atmospheric Administration (NOAA) Fisheries announced its decision to list the North Pacific Southern Resident killer whale (*Orcinus orca*: hereafter referred to as orca whales) population as endangered under the Endangered Species Act (ESA). The listing was effective on February 6, 2006 (50CFR 223/224). The listing is specific to the three resident whale pods (J, K, and L pod) with spring through fall ranges in Puget Sound and the Straits of Georgia and Juan de Fuca. A number of factors have been identified by NOAA Fisheries as having resulted in the listing of these orca whales as endangered. Sound and disturbance from vessel traffic, toxic chemicals which accumulate in top predators, and uncertain prey availability (primarily salmon) all have been identified as concerns for the continued survival of this population.

  On November 29, 2006, NOAA designated critical habitat for Southern Resident orca whale, effective December 29, 2006. The Project is located within areas that are designated as critical habitat for the Southern Resident orca whale. In the designation, three "specific areas" were established, in which Southern Resident orca whale critical habitat Primary Constituent Elements (PCEs) are found. Bellingham Bay is located within Area 1: Core Summer Areas, in which approximately 85% of all Southern Resident orca whale sightings occur. However, sightings in Bellingham Bay are infrequent. Sightings in Area 1 are most frequent on the western side of the San Juan Islands in Haro Strait and the Strait of Juan de Fuca.

1.1.2.3 Habitat Characteristics and Quality

The following section draws heavily from the Whatcom Waterway Draft SEIS (Ecology 2006). That document includes information on fish & wildlife, describing

types and functions of aquatic habitat, fisheries resources, sea birds and marine mammals, threatened, endangered, sensitive, and candidate species, priority restoration opportunities, and aquatic habitat issues and navigation infrastructure within Bellingham Bay and Whatcom Waterway.

The New Whatcom Project Area is utilized by numerous anadromous salmonid species. While many species of salmonids may be present in nearshore estuarine and marine waters of Bellingham Bay, those species that enter saltwater early during their first year (some chinook, chum, and pink salmon) are typically considered to be more nearshore reliant. These fish are predominantly surface oriented, inhabiting the top meter or two or the water column moving in and out with the tides over shallow subtidal and intertidal areas.

These juvenile salmon are nearshore dependent for two main reasons: forage opportunities and refuge from larger, deeper water predators. They feed on organisms at the water-substrate interface (epibenthos), in the water column (plankton), and at the surface (neuston). Chum and chinook early in their saltwater residence feed primarily on epibenthos, although some neustonic and planktonic feeding occurs, especially as fish become larger. Pinks feed primarily on plankton from their initial entry into salt water. A number of physical and biological factors in the nearshore environment interact to create conditions that can enhance or detract from forage and refuge opportunities. Four physical factors in particular, tidal elevation, substrate type, and slope, and salinity influence habitat suitability for these fish, all of which can be modified by exposure to current or waves. Habitat that optimizes each of these factors represents high quality habitat for juvenile salmonids. While the following discussion is focused on the needs of juvenile salmonids, the general conclusions regarding habitat quality are applicable to a range of aquatic species.

- **Tidal Elevation:** Tidal elevation of a particular area dictates the duration of tidal exposure (dry periods between tides). This affects the conditions that can develop at different elevations. Shallow subtidal areas experience relatively high light levels, but essentially no tidal exposure. Larger macroalgae, eelgrass, and other organisms that might be susceptible to drying can survive at these elevations. The vegetation in this area supports prey organisms and can provide refuge for juvenile salmon. These fish spend a relatively small proportion of their time in waters over this elevation (primarily during very low tides) because they are primarily surface oriented. Low to middle intertidal areas (-4 to +4 ft MLLW) experience relatively short periods of tidal exposure, averaged over an entire season, and also receive a great deal of light. This area can be very productive for desiccation resistant macroalgae and invertebrate populations, including those epibenthos on which chum and chinook feed. Because they move in and out with the tides, juvenile salmon also spend a large proportion of their time in water over substrate at low to middle tidal elevations. While juvenile salmon spend relatively little time at higher tidal elevations (e.g., above MHHW, 8.46 MLLW in Bellingham Bay), the fringing salt-tolerant plants that thrive in these areas can produce invertebrates, including chironomid fly larvae which also are important prey organisms. Tidal elevation characteristics relative to light and duration of

exposure are not substantially altered with differences in wave or current regimes in shallow subtidal areas. The upper range of low to middle intertidal macroalgae may be expanded as desiccation during tidal exposure is reduced due to wave action, and the upper intertidal and supratidal areas, or "splash zone" can be expanded to even higher elevations, increasing upper range of salt tolerant plants.

- **Substrate Type:** Substrate type is a factor in providing suitable foraging opportunities for juvenile salmon. The epibenthic invertebrate assemblage can vary both in terms of composition and density based on substrate type. Generally, finer substrates (e.g., silts, sand, and mud) are correlated with higher densities of those epibenthos on which juvenile salmon most often feed. This includes both those organisms associated with the substrate itself, and those organisms associated with aquatic vegetation (e.g., eelgrass). An exception to this generality is where exposure to wave or current energy is relatively high, in which case more coarse substrates (e.g., gravel or cobble) are correlated with higher densities of epibenthos. This is particularly the case with those organisms associated with macroalgae (e.g., certain types of amphipods), which is more likely to be present or accumulate in areas with coarser substrate. Coarser substrates also allow for more dissipation of water energy on the substrate surface.
- **Slope:** Slope is a factor that affects both foraging and refuge function of nearshore environments. Shallower slopes, particularly in the lower to middle tidal elevations, improves conditions for epibenthos, and therefore juvenile salmon foraging opportunity, by reducing desiccation rates during tidal exposure. They increase retention of organic detritus for processing into the food web at the epibenthic level. Shallower slopes also provide greater functional habitat area for juvenile salmon at given tidal elevations. Because juvenile salmon stay in the top meter or two of the water column, tidal profiles that allow them to stay in shallow water during most or all stages of the tidal cycle provide refuge from deeper water predators, including larger salmonids that feed from below. By contrast, steeply sloped nearshore areas provide less total area of less productive habitat at any given elevation and little if any refuge from predators deeper in the water column.
- **Salinity:** Salinity influences habitat suitability for juvenile salmon by determining the physiological regime and the biological assemblage. The biological assemblage, including aquatic vegetation and invertebrates, of a given area is strongly tied to salinity. In areas of freshwater input, like the Whatcom Waterway, a salinity gradient exists along which this assemblage shifts from freshwater to marine organisms, with specialists in estuarine conditions in the middle. Surface oriented juvenile salmon in the nearshore, particularly chum and chinook, forage extensively in estuarine habitats. This is the case both for fish in their natal estuaries, and also fish that have already entered salt water and subsequently encounter lower salinity conditions. Low salinity areas are limited habitats in inner Bellingham Bay and provide important habitats for juvenile salmonids undergoing the physiological transition to saltwater.

In summary, the characteristics of high quality habitat for juvenile salmonids and other selected species requires the optimization of multiple factors. The functions and values of the created habitat vary depending on this collection of factors.

1.1.2.4 Habitat Issues and Navigation Infrastructure

Portions of the New Whatcom Project Area have been developed for navigation uses with infrastructure improvements. This infrastructure affects the types of habitat conditions that are present in these areas. Other than depth modifications (i.e., dredging) the main types of navigation infrastructure that exist in the Whatcom Waterway site area include bulkheads, armored slopes and over-water structures. Habitat considerations associated with these features are described below:

- **Bulkheads:** The term bulkhead refers to constructed sheer vertical walls that stabilize the shoreline. Typically they are concrete or metal sheet pile, although many older bulkheads are constructed from treated timber. In the I & J and Whatcom Waterways, bulkheads are a common feature in the intertidal zone. Most extend from above mean higher high water to the structure design depth (varies from mean lower low water to depths greater than 10 feet below MLLW depending on the required water depth at the face of the bulkhead). Bulkheads are often installed in conjunction with armored slopes below the toe of the bulkhead. A bulkhead yields a habitat with no depth variability and no horizontal surfaces to support primary production, secondary production, or processing of detritus. While sessile organisms, including barnacles and some macroalgae, can attach to the vertical bulkheads, it is not suitable for producing epibenthic prey organisms for juvenile salmon. The vertical slope also means that juvenile salmon using the top one to two meters of the water column are in much deeper water during most or all tidal cycles, depending on the bottom elevation of the bulkhead, compared to a naturally sloping nearshore area. This may increase their susceptibility to predators. Juvenile salmon use waters adjacent to bulkheads, and can forage on prey items derived from planktonic or neustonic sources. However, due to the lack of epibenthic organisms, overall prey resources are typically considered to be reduced relative to sloped habitat; therefore, bulkhead shorelines are considered a low quality habitat.
- **Armored Slopes:** Slopes armored with large stones or “riprap” are typically steep and compress the horizontal habitat profile yielding less habitat within the desired zones for juvenile salmonids than do more gently sloped habitats. Unlike bulkheads, the resulting habitat does have surfaces to support primary productions, secondary production, and processing of detritus. Substrate size of riprap slopes differs from the fine silts or sands that would have been typical of the depositional delta area in the historic Whatcom Creek, or even more coarse gravel or cobble substrates farther from the mouth of the creek. At elevations that are exposed to regular, significant wave energy, riprap has essentially no ability to retain water or organic material on its own, except in depressions in individual pieces. Exposed rock surfaces at these elevations eventually develop sessile biological matrices, including macroalgae and invertebrates, which reduce desiccation at small scales and allows for an assemblage including mobile invertebrates. At lower elevations that do not have significant wave exposure,

riprap can provide a suitable substrate for many different species of macroalgae and also provides habitat areas in its interstices for invertebrates. A common means of improving the productivity of riprap slopes is to fill the interstices of the rock with a finer material (e.g., gravel) that can increase both water and organic material retention, and increase the ability of the bulkhead slope to support an assemblage of organisms including juvenile salmon prey organisms. This method may not be appropriate in higher energy areas where substrate may not be retained at mid and higher elevations. The biological assemblages on riprap substrate are more comparable to that of a rocky nearshore area than beaches. While there are epibenthic prey available for juvenile salmon in these areas, habitat function is reduced compared to areas with smaller substrate. Juvenile salmon use waters adjacent to riprap and can forage on prey items derived from planktonic or neustonic sources as well as the limited epibenthic prey. Armored slopes are considered to provide lower quality habitat than gentle slopes, but higher quality habitat than bulkhead slopes.

- **Overwater Structures:** Intertidal and shallow subtidal shading has decreased light levels underneath and around overwater structures. Shading is of primary concern because it reduces light available for photosynthesis by aquatic vegetation. Reduced primary productivity has implications both in terms of habitat structure and complexity (reduction or loss of aquatic vegetation), and in terms supporting productivity elsewhere in the food web, including juvenile salmon prey organisms. Shading impacts extend beyond the footprint of the structure as the sun's movement across the sky over a day or season results in a larger shaded area as it is oriented in different aspects. Small structures, such as narrow piers, shade relatively less area than large or wide structures such as pier aprons. Depending on the orientation of the narrow structure, direct sunlight can reach most of the shade footprint over the course of a day or season. The distance from the lighted edge to the center of the structure footprint is also relatively smaller than at a wider structure, resulting in higher levels of ambient light. In contrast, large proportions of the shade footprint associated with wide structures may never receive direct sunlight. Wider structures also decrease the ratio of lighted edge to shaded area, and increase the distance from the lighted edge to the center of the structure footprint. This results in less ambient light under wider structures and therefore more intense impacts associated with shading. This has implications for productivity and can reduce the habitat function of an area for juvenile salmon foraging. Nearshore habitat function may be reduced underneath and immediately adjacent to overwater structures. For juvenile salmon, this impact is somewhat greater at the typically highly productive low to middle intertidal zone, although impacts on macroalgae in the shallow subtidal and salt tolerant plants in the supratidal splash zone also can affect productivity in these zones. As with bulkheads, foraging function around overwater structures may be reduced due to decreased productivity, but alternative food sources (plankton, neuston) are available. Those juvenile salmon that move into deeper water to avoid overwater structures may be more susceptible to deeper water predators, but this behavior is not always the response to encountering a structure.

In summary, high quality habitats minimize the presence of bulkheads, steep armored slopes and over-water structures. However, waterfront navigation needs force compromises to be made between navigation and habitat features in most waterfront industrial areas.

The Whatcom Waterway Draft SEIS (3-32; Ecology 2006) lists priority restoration opportunities in Bellingham Bay, including several target species (e.g. salmonids, bull trout, sand lance, surf smelt, etc.) and habitat restoration/protection objectives, many of which are included in this Project. The habitat restoration/ protection objectives include:

- Provide clean sediments to support functions and species
- Restore the 200+ acres of historical native eelgrass bed that was formerly located in inner Bellingham Bay to the extent possible
- Restore/enhance degraded estuaries of Whatcom, Squalicum, Padden, and Little Squalicum Creeks to support salmonids, salmonid prey, and functions such as refuge, feeding, and rearing
- Restore/enhance/protect viable habitat that provides connective corridors between estuary and open water habitats and between other habitats in the open water environment
- Restore/enhance/protect natural habitat forming processes that create and maintain habitat
- Net gain in aquatic area and function
- Preserve existing viable habitat that tends to either concentrate sensitive life history stages and/or supports large numbers of species of concern
- Maximize habitat restoration/protection opportunities (including marine buffer) with remediation and/or shoreline projects
- Restore lost habitat attributes by removing shoreline fills, shoreline landfills, remnant structures, and removing/replacing treated timber structures.

2 EXISTING SITE CONDITIONS

2.1 Upland Site Conditions by Redevelopment Area

Area 1

Upland

Area 1 encompasses 51.35 acres and is a highly developed urban/industrial site. Paved areas, roads, and buildings cover 82.3% (42.25 acres) of the area. The balance of Area 1 (17.7%; 9.10 acres) is undeveloped/open space. Vegetation within Area 1 consists almost entirely of invasive/weedy species, including Himalayan blackberry (*Rubus armeniacus*), common tansy (*Tanacetum vulgare* – Class C noxious weed), butterfly bush (*Buddleja davidii* – Class C noxious weed), chicory (*Cichorium intybus*), and white sweet clover (*Melilotus alba*). No riparian vegetation is present in Area 1. Landscaped trees are present along Roeder Avenue. Wildlife habitat is limited within Area 1 and consists of highly fragmented, low quality urban habitat interspersed between paved areas.

The National Wetland Inventory (NWI) shows a wetland in Area 1 in the vicinity of the Georgia Pacific tissue warehouse. A site investigation revealed that no wetland exists at that location.

Aquatic

Area 1 contains approximately 0.6 linear miles of shoreline dominated by maritime industrial uses. Area 1 includes the head of I & J Waterway and the waterway's eastern side, south to the ASB breakwater, then from the eastern side of the ASB breakwater along the western side of Whatcom Waterway to the Roeder Avenue Bridge. The ASB is discussed in a separate section after Redevelopment Areas 1-10.

The Area 1 shoreline is completely developed. Creosote timber pile-supported piers and floating docks are present along the I & J and Whatcom waterways (Photograph 1). Both timber and concrete bulkheads are present along the entire southeastern shoreline of the I & J Waterway and along much of the Whatcom Waterway within Area 1 (Photograph 2). A portion of the bulkhead in Whatcom Waterway is failing (Photograph 3). Riprap is present along the portions of the shoreline in Whatcom Waterway that do not have a bulkhead. Small areas of more gently sloped shoreline with finer substrate are located at the head of I & J Waterway and at the northern corner of the ASB (Photograph 4). Approximately 33% of the shoreline of Area 1 has bulkheads (both timber and concrete), 25% consists of piers/docks with riprap or bulkhead shorelines, 22% consists of sloped, medium to fine substrate shoreline, and 20% consists of riprap with no pier or dock coverage. Since 80% of the shoreline contains infrastructure that decreases habitat quality, aquatic habitat in Area 1 is considered low quality.

The head of Whatcom Waterway is an estuarine environment, receiving freshwater input from Whatcom Creek. Whatcom Waterway and Whatcom Creek are used for migration and rearing by several species of anadromous salmonids. Spawning occurs in Whatcom Creek approximately 0.9 miles upstream of the mouth of the creek (WDFW SalmonScape 2007). Salmonids also use the shorelines in I & J

Waterway; however, this area has higher salinity conditions than the inner portions of Whatcom Waterway since I & J Waterway does not have a freshwater surface input. Therefore, use of I & J Waterway by juvenile salmonids is expected to be lower than Whatcom Waterway.

Area 2

Upland

Area 2 is located south across Whatcom Waterway from Area 1. Area 2 encompasses 22.60 acres and is a highly developed urban/industrial site. Paved areas, buildings, roads, and overwater structures cover 99.1% (22.40 acres) of Area 2. The balance of Area 2 (0.9%; 0.20 acre) consists of landscaping. Small amounts of weedy vegetation are present, with similar species as Area 1. Native vegetation or wildlife habitat is essentially non-existent in Area 2.

Aquatic

Area 2 encompasses approximately 900 ft of the southern Whatcom Waterway shoreline, from Roeder Avenue bridge approximately 900 ft west along the Waterway. This portion of shoreline is the most highly modified in the Project site. Approximately 50% of the shoreline consists of creosote timber pile-supported overwater pier structures over bulkheads and/or riprap. Approximately 20% consists of sloped shoreline up to a bulkhead, with numerous cut pile stubs. The remaining approximately 30% consists of a vertical concrete bulkhead (Photograph 5). This shoreline provides low quality aquatic habitat.

Area 3

Upland

Area 3 is located immediately west of Area 2 and is very similar to Area 2. Area 3 encompasses 7.74 acres. Paved areas, buildings, roads, and railroads cover 95.33% (7.38 acres) of Area 3. No undeveloped/open space exists in Area 3. Vegetation and wildlife habitat are essentially non-existent in Area 3.

Aquatic

Area 3 encompasses approximately 300 ft of the southern Whatcom Waterway shoreline. The shoreline contains riprap/bulkhead slopes with creosote timber pile-supported overwater pier structure (Photographs 5 & 6). This area provides low quality aquatic habitat.

Area 4

Upland

Area 4 is located immediately southwest of Area 3 and is similar to Area 3. Area 4 encompasses 11.38 acres. Roads/parking, buildings, railroad, and overwater structures cover 100% of Area 4. No undeveloped/open space exists in Area 4. In the western corner of Area 4 a narrow band of vegetation is present, overhanging a sandy sloped beach area (in the “log pond “) above a vertical bulkhead (Photograph 7). Vegetation in this area consists primarily of Himalayan blackberry and other weedy species. Wildlife habitat in Area 4 is limited to this area and is considered low

quality, since it is isolated from larger tracts of habitat and is surrounded by developed upland.

Aquatic

Area 4 encompasses approximately 1,100 ft of the Whatcom Waterway southeastern shoreline. This portion of shoreline includes creosote timber pile-supported overwater pier structures and bulkhead (Photographs 5&6). A pier-supported building present on the shoreline extends southwest along the shoreline. Area 4 includes a portion of the "log pond" area, between the previously mentioned pier-supported building and the southern shoreline (Photograph 7). The log pond area, which is no longer used for log storage or transfer, has been capped with sandy dredged material to isolate contaminated sediments and improve habitat conditions. The log pond consists of shallow water and sloping sandy shoreline up to a concrete block bulkhead (Photograph 6). The portion of Area 4 with piers and bulkheads provides low quality aquatic habitat, while the log pond provides high quality aquatic habitat.

Area 5

Upland

Area 5 is immediately southeast of Areas 2, 3, and 4 and contains similar high levels of development and industrial activity. Area 5 encompasses 6.99 acres. Roads, buildings, railroad encompass 100% of the area. No undeveloped/open space exists in Area 5. Vegetation and wildlife habitat are essentially absent in Area 5.

Aquatic

Area 5 contains no aquatic habitat.

Area 6

Upland

Area 6 is immediately southwest of Area 5. Area 6 encompasses 6.53 acres. Roads/parking and buildings encompass 100% of the area. No undeveloped/open space exists in Area 6. Vegetation and wildlife habitat are essentially absent in Area 6.

Aquatic

Area 6 contains no aquatic habitat.

Area 7

Upland

Area 7 is located immediately southeast of Areas 5 and 6. Area 7 encompasses 9.95 acres. Road/parking, buildings, and railroad encompass 100% of the area. No undeveloped/open space exists in Area 7 (Photograph 8). Vegetation is present off-site to the east of Area 7 along the existing railroad bed on a steep hillside (Photograph 8). Species include Himalayan blackberry, old man's beard (*Clematis vitalba* – Class C noxious weed), and big-leaf maple (*Acer macrophyllum*). No other vegetation or wildlife habitat is present in Area 7.

Aquatic

Area 7 contains no aquatic habitat.

Area 8

Upland

Area 8 is located immediately southwest of Area 4 and is similar to Area 4. Area 8 encompasses 24.38 acres. Area 8 consists almost entirely of impervious or gravel roadway/parking area. Road/parking and railroad right-of-way encompasses 100% of the area. Extremely limited, non-native vegetation is present along the edges of the long pond area. This vegetation does not provide significant wildlife habitat.

Aquatic

Area 8 abuts Whatcom Waterway for approximately 700 linear ft immediately southwest of Area 4 and includes a portion of the log pond area shoreline. The shoreline consists of sandy substrates and slopes up to a mixed bulkhead and riprap bank (Photograph 9). The aquatic habitat in this portion of the log pond is identical to that described in Area 4.

Area 9

Upland

Area 9 is immediately west of Area 8 and is similar to Area 8. Area 9 encompasses 21.32 acres. Road/parking, building footprints, railroad, and overwater coverage encompass 100% of the area. No undeveloped/open space exists in Area 9. Area 9 contains the Bellingham Shipping Terminal (BST). Vegetation is limited to landscaping around existing buildings and limited patches of weedy vegetation. Wildlife habitat is essentially absent.

Aquatic

Area 9 encompasses approximately 2,300 linear ft of shoreline. Area 9 includes two perpendicular docks/piers and one pier that parallels the shoreline. Approximately 50% of Area 9 shoreline is riprap, 30% is pile-supported pier structure over riprap/bulkhead shoreline, and the remaining 20% is a bulkhead with pile-supported infrastructure. Area 9 includes the southwestern corner of the log pond, which contains a small amount of low-slope, fine substrate shoreline and also approximately 375 ft of timber bulkhead (Photograph 9). The southwestern portion of Area 9 has public shoreline access at the corner of Cornwall Avenue and Wharf Street. Overall, the northern and eastern shorelines of Area 9 provide low quality aquatic habitat, and the western shoreline provides low to moderate quality aquatic habitat.

Area 10

Upland

Area 10 encompasses the Cornwall landfill and is located along the shoreline of Bellingham Bay, southwest of Areas 2-9. The northern portion of Area 10 is a narrow band between Bellingham Bay and the BNSF railroad, which widens to the west.

Area 10 encompasses 18.71 acres. Paved or gravel parking/driveway and buildings encompass 81.1% of the area. Undeveloped/open space encompasses 18.9% of the site, although this consists of flat landfill area dominated by low weedy vegetation. A vegetated drainage swale is present in the southern extent of the site. Public shoreline access is located in the northern corner of Area 10 at the terminus of Cornwall Avenue. The most extensive vegetation in Area 10 is along the railroad and along the shoreline. The majority of the vegetated area of Area 10 consists of weedy herbaceous species such as red clover (*Trifolium pratense*), curly dock (*Rumex crispus*), yarrow (*Achillea millefolium*), Canada thistle (*Cirsium arvense* – Class C noxious weed), common tansy, and various grasses (Photograph 10). A row of Himalayan blackberry with some interspersed native shrubs and small trees is present along the shoreline. Wildlife habitat in Area 10 would be limited to this area. Overall, Area 10 provides the most upland habitat of all the Redevelopment Areas, though it is of low to moderate quality due to its isolation from larger tracts of habitat by the railroad, fence and development, lack of native vegetation, and lack of diversity of vegetation strata.

Aquatic

Area 10 includes approximately 2,600 linear ft of shoreline adjacent to Bellingham Bay (Photograph 11). No overwater structures existing in Area 10, but numerous cut pile stubs are present along the shoreline. The shoreline consists of riprap/fill. Patches of eelgrass are present at the north end and southwestern corner of this area. Substrate and slope are consistent with high quality aquatic habitats. Area 10 is an old municipal landfill and in the past the refuse eroded onto the shoreline. Overall, this area provides relatively high quality aquatic habitat.

ASB Marina

Upland

The ASB encompasses 35.93 acres. This includes an approximately 28-acre wetted treatment basin, a riprap breakwater around the basin, and additional paved upland area landward of the basin. Upland area is limited to the riprap breakwater around the ASB and a narrow strip along the landward side of the basin. Limited terrestrial vegetation is present on the breakwater. Although very limited vegetation is present on the inside of the treatment basin, vegetation and wildlife habitat are essentially absent.

Aquatic

The inside of the ASB is an industrial water treatment facility and provides no aquatic habitat. The bayward side of the ASB consists of a steeply sloped riprap breakwater down to approximately -6 ft MLLW. The breakwater then transitions to low-slope, fine substrate bottom habitat. The bayside of the ASB provides approximately 3,500 linear ft of low quality aquatic habitat.

3 EXISTING SITE VICINITY CONDITIONS

3.1 Plants

The surrounding vicinity of the New Whatcom site is similar to the site itself in that it is highly developed and industrialized, and natural vegetation is generally lacking. Landscaped vegetation is present along roadways such as Roeder Avenue. The slope that borders Roeder Avenue to the north is vegetated with trees such as big-leaf maple and red alder, and shrubs such as Himalayan blackberry. A narrow band of vegetation is present east of the railroad right-of-way. This band increases in width near the southern end of the site (south of Redevelopment Area 10) and contains forested and scrub-shrub communities. Wetlands are likely present in this off-site area as well. Riparian habitat surrounds Whatcom Creek upstream of the Whatcom Waterway. Beyond this, vegetation in the vicinity is typical of highly developed urban areas.

3.2 Wildlife

Wildlife likely to be present in the vicinity of the Project site would be similar to those likely present within the Project site, though the surrounding area has more potential wildlife habitat and features than the Project site. In general, wildlife species and habitat is limited to that which is typical of an urban environment, although wildlife habitat corridors in areas such as Whatcom Creek connect to larger blocks of wildlife habitat and therefore have greater opportunity for supporting a wilder range of species. For details on wildlife species that may be present in the vicinity of the site and the greater Bellingham Bay Area, see the Whatcom Waterway Draft SEIS (Ecology 2006).

3.3 Water

Whatcom Creek flows into Whatcom Waterway and passes through Whatcom Waterway into Bellingham Bay. Squalicum Creek flows into Bellingham Bay approximately 0.8 mile northwest of the site. The site borders Bellingham Bay to the southwest. See the Whatcom Waterway Draft SEIS (Ecology 2006) for further information on surface water in the vicinity of the Project.

4 CONSTRUCTION IMPACTS

4.1 2016

The following section evaluates impacts associated with elements that would be constructed by 2016. All proposed in-water/over-water work would be completed by 2016. All in-water/over-water elements are similar for Alternatives 1-3; therefore, in-water/over-water construction impacts are only discussed under Alternative 1.

4.1.1 Alternative 1

Area 1

Upland

In Area 1 prior to 2016, Alternative 1 would include upgrades to the existing road system, building demolition, building construction, parking development, ground disturbance, paving, road construction, upgrades to or reconstruction of stormwater outfalls, and vehicle/machinery use associated with upland construction. Some buildings would be retained and reused. The new roads, road upgrades and road extensions would typically pass through existing paved or graveled areas. A trail would be constructed along C Street from Roeder Avenue to the new marina, using the existing roadway. Additionally, parking development, paving and building construction associated with the ASB marina would occur in Area 1. These elements would occur in areas currently devoid of native vegetation or habitat and would thus have negligible impacts on habitat.

The I & J Waterway Park, Marine Trades Park, and a 25 ft wide shoreline vegetation buffer would be established along the shoreline between the ASB marina and Area 1 by 2016. These features would encompass a total of approximately 0.18 mile (950 linear ft) of shoreline along the I & J Waterway and adjacent to the ASB marina and encompass approximately 2.95 acres. These elements would convert existing area that consists mainly of weedy vegetation and low quality habitat to parks/open space with the planting of trees and additional vegetation. Enhancement of vegetation would increase upland habitat in an area that is essentially currently devoid of vegetation. The upland parks with their trees would provide songbird habitat.

Any stormwater runoff resulting from ground disturbance during construction would have the potential to create temporary erosion and sedimentation impacts. Activities that have the potential for erosion include removal of structures, placement and compacting structural fill, and stockpiling of soils. A Stormwater Pollution Prevention Plan (SWPPP) would be required by the National Pollutant Discharge Elimination System (NPDES) permit for the Project. This SWPPP would include Best Management Practices (BMPs) associated with Temporary Erosion and Sediment Control (TESC) measures that would be implemented to prevent significant water quality impacts (A.C. Kindig & Co. 2007).

Aquatic

Aquatic improvements in Area 1 would include beach habitat restoration at the head of I & J Waterway, two new transient moorage floats in Whatcom Waterway and presumably a pedestrian bridge over Whatcom Waterway. Construction of transient

moorage would entail pile driving and the use of construction machinery. Potential construction impacts to aquatic resources would include noise from pile driving and construction machinery, minor temporary turbidity from pile driving, and the potential for spills of harmful materials from construction machinery. Beach habitat restoration is being implemented pursuant to the habitat restoration/protection objectives listed in Section 1.2.2: *"Restore/enhance/ protect viable habitat that provides connective corridors between estuary and open water habitats and between other habitats in the open water environment."*

If steel piles are used to anchor the moorage floats, and if they are driven with an impact hammer, there is potential for noise generated to affect aquatic and upland species. As part of future state and federal permitting, measures would be required and implemented that avoid and minimize impacts of pile driving on aquatic and upland species (see Section 3.4.4.9 Mitigation Measures).

Under Alternative 1, it is assumed that a pedestrian bridge between Areas 1 and 3 would be constructed over the Whatcom Waterway to connect the proposed trail system north of the waterway to the trail system south of the waterway. As currently planned, the bridge would be approximately 500 ft long by a maximum of 20 ft wide and would encompass approximately 0.23 acres in area. The bridge would be elevated above the water and would open (vertically or horizontally) to allow passage of larger boats at the transient moorage proposed to be constructed along the northern and southern edges of the Whatcom Waterway. No in-water structures would be required for the bridge, as it is assumed that the bridge would span the waterway. Due to its height above the water, the bridge would not result in significant shading impacts on the water, as would typically occur with a pier or dock, and no in-water piers are anticipated. Significant impacts to aquatic habitat associated with construction of the pedestrian bridge would not be anticipated.

No dredging would occur as part of Alternatives 1-3. Turbidity that would be generated by pile driving would not reach levels that would be expected to impact aquatic species. Accidental spills of chemicals could occur in conjunction with construction. As part of the proposed BMPs, the construction contractor would be responsible for the preparation of spill response and hazardous material control plans to be used for the duration of the construction period. The plan would outline measures to be taken to prevent the release or spread of hazardous materials, including (but not limited to) gasoline, oils, and chemicals (see Section 3.4.4.9 Mitigation Measures).

Area 2

Upland

Under Alternative 1, the Whatcom Waterway Trail, a 25-foot wide shoreline vegetation buffer, a 100 ft wide shoreline park, habitat restoration, building demolition, building construction, parking development, ground disturbance, paving, road construction, moving the railroad, upgrades to or reconstruction of stormwater outfalls, and vehicle/machinery use would occur in Area 2 by 2016. Upland vegetation enhancement/habitat restoration would encompass a total of 2.89 acres along approximately 0.17 mile of shoreline in Area 2. Enhancement of vegetation

would benefit upland habitat in an area that is essentially currently devoid of vegetation. The upland parks with their trees would provide songbird habitat, while the shoreline buffer would provide habitat for a wider range of species. The shoreline vegetation would also increase the quality and function of the adjacent aquatic habitat. These elements would be constructed in existing paved/unvegetated areas and would not result in construction impacts to habitat.

Any stormwater runoff resulting from ground disturbance during construction would have the potential to create temporary turbidity. BMPs would be implemented as described in Area 1.

Aquatic

In-water improvements described here include the entire shoreline that encompasses Areas 2, 3, and 4 east of the log pond. In-water work spans the boundaries of these areas, thus they are discussed together and apply to the combined Areas 2-3-4 shoreline. Work would include removal of existing concrete piers and 990 associated piles, removal of 1,490 linear ft of bulkhead, and cut/fill of approximately 3,000 linear ft to create a sloped shoreline. These shoreline habitat restoration actions are implemented pursuant to the habitat restoration/protection objectives listed in Section 1.2.2.

Potential construction impacts to aquatic resources from the removal of existing shoreline features would include temporary turbidity from pile and bulkhead removal, potential for releasing debris into the water, noise from machinery, and potential spills of harmful materials from machinery. As part of future state and federal permitting, measures would be taken to avoid and minimize these potential impacts.

Removal of existing piers could cause minor, temporary, localized turbidity during removal of piles. As with pile driving, this turbidity would also be expected to be below levels that would impact aquatic species. Debris from removed or demolished in-water elements could be accidentally released into the water during demolition and removal of existing piers and docks. There is a small risk of accidental spills of chemicals occurring in conjunction with machinery operation.

Two new transient moorage floats would be constructed parallel to the southern edge of the Whatcom Waterway, including 64 new piles and 32,400 sq ft of overwater coverage (31,200 sq ft of which would be over subtidal habitat). These floats would be similar to those constructed in Area 1 (located parallel to the northern edge of the Whatcom Waterway), and construction impacts would be similar to those described in Area 1.

Area 3

Upland

Under Alternative 1, the 25 ft wide shoreline vegetation buffer, Historic District Park, Pocket Park, and habitat restoration would be constructed by 2016. These elements would encompass 1.63 acres. Additionally, building demolition, building construction, parking development, ground disturbance, paving, road construction, moving the railroad, upgraded or reconstructed stormwater outfalls, and vehicle/machinery use associated with upland construction would occur. Vegetation in Area 3 would

increase through the installation of trees and other vegetation in association with the 25 ft wide shoreline vegetation buffer and the new parks and trails. Enhancement of vegetation would benefit upland habitat in an area that is essentially devoid of vegetation, with habitat function benefits similar to those described for Area 1. These elements would be constructed in existing paved/unvegetated areas and would not result in construction impacts to habitat.

Any stormwater runoff resulting from ground disturbance during construction would have the potential create temporary turbidity. BMPs would be implemented as described in Area 1

Aquatic

See discussion of aquatic impacts under Area 2.

Area 4

Upland

Under Alternative 1, the 25 ft wide shoreline vegetation buffer, construction of Waterfront Park, and habitat restoration would occur by 2016. These would encompass 4.87 acres. Additionally, building demolition, building construction, parking development, ground disturbance, paving, road construction, moving the railroad, upgrades to or reconstruction of stormwater outfalls, and vehicle/machinery use associated with upland construction would occur. The only habitat present in Area 4 is the limited band of non-native vegetation along the shoreline of the log pond area. Construction of the 25 ft wide shoreline vegetation buffer would replace this limited habitat by native riparian species. This vegetation would provide similar riparian habitat benefits as described in Area 2. Upland construction elements would be constructed in existing paved/unvegetated areas and would not result in construction impacts to habitat.

Any stormwater runoff resulting from ground disturbance during construction would have the potential create temporary turbidity. BMPs would be implemented as part of the stormwater construction permit.

Aquatic

See discussion of aquatic impacts under Area 2.

Area 5

Upland

Upland work to occur prior to 2016 includes moving the railroad to the southeastern portion of Area 5, building demolition, building construction, ground disturbance, paving, road construction, moving the railroad, upgrades to or reconstruction of stormwater outfalls, and vehicle/machinery use associated with upland construction. Some buildings in Area 5 would be retained and reused. These elements would have negligible impacts on upland habitat.

Since the proposed developments in Area 5 (relocated railroad right-of-way, extended or improved roads) would result in similar conditions as the existing conditions and plants and wildlife habitat in Area 5 are extremely limited, no

construction impacts to habitat are anticipated. The installation of landscaping would improve upland habitat conditions in a similar manner as described in Area 1.

Aquatic

Not applicable.

Area 6

Upland

Landscaping would be installed after the removal of the Encogen facility. This would result in improvements of upland habitat in Area 6, similar to that described in Area 1. The railroad that currently runs along the northwest side of Area 6 would be relocated to the southeast side of Area 7 and would no longer abut Area 6. Since the railroad is already present, and it would move approximately 550 ft to an area that already has railroad infrastructure, no construction impacts to habitat are anticipated in Area 6. Additionally, stormwater outfalls would be upgraded or reconstructed. This would not result in significant construction impacts.

Aquatic

Not applicable.

Area 7

Upland

Alternative 1 calls for the extension of Laurel Street over the proposed railroad, building demolition, building construction, ground disturbance, paving, road construction, vehicle/machinery use associated with upland construction, upgrades to or reconstruction of stormwater outfalls, and moving the existing railroad to the southeast side of Area 7. The new Laurel Street bridge would pass over a section of existing vegetation that would result in negligible impacts to plants and animals in this area. The relocated railroad would utilize existing railroad infrastructure. Railroad bed and track is already present along the southwestern side of Area 7 where the railroad would go. While this existing infrastructure would require upgrades and repairs, little new construction would be necessary. Thus, no construction impacts are expected.

A potential wetland complex is located southeast of Areas 7 and 10 and lies outside the site (Figure 1). Redevelopment actions would be expected to have negligible impacts to off-site wetlands in the complex. Ground disturbance and stormwater runoff could potentially affect this wetland complex during construction but would be managed with BMPs to ensure that sediment does not enter the adjacent wetland complex. The extension of Laurel Street would pass over the northern edge of the vegetated area that contains the wetland complex but would not directly affect any wetlands.

Figure 1. Potential wetland complex (green) (Google Earth)

Aquatic

Not applicable.

Area 8

Upland

Under Alternative 1, the 25 ft wide shoreline vegetation buffer and the Log Pond Park would be constructed by 2016. Log Pond Park would encompass 5.21 acres. Additionally, building demolition, building construction, parking development, ground disturbance, paving, road construction, upgrades to or reconstruction of stormwater outfalls, and vehicle/machinery use associated with construction would occur. The shoreline buffer and park would convert mainly paved/unvegetated areas to parks/open space, with the exception of the limited shoreline vegetation along the bulkhead adjacent to log pond. This vegetation would be replaced with native riparian vegetation. Enhancement of vegetation (shoreline buffer and upland parks) would benefit upland habitat in an area that is essentially devoid of vegetation, with habitat function benefits similar to those described for Area 1. Construction elements

would occur in existing paved/unvegetated areas and would not result in construction impacts to habitat.

Any stormwater runoff resulting from ground disturbance during construction would have the potential create temporary turbidity. BMPs would be implemented as described in Area 1.

Aquatic

The shoreline of the log pond in Area 8 would be restored to beach and marsh habitat. This would benefit aquatic habitat in the vicinity of the Whatcom Creek Estuary. These shoreline habitat restoration actions are implemented pursuant to the habitat restoration/protection objectives listed in Section 1.2.2.

Area 9

Upland

Under Alternative 1, upland work to be completed by 2016 would include building demolition, building construction, parking development, road construction/ improvement, construction of the Beach Park Marine Facility, construction of a walking trail between Log Pond Park and Beach Park Marine Facility, construction of Wharf Street trail from Commercial Street to the shoreline, and moving the railroad. Some buildings in Area 9 would be retained and reused. Parks and trails would encompass 1.68 acres in Area 9. Construction would convert existing paved/ unvegetated area and low quality habitat to parks/open space with the planting of trees and additional vegetation. Upland vegetation and wildlife habitat is extremely limited in Area 9; thus this upland work would have negligible impacts on these features. Vegetation at the site would be increased through the installation of trees and other vegetation in association with the parks and trails. As this would occur in an area that is currently essentially devoid of vegetation, it would benefit upland habitat function. Use of the new or extended road infrastructure would have negligible adverse impacts on plants and wildlife habitat. Construction elements would occur in existing paved/unvegetated areas and would not result in construction impacts to habitat.

Any stormwater runoff resulting from ground disturbance during construction would have the potential create temporary turbidity. BMPs would be implemented as described in Area 1.

Aquatic

The northeast shoreline of the log pond in Area 9 would be restored to beach and marsh habitat, similar to Area 8. Beach habitat in the western shoreline of Area 9 would be restored. These shoreline habitat restoration actions are implemented pursuant to the habitat restoration/protection objectives listed in Section 1.2.2.

Area 10

Upland

Alternative 1 calls for the creation of Cornwall Park, Beach Park Marine Facility, and a trail along the shoreline of Area 10, along with building and parking development

and construction of a stormwater outfall. The park elements would encompass a total of 8.65 acres (most of Area 10) and include ground disturbance and conversion of existing vegetation to parks/open space. Existing non-native weedy vegetation would be replaced with native vegetation through the installation of trees and other vegetation in association with parks and trails. This would convert existing low to moderate quality habitat to moderate quality habitat with the installation of trees and landscaping. Enhancement of vegetation (shoreline buffer and upland parks) would benefit upland habitat in an area that is dominated by non-native weedy vegetation, with habitat function benefits similar to those described for Area 1. Building and parking development would result in ground disturbance and other construction-related impacts. These are expected to have negligible impacts on habitat.

Any stormwater runoff resulting from ground disturbance would have the potential create temporary turbidity. BMPs would be implemented to minimize this risk as described in Area 1.

Site visits did not reveal any evidence of stormwater runoff from the off-site wetland complex reaching the beach in the north end of Area 10, but the runoff may drain to the beach as groundwater. Redevelopment actions in Area 10 would have no impacts on this wetland complex or its associated stormwater runoff. Construction in Area 10 would not alter this system or its drainage. Should surface drainage be apparent, this drainage would be properly managed and directed to the beach.

Aquatic

Beach habitat restoration described in Area 9 would also occur in Area 10 at the foot of Cornwall Street, with similar habitat benefits.

ASB Marina

Upland

Parks/open space would be created on the existing riprap bank, encompassing approximately 0.99 acre. This would provide similar upland habitat as described in Areas 1-9, which does not currently exist at the ASB.

Aquatic

Alternative 1 includes opening the ASB to Bellingham Bay by breaching the berm, creating approximately 28 acres of new aquatic habitat. Alternative 1 also includes a Marina in the ASB (Marina Concept A), as does Alternative 4 (no-action alternative-Marina Concept B). The layout and terrestrial and aquatic habitat implications of the two marinas differ in that more fill would be placed waterward of the breakwater under Alternative 1 than under Alternative 4 (200,000 cubic yards versus 20,000 cubic yards) (see Figure 2-14). Construction impacts of Alternative 1 are the same as Alternative 4 and are not discussed further. See below (Summary of Aquatic Habitat Changes for Alternatives 1-3) for further discussion on habitat.

Alternative 1 includes converting the ASB to a marina that complements mixed use development. Up to 300 piles would be installed to support up to 2.75 acres of floats. Noise associated with pile driving would be similar to that described in Areas 1-4,

although the breakwater would contain the noise to within the ASB marina, which would significantly minimize the potential reach of noise impacts.

Approximately 200,000 cubic yards of fill would be placed along the breakwater to reconfigure the breakwater for a marina and to create shallow aquatic habitat benches. Placement of fill inside the breakwater would be contained within the ASB marina, significantly limiting the potential reach of impacts from turbidity. Placement of fill outside the breakwater would result in temporary turbidity, minor construction noise, and the potential for spills of hazardous material. These impacts would be minimized by BMPs (see Section 3.4.4.9 Mitigation Measures).

Overall, due to its current degraded state and isolation from Bellingham Bay, the redevelopment of the ASB as a marina would result in substantial aquatic habitat benefits through the creation of new aquatic habitat, removal of existing contaminated sediments, and construction of beach habitat.

4.1.2 Summary of Aquatic Habitat Changes for Alternatives 1-3

Substantial overall benefits to aquatic habitat in the site would result from redevelopment. Redevelopment activities under Alternatives 1-3 include a reduction in overwater coverage, removal of creosote-treated piles, reduction of steel piles, conversion of bulkhead or riprap to sloped shoreline, and extensive riparian and aquatic habitat restoration/enhancement.

4.1.2.1 Pedestrian Bridge

The pedestrian bridge between Areas 1 and 3 would be constructed over Whatcom Waterway to connect the proposed trail system north of Whatcom Waterway to the trail system south of the Waterway. The bridge would be approximately 500 ft long by a maximum of 20 ft wide. No in-water structures would be required for the bridge, as it is assumed that the bridge would span the waterway. The bridge would be elevated above the water and would open (vertically or horizontally) to allow passage of large boats to moor at the transient moorage to be constructed along Areas 2-4. The bridge would be designed to be as transparent as possible to minimize interference with views. Due to its height above the water, the bridge would not have significant shading impacts on the water, as would typically occur with a pier or dock. The bridge would encompass a maximum of approximately 0.23 acre.

4.1.2.2 Changes in Overwater Coverage

Existing overwater structures along the south side of the Whatcom Waterway would be removed, which currently encompass 2.27 acres. 1.59 acres of this is over intertidal or shallow subtidal habitat and 0.68 acre over subtidal habitat. 560 creosote-treated piles would be removed; 392 of these are in shallow subtidal habitat, and 168 are in subtidal. 430 steel piles would be removed; 301 from shallow subtidal habitat and 129 from subtidal habitat.

New transient moorage floats would be constructed along Area 1 and Areas 2-4. The floats are designed to minimize impacts on aquatic habitat. The floats would be positioned offshore in subtidal habitat rather than in shallow subtidal habitat to minimize shading impacts on nearshore habitat. The floats along Area 1 would result

in 0.74 acre of overwater coverage, 0.72 acre of which would be over subtidal habitat (deeper than -10 ft MLLW), and 0.02 acre over intertidal/shallow subtidal habitat (shallower than -10 ft MLLW). These floats would require 64 new piles. The floats along Areas 2-4 would also result in 0.74 acre of overwater coverage, 0.72 acre of which would be over subtidal habitat (deeper than -10 ft MLLW), and 0.02 acre over intertidal/shallow subtidal habitat (shallower than -10 ft MLLW). These floats would also require 64 new piles.

The result of these actions would be a substantial net reduction (1.5 acres) of overwater coverage in intertidal/shallow subtidal habitat within Whatcom Waterway. The majority of overwater coverage would occur in subtidal habitat, which would increase by 0.8 acre. These actions would substantially benefit aquatic habitat in Whatcom Waterway.

The small increase in overwater coverage in the subtidal zone is unlikely to affect rates of primary productivity through light attenuation. Further, the proposed moorage dock is narrow enough that substantial light would penetrate under it from the margins. Overall, it is unlikely that the project would result in decreased primary productivity at the site due to the small increase in area of the transient moorage and its location over subtidal habitat.

4.1.2.3 Shoreline Habitat Restoration/Enhancement

The bulkhead in Area 1 and Areas 2-4 would be replaced with a "softened" sloped shoreline along 0.46 miles of shoreline in Whatcom Waterway. This would substantially benefit aquatic habitat in the Whatcom Waterway estuary and be consistent with the habitat restoration/protection objectives listed in Section 3.4.1.2.

Beach habitat restoration would occur in Area 1 (at the head of I & J Waterway), Areas 8 & 9 (in the log pond), and in Area 10 (at the shoreline near Cornwall Street/Commercial Street extension). Shoreline habitat in Area 10 would be improved through the conversion of riprap shoreline to finer substrate and planting of riparian vegetation along the shoreline. This would represent substantial aquatic habitat benefits and be consistent with the habitat restoration/protection objectives listed in Section 3.4.1.2 by restoring/enhancing the degraded Whatcom estuary to support salmonids and salmonid prey.

4.1.2.4 New Aquatic Habitat

The redevelopment of the ASB as a marina (Concept A) would yield approximately 28 acres of new aquatic habitat in the immediate vicinity of the Whatcom Waterway Estuary. The action would create approximately 4.70 acres of new intertidal and shallow subtidal aquatic habitat, 0.01 acre of which would be covered by structures. The action would create approximately 23.30 acres of new subtidal aquatic habitat, 2.77 acres of which would be covered by structures. Shallow habitat benches would be created around the perimeter of the ASB breakwater to benefit juvenile salmonids. A fish passage would be created in the breakwater at the opposite end from the entrance to the marina to facilitate fish migration. This would represent a significant benefit to aquatic habitat and would be consistent with the habitat restoration/protection objectives listed in Section 3.4.1.2 by providing a substantial

net gain in aquatic area and by enhancing salmonid and salmonid prey rearing habitat.

Table 2. Changes in aquatic habitat associated with Alternatives 1-4

	Alternatives 1-3, Marina Concept A	Alternative 4 (No Action), Marina Concept B
New Intertidal & Shallow Subtidal Habitat (ASB converted to Marina)		
not covered by structures (acres)	4.69	3.69
covered by structures (acres)	0.01	0.01
New Subtidal Habitat (ASB converted to Marina)		
not covered by structures (acres)	20.53	21.09
covered by structures (acres)	2.77	3.21
Changes to Intertidal & Shallow Subtidal Habitat[1]		
Net reduction in overwater coverage (acres)	1.53[2]	0
slope or substrate enhanced (acres)	0.88[3]	0
Changes to Subtidal Habitat[1]		
Net increase in overwater coverage (acres)	0.75[4]	0
slope or substrate enhanced (acres)	0	0
Creosote piles removed[1] (number)	560	0

[1]Will occur in Whatcom Waterway.

[2]Includes removal of 1.59 acres of intertidal/shallow subtidal coverage through demolition of South Whatcom Waterway pier/wharfs and 0.06 acre of new intertidal/shallow subtidal coverage from ramps associates with transient moorage float ramps: **overall decrease in intertidal/shallow subtidal coverage is 1.53 acres.**

[3]1,500 ft of shoreline by 70 ft wide (below MHHW) along south Whatcom Waterway would be enhanced by creating a shallower slope along with pier/wharf/bulkhead removal. Total area of slope or substrate enhancement would be **2.41 acres**, most of which is under the area where intertidal/shallow subtidal overwater coverage will be reduced. To avoid double-counting this area, this total includes only the enhanced slope area that is not included in net reduction of overwater coverage (2.41 minus 1.53).

[4]Includes removal of 0.68 acre of subtidal coverage through demolition of South Whatcom Waterway pier/wharfs and 1.43 acres of new subtidal coverage from transient moorage floats and ramps: **overall increase in subtidal coverage is 0.75 acres.**

4.1.3 Alternative 2

Alternative 2 would result in similar or lower density of upland construction in the redevelopment areas as compared to Alternative 1 by 2016. Only the differences in upland construction from Alternative 1 are listed below; otherwise, upland construction impacts should be assumed to be identical to Alternative 1. In general, less acreage of parks would be constructed in the upland under Alternative 2 than Alternative 1, resulting in less habitat benefits. In-water construction is similar for all alternatives (with the exception of the pedestrian bridge over Whatcom Waterway) except the no-action alternative (Alternative 4), thus no aquatic impacts are discussed for Alternatives 2, 2A, and 3.

Area 1

Upland work in Area 1 under Alternative 2 would differ from Alternative 1 in that the Broadway Overpass would not be built and the I & J Waterway Park would not be built. Other features would be similar to Alternative 1 and construction impacts would be similar to Alternative 1. However, less parks/open space would be created, resulting in less upland habitat benefits than Alternative 1. This would still represent an improvement over the existing conditions.

Area 2

Initial upland work in Area 2 would differ from Alternative 1 in that the 2.3 acre Mill Reserve Park/shoreline buffer would not be built. Also, existing buildings that would be demolished under Alternative 1 would remain under Alternative 2. Construction impacts would be similar to Alternative 1. However, less parks/open space would be created, resulting in less upland habitat benefits than Alternative 1. This would still represent an improvement over the existing conditions.

Area 3

Initial upland work in Area 3 would be similar to Alternative 1. The 0.94 acre Historic District Park would not be built under Alternative 2, which would be built under Alternative 1. Also, existing buildings that would be demolished under Alternative 1 would remain under Alternative 2. Construction impacts would be similar to Alternative 1. However, less parks/open space would be created, resulting in less upland habitat benefits than Alternative 1. This would still represent an improvement over the existing conditions.

Area 4

Initial upland work in Area 4 would be similar to Alternative 1. The 3.65 acre Waterfront Park would not be built under Alternative 2, which would be built under Alternative 1 after 2016. Construction impacts would be similar to Alternative 1. However, since less parks/open space would be created, Alternative 2 would have less upland habitat benefits than Alternative 1. This would still represent an improvement over the existing conditions.

Area 5

Initial upland work in Area 5 would be similar to Alternative 1 with the exception that one building that would be demolished under Alternative 1 would be retained under Alternative 2.

Area 6

Initial upland work in Area 6 would be similar to Alternative 1.

Area 7

Initial upland work in Area 7 would be similar to Alternative 1. The Wharf Street Flyway would not be built under Alternative 2, and it would be built after 2016 under Alternative 1. This is discussed below under “Balance of Construction Impacts”.

Area 8

Initial upland work in Area 8 under Alternative 2 would differ from Alternative 1 in that the Log Pond Park would be only 0.64 acre as opposed to 5.21 under Alternative 1. Construction impacts would be similar to Alternative 1. However, since less parks/open space would be created, Alternative 2 would have less upland habitat benefits than Alternative 1. This would still represent an improvement over the existing conditions.

Area 9

Initial upland work in Area 9 under Alternative 2 would be similar to Alternative 1, with the exception that the 0.14 acre Wharf Street Trail from the Wharf Street Flyway to Commercial Street would not be built. Construction impacts would be similar to Alternative 1.

Area 10

Upland work in Area 10 under Alternative 2 would be similar to Alternative 1 with the exception that Cornwall Park would be 0.77 acre smaller. Construction impacts would be similar to Alternative 1. However, since less parks/open space would be created, Alternative 2 would have less upland habitat benefits than Alternative 1. This would still represent an improvement over the existing conditions.

ASB Marina

Upland work in the ASB marina under Alternative 2 would be similar to Alternative 1.

4.1.4 Alternative 2A

Construction impacts under Alternative 2A would be similar to Alternative 2 except that the initial construction impacts related to moving the railroad (including Laurel Street extension/bridge through Area 7) would not occur until after 2016. Impacts of moving the railroad would be the same as Alternatives 1 and 2.

4.1.5 Alternative 3

Alternative 3 represents the lowest density of development and least initial construction impact of all alternatives except the No Action Alternative (Alternative 4). Prior to 2016, upland work that would occur would be all proposed upland parks/trails, and some of the proposed road/bridge construction/improvements in Areas 1-7 and 10. As mentioned above, all aquatic work would be constructed by 2016 and would be identical to Alternatives 1 & 2, with the exception of the pedestrian bridge over Whatcom Waterway, which would not be constructed under Alternative 3.

Area 1

Under Alternative 3, the I & J Waterway Park, Warehouse Trail and the Whatcom Waterway pedestrian bridge would not be constructed. Therefore, construction impacts would be slightly less under Alternative 3 than Alternatives 1 or 2. However, habitat benefits of enhanced vegetation would also be less than Alternative 1 since I & J Waterway Park would not be constructed. Habitat benefits would be similar to Alternative 2.

Area 2

Under Alternative 3 in Area 2, road upgrades would occur after 2016. The Mill Reserve Park proposed under Alternative 1 would not be constructed under Alternative 3. The railroad would not be moved from its current location. Construction impacts under Alternative 3 would be similar to Alternatives 1 and 2. However, habitat benefits of enhanced vegetation would be less than Alternative 1 since Mill Reserve Park would not be constructed. Habitat benefits would be similar to Alternative 2.

Area 3

Under Alternative 3 in Area 3, upgrades to Bay Street and construction of the Waterway Promenade would occur after 2016. The Historic District Park proposed under Alternative 1 would not be constructed under Alternative 3. The railroad would not be moved from its current location. These elements would result in similar construction impacts as Alternative 1. However, habitat benefits of enhanced vegetation would be less than Alternative 1 since the Historic District Park would not be constructed. Habitat benefits would be similar to Alternative 2.

Area 4

Under Alternative 3 in Area 4, the Waterfront Park would be a trail rather than the trail/park that is proposed under Alternative 1. No significant additional construction impacts are expected. However, habitat benefits of enhanced vegetation would be less than Alternative 1, since Waterfront Park would not be constructed. Habitat benefits would be similar to Alternative 2.

Area 5

With the exception of the railroad remaining in place, construction impacts would be similar to Alternative 1.

Area 6

With the exception of the railroad remaining in place, construction impacts would be similar to Alternative 1.

Area 7

With the exception of the railroad remaining in place, construction impacts would be similar to Alternative 1.

Area 8

Under Alternative 3 in Area 8, the 5.21 acre Log Pond Park would not be built, the railroad would not be moved, the extension/construction of Commercial Street through Area 8 would occur, and the extension/construction of Log Pond Drive would occur after 2016. Construction impacts under Alternative 3 would be similar to Alternatives 1 and 2. However, habitat benefits of enhanced vegetation would be less than Alternative 1, since Log Pond Park would not be constructed. Habitat benefits would be similar to Alternative 2.

Area 9

Under Alternative 3 in Area 9, Commercial Street would not be extended through Area 9, the Wharf Street Flyway would not be built, and Oak Drive would be constructed after 2016. The railroad would not be moved. Construction impacts would therefore be slightly less than Alternative 1. Habitat benefits would be similar to Alternatives 1 and 2.

Area 10

Under Alternative 3 in Area 10, Cornwall Park would not be constructed. Therefore, construction impacts on habitat would be less under Alternative 3 than Alternatives 1 and 2. However, the positive impacts to habitat (such as removing weedy/invasive vegetation) that would occur through construction Cornwall Park would also not occur.

ASB Marina

Upland work in Area 11 under Alternative 3 would be similar to Alternatives 1 and 2.

4.1.6 Alternative 4 (No Action)

Alternative 4 is the No-Action Alternative. Under the No-Action Alternative, the only upland work that would occur is the upgrades to Hilton, Maple, C, and F Streets in Area 1, the upgrade to Chestnut and the Chestnut and Bay Bridges in Area 2, and the pedestrian bridge from Cornwall Park to Boulevard Park. Only select aquatic work would occur, such as replacement of a bulkhead with sheet pile in the south side of Whatcom Waterway and installation of fenders and bollards. A higher density ASB marina would be constructed (Concept B) with less aquatic habitat and more slips, although construction impacts associated with the ASB Marina Concept B would be similar to the marina constructed under Alternatives 1-3. Therefore, Alternative 4 yields the least overall construction impacts of all alternatives. However, Alternative 4 does not yield the substantial upland and aquatic habitat benefits that would occur for Alternatives 1-3.

Areas 1-8

No upland or aquatic work would occur. Therefore, initial construction impacts associated with upland and aquatic work under Alternatives 1-3 would not occur.

Area 9

No upland work would occur. Aquatic work in Area 9 under the No Action Alternative would be limited to replacement of 400 linear ft of existing bulkhead with sheet piling, 21 H-pile supports installed at 20 ft intervals to support the sheet pile, and 3,000 cubic yards of backfill placed waterward of MHHW, which would cover 8,000 sq ft below MHHW. These activities would result in similar impacts as described in Area 2 under Alternative 1 associated with bulkhead removal, including turbidity and the potential for debris release. Pile driving would occur with an impact hammer, resulting in significant noise in the vicinity of the work. These impacts would not occur under Alternatives 1-3.

Area 10

No upland or aquatic features would be built. Thus, upland impacts associated with trail and park creation would not occur. However, the benefits of removing weedy/invasive vegetation would also not occur.

ASB Marina

Construction impacts of Marina Concept B would be similar to Marina Concept A under Alternatives 1-3. However, more boat slips would be constructed under Marina Concept B than Marina Concept A (up to 600 rather than up to 460 under Concept A), also resulting in greater area of new aquatic habitat in the marina covered by docks (3.22 acres as opposed to 2.78 acres) and one-tenth of the fill would be placed along the breakwater outside of the marina (20,000 cubic yards as opposed to 200,000 cubic yards under Alternatives 1-3) for reconfiguring of the breakwater as a marina. Therefore, initial construction impacts in the ASB under Alternative 4 would be less than Alternatives 1-3. However, the habitat benefits of park/open space creation on the ASB breakwater would not occur.

4.2 2026

The balance of redevelopment construction includes those elements that would be constructed after 2016 and by 2026. Only the impacts from those elements are discussed below. All aquatic work and all parks/trails would be constructed prior to 2016; therefore, they are not discussed further.

4.2.1 Alternative 1

Areas 1-4

All work in Areas 1-4 would be completed prior to 2016; thus, no additional construction impacts would occur.

Area 5

In Area 5 after 2016, the extension of Commercial Street over the proposed railroad through to Area 5 would pass over approximately 4,500 sq ft of existing vegetation and marginal wildlife habitat on the hill slope above Area 5. No significant adverse impacts are expected.

Area 6

Several buildings would be demolished in Area 6 after 2016. Construction impacts of this on habitat are expected to be negligible, as Area 6 and its surrounding area contains virtually no habitat.

Area 7

In Area 7 after 2016, the Wharf Street Flyway would be constructed through Area 7. The Wharf St. Flyway would pass through the vegetated area southeast of Area 7 in the southwest portion of the complex. This area is a narrow band of vegetation between an existing road and the railroad side-track in Area 7, including big-leaf maple and Himalayan blackberry. The affected vegetation does not provide

substantial upland habitat. Adverse construction impacts would be minor, but would reduce the area of this low quality habitat.

Area 8

In Area 8 after 2016, Log Pond Drive would be constructed from the corner of Commercial St. and Laurel St. to Oak St and Commercial St. would be extended through Area 8 to Area 9. Any adverse construction impacts of building these roads would be negligible.

Area 9

In Area 9 after 2016, upland work would include construction, extension, or improvements of Oak Street, Commercial Street, and Flyway Street into Area 9. Construction of these roads would have negligible impacts.

Area 10

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

ASB Marina

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

4.2.2 Alternative 2

Only the differences in upland construction from Alternative 1 are listed below; otherwise, upland construction impacts are similar to Alternative 1. All parks/trails would be constructed prior to 2016, and in-water construction is the same for all alternatives except the No-Action Alternative (Alternative 4). Thus, they are not discussed further.

Area 1

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

Area 2

The only work that would occur in Area 2 after 2016 would be the construction of Maple Street from Commercial Street to Waterway Promenade. Construction impacts of this would be negligible.

Area 3

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

Area 4

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

Area 5

The only work that would occur in Area 5 after 2016 would be the construction of Commercial Street through Area 5. Construction impacts of this would be negligible.

Area 6

Construction impacts in Area 6 are similar to Alternative 1.

Area 7

Under Alternative 2, the Wharf Street Flyway that is proposed under Alternative 1 after 2016 would not be built at all. This would result in slightly lower construction impacts on vegetation and marginal wildlife habitat under Alternative 2 than Alternative 1.

Area 8

Construction in Area 8 after 2016 would be similar to Alternative 1 with the construction of Commercial Street and Log Pond Drive.

Area 9

Construction in Area 9 after 2016 would differ from Alternative 1 in that Commercial Street and the Wharf Street Flyway would not be built. Thus, construction impacts would be slightly less than Alternative 1, but this difference would be negligible.

Area 10

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

ASB Marina

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

4.2.3 Alternative 2A

Construction impacts under Alternative 2A would be identical to Alternative 2 except that the moving of the railroad corridor would be delayed, occurring by 2026 rather than by 2016. This would not result in any adverse impacts.

4.2.4 Alternative 3

Area 1

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

Area 2

Work that would occur in Area 2 after 2016 under Alternative 3 would be the construction/extension of Central Street, Bay Street, Waterway Promenade, and Maple Street. Construction impacts of this would be negligible.

Area 3

Work that would occur in Area 3 after 2016 under Alternative 3 would be the construction/extension of Bay Street and Waterway Promenade through Area 3. The railroad would not be moved from its current location. These elements would result in slightly lower construction impacts than Alternative 1, although the difference would be negligible.

Area 4

All work would be completed prior to 2016; thus, no additional construction impacts would occur.

Area 5

Under Alternative 3, the railroad right-of-way would not move; the extension of Commercial Street that would have affected existing vegetation under Alternatives 1 and 2 would not occur. Thus, construction impacts under Alternative 3 would be slightly lower than Alternatives 1 and 2.

Area 6

Construction impacts in Area 6 after 2016 would be similar to Alternatives 1 and 2.

Area 7

No construction impacts on vegetation or wildlife habitat are anticipated in Area 7 under Alternative 3. The proposed extension of Laurel Street over the railroad right-of-way would not occur, thus reducing construction impacts on plants and wildlife habitat as compared to Alternatives 1 and 2. Further, the Wharf Street Flyway proposed under Alternative 1 would not be constructed, similar to Alternative 2.

Area 8

Under Alternative 3 in Area 8 the railroad would not be moved and extension/construction of Commercial Street and Log Pond Drive through Area 8 would not occur. Construction impacts under Alternative 3 would be slightly lower than Alternative 1, though the difference would be negligible.

Area 9

Under Alternative 3 in Area 9, the railroad would not be moved and the Wharf Street Flyway that is proposed under Alternative 1 would not be built. Construction impacts in Area 9 would therefore be slightly less than Alternative 1, though the difference would be negligible.

Area 10

All work would be completed prior to 2016; thus, no additional construction impacts would occur. Construction impacts would be similar to Alternatives 1 and 2.

ASB Marina

Upland work in Area 11 under Alternative 3 would be similar to Alternatives 1 and 2.

4.2.5 Alternative 4 (No Action)

Alternative 4 is the No-Action Alternative. Under Alternative 4, all work would occur prior to 2016.

5 OPERATION IMPACTS

5.1 Alternative 1 (Higher Density Alternative)

5.1.1 2016 Impacts

Area 1

Upland

Alternative 1 would result in a reduced industrial use of Area 1, including the cessation of upland industrial operations, which would represent positive operational impacts.

Aquatic

Three stormwater outfalls would be constructed in Area 1 to service the site (outfalls F, G, and H; see Table 3; A.C. Kindig & Co. 2007). Two of these would be constructed next to existing outfalls (G and H) and one would be new (F). Stormwater originating on all pollution-generating surfaces would be treated prior to discharge. Stormwater originating from roofs constructed with inert materials would be conveyed directly to outfalls, as these are not considered pollution-generating surfaces. New stormwater infrastructure would improve overall quality of water discharged into Bellingham Bay compared to existing conditions, representing operational benefits to Area 1. Existing stormwater outfalls that service off-site stormwater collection would not be affected.

Overall boat traffic in Whatcom Waterway is not expected to change as a result of the Project. The use of new transient moorage floats would result in recreational boat traffic, but the Project would also eliminate the existing industrial boat traffic. This is expected to offset any increases in boat traffic associated with transient moorage floats. Wakes produced by recreational boaters are expected to be smaller than those produced by natural wind-driven waves (Anchor 2007a). Further, since the current industrial boat traffic in Whatcom Waterway would be replaced with smaller recreational boats as a result of this Project, wake sizes would also be reduced. Recreational boat traffic, like industrial boat traffic, has a very small risk of disturbing Southern Resident orca whale. See "ASB/Marina" section below for a further discussion on the potential for whale disturbance.

Area 2

Upland

No upland operational impacts are expected to occur.

Aquatic (applies to Areas 2-4)

Three stormwater outfalls would be constructed in Areas 2-4 to service the site (outfalls A, B, and C; see Table 3). One of these would be constructed next to an existing outfall (outfall B) and would be shared by Areas 1-3. Two would be new; one located in Area 2 (outfall A) and one in Area 4 (outfall C). Stormwater would be treated as described under Area 1 and would represent similar operational benefits to water quality. Existing stormwater outfalls that service off-site stormwater collection would not be affected.

The use of new transient moorage floats would present operational impacts similar to those discussed under Area 1.

Area 3

Upland

No upland operational impacts are expected to occur.

Aquatic

See discussion of aquatic operation impacts under Area 2.

Area 4

Upland

No upland operational impacts are expected to occur.

Aquatic

See discussion of aquatic operation impacts under Area 2.

Area 5

Upland

No upland operational impacts are expected to occur.

Aquatic

Area 5 would share new outfalls A and B with Area 2. Stormwater would be treated as described under Area 1 and would represent similar operational benefits to water quality. Existing stormwater outfalls that service off-site stormwater collection would not be affected.

Area 6

Upland

No upland operational impacts are expected to occur.

Aquatic

One new outfall would be constructed in Area 6 (outfall E), which would be constructed next to an existing outfall (Table 3). Area 6 would also share new outfall C with Area 4. Stormwater would be treated as described under Area 1 and would represent similar operational benefits to water quality. Existing stormwater outfalls that service off-site stormwater collection would not be affected.

Area 7

Upland

A forested wetland complex is present immediately southeast of Area 7, adjacent to where the railroad would be moved. This complex would not be significantly impacted by upland site operations. Pervious surfaces would not increase. Overall, post-project operational conditions would be similar to existing conditions.

Aquatic

Area 7 would share new outfall B with Areas 2-5 and new outfall E with Areas 5 and 6 (Table 3). Stormwater would be treated as described under Area 1 and would represent similar operational benefits to water quality. Existing stormwater outfalls that service off-site stormwater collection would not be affected.

Area 8

Upland

No upland operational impacts are expected to occur.

Aquatic

Area 8 would share new outfall B with Areas 2-5 and 7, new outfall C with Areas 4 and 6, and new outfall E with Areas 5-7. Stormwater would be treated as described under Area 1 and would represent similar operational benefits to water quality. Existing stormwater outfalls that service off-site stormwater collection would not be affected.

Area 9

Upland

No upland operational impacts are expected to occur.

Aquatic

Existing outfall D would be re-constructed to service Area 9. Area 9 would also share new outfall E with Areas 5-8. Stormwater would be treated as described under Area 1 and would represent similar operational benefits to water quality. Existing stormwater outfalls that service off-site stormwater collection would not be affected.

Area 10

Upland

No upland operational impacts are expected to occur.

Aquatic

Stormwater in Area 10 would be served by multiple linear dissipaters. Potentially each building could have its own dispersion trench constructed above the mean high water elevation.

ASB Marina

Upland

No upland operational impacts are expected to occur.

Aquatic

Bellingham Bay is located within Southern Resident orca whale Specific Area 1: Core Summer Areas (NOAA 2006). This area encompasses the portion of Puget Sound bordered to the north and west by the U.S./Canadian border and south to include the waters surrounding the San Juan Islands, the U.S. portion of the Southern Strait of

Georgia, and areas directly offshore of Skagit and Whatcom Counties. Approximately 85% of Southern Resident orca whale sightings occur in Area 1 rather than Areas 2 and 3, although the vast majority of Area 1 sightings occur around and west of the San Juan Islands.

The increased boat traffic resulting from the transient moorage mentioned above may result in a slightly increased risk of Southern Resident orca whale disturbance through more small recreational vessels traveling through their core habitat. However, it is anticipated that the increase in small vessel traffic would be offset by a decrease in large vessel traffic associated with industrial uses as a result of redevelopment (Anchor 2007a). Therefore, no significant increase in risk of disturbance on Southern Resident orca whale is expected. Further, NOAA has guidelines for whale watching boats to minimize disturbance to whales. The Port would address this potential by educating boaters through NOAA guidance and subsequent updates on how to avoid disturbing Southern Resident orca whales.

Under Alternative 1, the ASB Marina would include up to 460 boat slips. Operation of the marina could cause impacts to aquatic habitat typical of a marina, such as the potential for accidental spills of harmful materials and boat wakes. The marina would adhere to the guidelines found in the Resource Manual for Pollution Prevention in Marinas (Ecology 1998). These guidelines, based on international, federal and state laws, focus on reducing pollution such as discharge of oil or oil-based products during engine maintenance/repair and operation, hazardous materials used on-board or during repairs, trash and plastics, spill prevention/response, and the introduction of exotic species.

Boats utilizing the ASB marina would produce wakes as they enter and exit the marina. Boat wakes can cause erosion due to the elevated wave action on the shore. These wakes could potentially affect new sloped shoreline in Whatcom Waterway in Redevelopment Areas 2-4, 8 and 9. However, wakes are expected to be smaller than natural wind-driven waves in Bellingham Bay, as the marina would be utilized by small boats that produce small wakes (Anchor 2007a). Wakes and natural waves can be additive under some circumstances, but boat traffic is typically low during periods of high waves (Anchor 2007b). Wakes would be further minimized by nearshore speed restrictions (Anchor 2007a). Impacts from these wakes on the redeveloped shorelines are expected to be negligible.

Summary of Stormwater Impacts

Stormwater treatment/outfall facilities in Areas 1-10 would be updated as part of the Redevelopment Actions. Basic stormwater treatment could be provided by any type of facility meeting Basic criteria under the 2005 Washington Department of Ecology *Stormwater Management Manual for Western Washington* (Ecology 2005). The most probable facility types are likely to be wet vaults, bioretention facilities (which also qualify as an Enhanced Treatment), biofiltration swales, and filter strips (A.C. Kindig & Co. 2007). It was concluded that with the proper employment of construction best management measures, the site could adequately prevent long term or severe turbidity impacts to surface waters during construction that would adversely affect downstream habitat. Monitoring, site cleanup, and on-site inspections as required by

the NPDES permit would be expected to locate and rectify problems shortly after their occurrence, or prevent them altogether (p. 3-9; A.C. Kindig & Co. 2007).

Stormwater outfalls could represent a beneficial operational impact in that they could be sited to provide a freshwater input source for maintaining saltmarsh vegetation along the shoreline.

Table 3. New outfalls to serve Redevelopment Areas 1 through 10 (A.C. Kindig & Co. 2007)

Outfall	Redevelopment Area									
	1	2	3	4	5	6	7	8	9	10
A		●			●[1]					
B		●	●	●	●[1]		●[1]	●[1]		
C				●		●[1]		●		
D									●	
E					●[2]	●	●	●	●	
F	●									
G	●									
H	●									
Area 10										●

[1] Not under Alternative 3 or 4
[2] Not under Alternative 1

Because of updated stormwater treatment facilities, Alternatives 1 through 3 would result in an improvement in the overall water quality discharged to Bellingham Bay in comparison with existing conditions. All stormwater parameters would be well within marine quality standards and well within background conditions in Bellingham Bay, with the exception of fecal coliform. However, given that there is presently no stormwater quality treatment for runoff that would remove fecal coliform, all alternatives are likely to represent a near-comparable source of fecal coliform to the existing industrial conditions (A.C. Kindig & Co. 2007).

5.1.2 2026 Impacts

All redevelopment elements that could result in upland or aquatic operational impacts would occur prior to 2016.

5.2 Alternative 1A (Higher Density Alternative with Retention of Existing Cogeneration Plant)

2016 and 2026 impacts in vegetation and wildlife habitat would be similar to Alternative 1.

5.3 Alternatives 2 and 2A (Medium Density Alternative)

5.3.1 2016/2026 Impacts

Upland operational impacts would be similar for Alternatives 1-3 in both the 2016 and 2026 evaluation. Aquatic operational impacts under Alternatives 2 and 2A would be similar to Alternative 1 in all Redevelopment Areas in both the 2016 and 2026 evaluation. Alternatives 2 and 2A are medium density redevelopment Alternatives, and thus represent a mid-point between Alternatives 1 and 3 concerning stormwater management and resulting water quality impacts. Since no adverse impacts are

forecast under Alternatives 1 and 3, the intermediate Alternatives 2 and 2A are unlikely to have adverse impacts.

5.4 Alternative 3 (Lower Density Alternative)

Upland operational impacts under Alternative 3 would be similar to Alternative 1 in both the 2016 and 2026 evaluation, and thus are not discussed further. Aquatic operational impacts under Alternative 3 would differ from Alternative 1 only in stormwater management, as discussed below. Outfalls would only differ from Alternative 1 in Areas 5-8, thus only these areas are discussed.

5.4.1 2016/2026 Impacts

Area 5

Because of the lower concentration of development proposed under Alternative 3, Area 5 would use one outfall rather than two. New outfalls A and B would not be used by Area 5 as would occur under Alternative 1. Instead, Area 5 would share new outfall E with Areas 6-9.

Area 6

Because of the lower concentration of development proposed under Alternative 3, Area 6 would use one outfall rather than two. New outfall C would not be used by Area 6 as would occur under Alternative 1. Area 6 would still share new outfall E with Areas 5 and 7-9.

Area 7

Because of the lower concentration of development proposed under Alternative 3, Area 7 would use one outfall rather than two. New outfall B would not be used by Area 7 as would occur under Alternative 1. Area 7 would still share new outfall E with Areas 5-6 and 8-9.

Area 8

Because of the lower concentration of development proposed under Alternative 3, Area 8 would use two outfalls rather than three. New outfall B would not be used by Area 8 as would occur under Alternative 1. Area 8 would still share new outfall C with Area 4 and outfall E with Areas 5-7 and 9.

5.5 Alternative 4 (No Action Alternative)

5.5.1 2016/2026 Impacts

Under Alternative 4, upland operational impacts would be similar to the existing conditions in all Redevelopment Areas. Aquatic operational impacts would occur in association with boat use of the ASB marina. These would be similar to operational impacts described under Alternatives 1-3, although the ASB Marina would include more slips (up to 600 rather than up to 460 as in Marina Concept A). Thus, small recreational boat use would be slightly greater, but no significant difference in potential impacts would be expected.

Under Alternative 4, operational impacts on water quality resulting from stormwater management would be different compared to Alternatives 1-3. These are discussed on a Project-site basis, since impacts would be similar in all Redevelopment Areas.

Alternative 4 would result in a change in water quality from the existing condition on a site-wide basis as allowed under the existing industrial use zoning. Analysis of this industrial alternative indicates it would have poorer water quality for dissolved metals than under Alternatives 1-3, though still within state standards and except for zinc within or near background (A.C. Kindig & Co. 2007). Fecal coliforms would be lowest under this alternative because industrial use has the fewer human-induced causes than all other land use categories except parks. Unlike under the redevelopment alternatives, fecal coliforms would likely be within state water quality standards no matter what type of Basic stormwater treatment facility was employed. Fecal coliform concentrations would be reduced under this alternative relative to existing conditions, because future treatment of stormwater by basic water quality treatment facilities is assumed (A.C. Kindig & Co. 2007).

5.6 Separate Actions

The separate actions that would affect aquatic habitat are:

- Two NOAA piers in the BST in Area 9, with associated floats, fender system, piles, and gangway. These piers would encompass a total of 0.55 acres of intertidal/shallow subtidal coverage and 2.29 acres of subtidal coverage, and include a total of 1,334 piles.
- The Whatcom Waterway north side bulkhead would be replaced with new sheet pile bulkhead and H-piles instead of converting it to sloped shoreline.
- Piers in north Whatcom Waterway would be demolished, removing 0.08 acre of intertidal/shallow subtidal overwater coverage. 10 dolphins would be demolished, which include 40 creosote piles.
- The chemical dock along with associated piles, catwalks, and rail spans in Area 9 would be demolished. This would remove 0.04 acre of intertidal/shallow subtidal coverage and 0.32 acre of subtidal coverage, and 354 creosote piles. 58,000 cubic yards of dredging would occur in this location, including both contaminated and clean sediment.
- New moorage dolphins would be constructed in Area 9, including 120 piles. New catwalks would be constructed, encompassing 0.06 acre of subtidal overwater coverage. Old fender piles, catwalks, and catwalk piles would be demolished, including 121 piles and 0.03 acre of subtidal coverage.
- Two new piers and floats would be constructed in I & J Waterway, encompassing 0.02 acre of intertidal/shallow subtidal coverage and 0.16 acre of subtidal coverage, and 24 piles. 0.22 mile of bulkhead would be replaced with sheet pile bulkhead, including 58 H-piles. Existing piers would be demolished along with associated piles, including 0.15 acre of subtidal coverage and 20 piles.
- An overwater pedestrian trail would be constructed from the western side of Cornwall Park to Boulevard Park. This trail would be approximately 0.4 miles long

and 10 ft wide, and would entail driving piles. The trail would pass over intertidal/shallow subtidal habitat and subtidal habitat, some of which contains scattered eelgrass patches. Impacts to eelgrass from the overwater trail could include damaging eelgrass shoots within the footprint of piles during pile driving and shading of the eelgrass by the trail that could affect photosynthesis.

In addition to the over-water trail, the City is planning a "high-speed" bicycle near the base of the bluff through the perimeter of the site. Construction of this trail could result in minor impacts to existing upland habitat; however, given the general lack of habitat on the site, such impacts would not be significant. This "high-speed" trail would also be subject to a separate environmental review and permitting process in the future.

All separate actions would be subject to applicable local, State, and federal permits and may be subject to separate review.

5.7 Cumulative Impacts

The following table summarizes the cumulative impacts of the Redevelopment Alternatives and the separate actions.

Table 4. Cumulative impacts on aquatic habitat in the Project Area (Alternatives 1-4, separate actions)

	Alternatives 1-3, Marina Concept A	Alternative 4 (No Action), Marina Concept B	Separate Actions	**Totals for Alternatives 1-3 and Separate Actions**
New Intertidal & Shallow Subtidal Habitat (ASB converted to Marina)				
not covered by structures (acres)	4.69	3.69		**4.69**
covered by structures (acres)	0.01	+0.01		**0.01**
New Subtidal Habitat (ASB converted to Marina)				
not covered by structures (acres)	20.53	21.09		**20.53**
covered by structures (acres)	2.77	3.21		**2.77**
Changes to Intertidal & Shallow Subtidal Habitat[1]				
Changes in overwater coverage (acres)	-1.53[2]		+0.91[3]	**-0.62[4]**
slope or substrate enhanced (acres)	2.41[5]			**2.41**
Changes to Subtidal Habitat[1]				
Net increase in overwater coverage (acres)	0.75[6]		2.01[7]	**2.78[8]**
slope or substrate enhanced (acres)	0			
Creosote piles removed[1] (number)	560		599	**1,159**

[1]Elements under Alternatives 1-4 would occur in the Whatcom Waterway; separate actions also includes some elements that would occur in I & J Waterway

[2]Includes removal of 1.59 acres of intertidal/shallow subtidal coverage through demolition of South Whatcom Waterway pier/wharfs and construction of 0.06 acre of new intertidal/shallow subtidal coverage from ramps associates with the transient moorage floats; **decrease in intertidal/shallow subtidal coverage from redevelopment alternatives is 1.53 acres.**

[3]Includes new NOAA piers (+0.55 acre), removal of floats in Whatcom Waterway (-0.08 acre), removal of chemical docks in the BST (-0.04 acre), new piers in the I & J Waterway (+0.02 acre), and an assumed 0.46 acre for pedestrian trail from Cornwall Park to Boulevard Park (2050 ft by 10 ft): **increase in intertidal/shallow subtidal coverage from separate actions is 0.91 acres.**

[4]Represents a net decrease in intertidal/shallow subtidal overwater coverage.

[5]1,500 ft of shoreline by 70 ft wide (below MHHW) along south Whatcom Waterway would be enhanced by creating a shallower slope along with pier/wharf/bulkhead removal. Total area of slope or substrate enhancement would be **2.41 acres**, most of which is under the area where intertidal/shallow subtidal overwater coverage will be reduced. To avoid double-counting this area, this total includes only the enhanced slope area that is not included in net reduction of overwater coverage (2.41 minus 1.53).

[6]Removal of 0.68 acre of subtidal coverage through demolition of South Whatcom Waterway pier/wharfs, construction of 1.43 acres of new subtidal coverage with transient moorage floats/ramps; **increase in subtidal coverage from redevelopment alternatives is 0.75 acres.**

[7]Includes new NOAA piers (+2.29 acres), removal of old chemical docks in the BST (-0.32 acre), removal of old catwalks (-0.03 acre)/construction of new catwalks (+0.06 acre), demolition of existing piers in I & J Waterway (-0.15 acre), and new piers in I & J Waterway (+0.16 acre): **increase in subtidal coverage from separate actions is 2.01 acres.**

[8]Represents a net increase in subtidal overwater coverage.

The Redevelopment Alternatives and separate actions provide approximately 28 acres of new aquatic habitat, a reduction of intertidal/shallow subtidal overwater coverage of 0.53 acres, an increase in overall overwater coverage by 2.26 acres, up to 3.4 acres of enhanced shoreline habitat/substrate, and the removal of 1,559 creosote piles. Overall, the cumulative impacts of Alternatives 1-3 and separate actions is an increase in area and quality of aquatic habitat.

5.8 Mitigation Measures

5.8.1 Upland

The new parks and shoreline vegetation planting and landscaping associated with redevelopment would replace and/or improve the vegetation and wildlife habitats on the site. No additional mitigation measures are proposed for upland vegetation and wildlife habitat.

5.8.2 Aquatic

The Project includes measures to avoid and minimize impacts on aquatic habitat. This includes and is consistent with the habitat restoration/protection objectives listed in Section 3.4.1.2. Shallow subtidal overwater coverage in Whatcom Waterway would be reduced by 1.53 acres, significantly improving nearshore juvenile salmonid habitat. Any increases in overwater coverage would occur in subtidal habitat, where the resultant shading would have no significant adverse impacts on aquatic habitat. 3.44 acres of new sloped shoreline would be constructed in place of bulkheads and/or riprap on the south side of the Whatcom Waterway, also significantly improving aquatic habitat. 4.7 acres of intertidal and shallow subtidal habitat and 23.3 acres of unshaded subtidal habitat would be created with the redevelopment of the ASB as aquatic habitat and a marina. The 25 ft wide buffer of native shoreline vegetation would be provided landward of OHWM along the south side of Whatcom Waterway.

Aquatic work would generate minor impacts such as turbidity, noise from machinery and pile driving, and the potential for spills of fuels and/or other toxic materials. The following Best Management Practices (BMPs) are typically implemented to avoid and minimize this potential.

5.8.2.1 Planned Elements

- The Project has been designed to avoid or minimize loss of aquatic habitat.
- The Project yields a decrease in overwater coverage by structures in intertidal/shallow subtidal habitat of 1.53 acres, and an overall decrease (intertidal/shallow subtidal and subtidal) in overwater coverage of 0.87 acre
- 560 creosote treated piles would be removed from the aquatic environment.
- The Project would yield a reduction in steel piles by 302, 301 of which would be in intertidal/shallow subtidal habitat.
- The upgraded stormwater system would improve both the collection, treatment and discharge of stormwater. Stormwater outfalls could be sited to provide a freshwater input source to support saltmarsh vegetation.
- 3.44 acres of intertidal/shallow subtidal shoreline would be reconstructed to replace bulkheads with sloped shoreline.
- An SWPPP would be prepared for the Project, which include BMPs associated with TESC measures that would be implemented to prevent significant water quality impacts per NPDES permits (A.C. Kindig & Co. 2007).
- The Marina would be operated according to the guidelines found in the Resource Manual for Pollution Prevention in Marinas (Ecology 1998).

5.8.2.2 General Measures

- In-water work would occur when juvenile salmonids are absent or present in very low numbers.
- Care would be taken to prevent any petroleum products, chemicals, or other toxic or deleterious materials from entering the water. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., will be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into waters. Proper security shall also be maintained to prevent vandalism.
- The contractor will have a spill containment kit, including oil-absorbent materials, on site to be used in the event of a spill or if any oil product is observed in the water.
- If a spill were to occur, work would be stopped immediately, steps would be taken to contain the material, and appropriate agency notifications would be made. The contractor is responsible for the preparation of spill response and hazardous material control plans to be used for the duration of construction.

- Spills and/or conditions resulting in distressed or dying fish shall be reported immediately to Ecology's Northwest Regional Spill Response Office at (206) 649-7000 (a 24-hour phone number).
- If fish are observed in distress or a fish kill occurs, work would be stopped immediately. WDFW, Ecology and other necessary agencies would be contacted and work would not resume until further approval is given.

5.8.2.3 Pile Removal and Installation

- A boom will be installed around the work area prior to removal of piles, piers, bulkhead, or other in-water elements to contain and collect debris. Debris will be disposed of at an approved upland location.
- Every effort will be made to minimize release of adhering sediments when extracting piling that are pulled from the water and placed on receiving barge or on the adjacent wharf.
- The receiving barge or wharf site on which the extracted piling are placed will be fitted for control of drainage, such that any sediment or creosote treated wood fragments present on the extracted piling will be contained. The containment basin will be sufficiently durable to function as a continuous confinement mechanism.
- A bubble curtain will be used to minimize noise impacts to aquatic species when steel piles are driven with an impact hammer.

5.9 Significant Unavoidable Adverse Impacts

This Project would not generate any significant unavoidable adverse impacts. The overall result of the Project would be substantial improvements to upland and aquatic habitat in the Project Area.

6 REFERENCES

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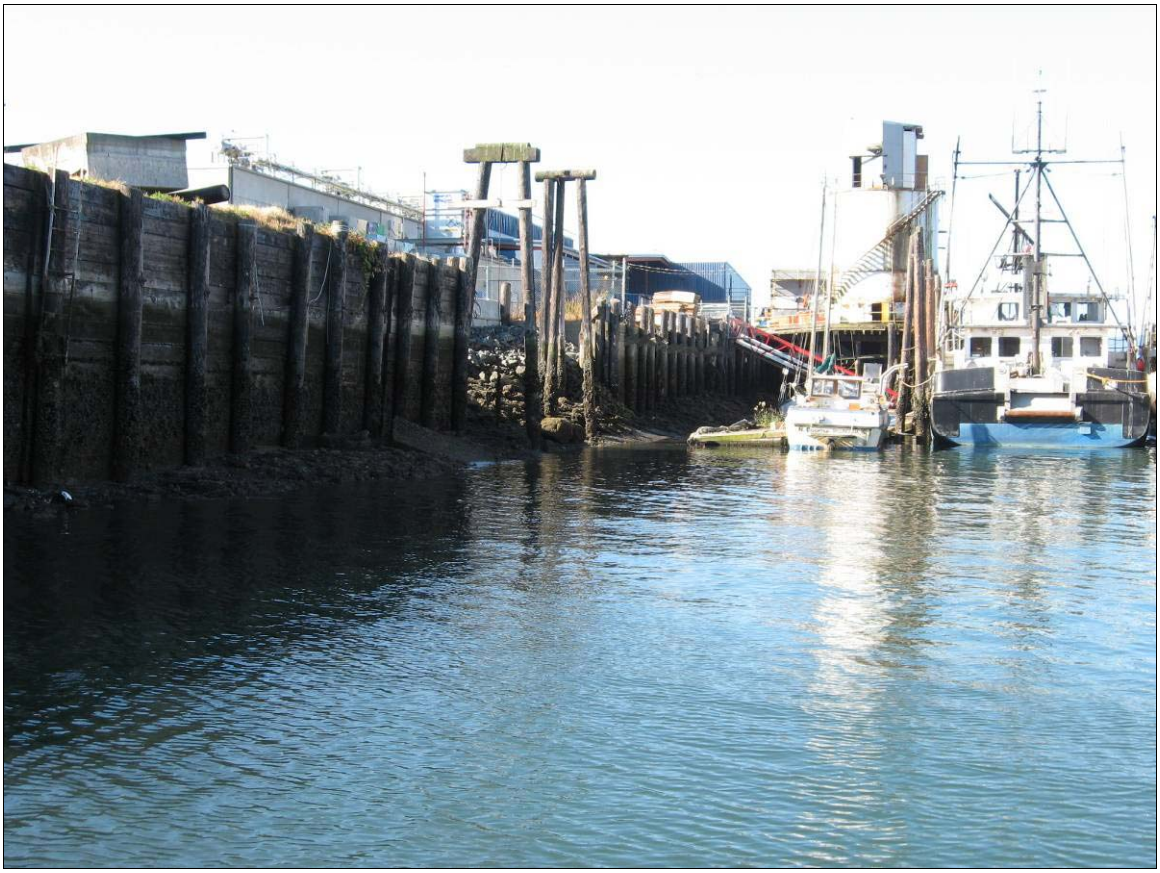
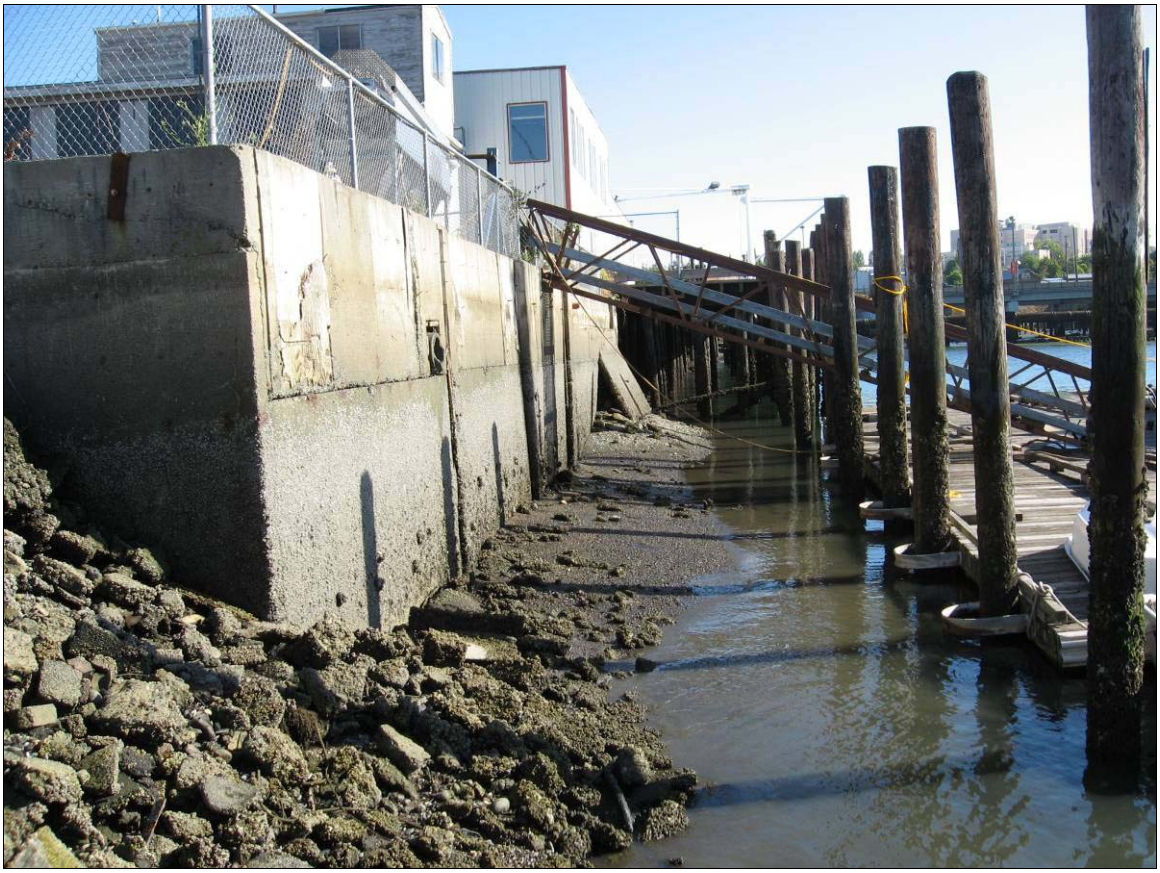
NEW WHATCOM REDEVELOPMENT PROJECT

ATTACHMENT 1: PHOTOGRAPHS

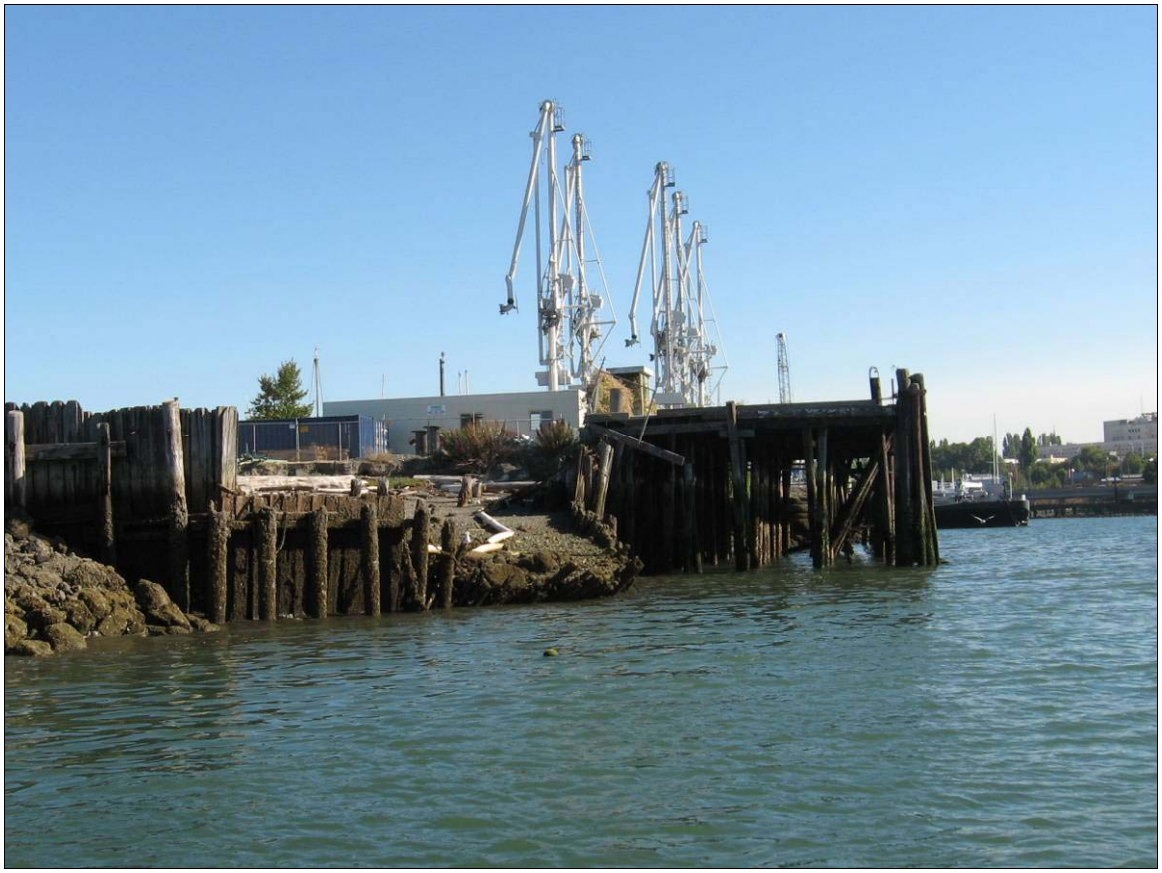
Grette Associates LLC
ENVIRONMENTAL CONSULTANTS



Photograph 1. Timber bulkhead in I & J Waterway, Area 1



Photograph 2 Typical concrete bulkhead, dock in Whatcom Waterway in Area 1



Photograph 3. Failing bulkhead, overwater piers in Area 1

Photograph 4. Sloped shoreline at the head of I & J Waterway, Area 1

Photograph 5. Pier, bulkhead, cut slope along Areas 2-4 shoreline

Photograph 6. Typical under-pier conditions in Areas 2-4

Photograph 7. Long pond area with existing vegetation along the top of the bulkhead

Photograph 8. Pavement, railroad infrastructure in Area 7 adjacent to wetland complex

Photograph 9. Pier, bulkhead in western portion of log pond in Areas 8 & 9

Photograph 10. Area 10 upland depicting drainage swale and weedy vegetation

Photograph 11. Typical shoreline in Area 10