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Gateway Pacific Terminal

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Whatcom County
Planning and Development Services

December 1996

WHATCOM COUNTY
PLANNING AND
DEVELOPMENT SERVICES
Michael T. Knapp, A.I.C.P.
Director

LAND USE SERVICES DIVISION
Bill Florea, Manager
5280 Northwest Dr., Ste. B
Bellingham, WA 98226

LETTER OF TRANSMITTAL

TO: Public agencies and persons with interest in Gateway Pacific International Terminals

FROM: Roland Middleton,
Senior Land Use Specialist
Deputy SEPA Official
(ext. 50202)

DATE: December 23, 1996

SUBJECT: Draft Environmental Impact Statement (DEIS)

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This DEIS was prepared to provide an analysis of the significant environmental impacts that are likely to occur as a result of the proposed Gateway Pacific International Terminals.

A hearing to receive comments on the DEIS will be held at 10:30 a.m. on January 8, 1997 in the Whatcom County Council Chambers; Courthouse 311 Grand Ave. Bellingham WA.

Written comments will be accepted until the close of the working day 4:30 p.m. January 22, 1997 at the following address:

Roland Middleton, Deputy SEPA Official
Whatcom County Land Use Division
5280 Northwest Drive Suite B
Bellingham, WA 98226

After the close of the comment period a Final Environmental Impact Statement will be prepared in response to the comments received on the Draft EIS.

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FACT SHEET

Project Title	**Gateway Pacific Terminal**
Proposed Action	The Proposed Action will be a multi-user import and export marine terminal for bulk, break-bulk, and other marine cargoes. The terminal will be located at Cherry Point, south of the Arco refinery, as shown in Figure 1. Of the 1,092 acre site, approximately 80 acres would be used for upland terminal facilities and 100 acres would be used for a railroad-track loop to accommodate trains transporting commodities to the site. The pier and pierhead would be located in the waters of Georgia Strait between the Arco and Intalco piers. The onshore terminal facilities, designed for the handling and storage of bulk, break-bulk and other marine cargoes, would be located on the gently sloping land located south of Henry Road immediately east of the Arco pier access boundary. The terminal facilities would be connected by rail to the Burlington Northern Railway at Aldergrove Road to the BNR Intalco/Cherry Point Branch Line. The terminal storage area would occupy approximately 80 acres and would provide for the receiving, storage, handling and reclaiming of bulk cargoes, break-bulk and other marine cargoes for export and import. Both covered and open storage would be provided, depending on cargo needs. The marine facilities for berthing, loading and unloading ships and barges would consist of a 105-foot wide and 2,820-foot long pierhead structure and a 50-foot wide by 1,100-foot long approach trestle connecting the pierhead to the terminal storage area. The marine structures would be supported on steel pipe piles.
Location	The site of the proposed action is located at Cherry Point, which is a small promontory of land on the south side of the more prominent Point Whitehorn, south of Birch Bay, on the Strait of Georgia. The site is within the Cherry Point Heavy Impact Industrial Zone and the Cherry Point Shoreline Management Area, in which the proposed action is a permitted use.
Proponent	Pacific International Terminals 1801 Roeder Avenue, Suite 156 Bellingham, WA 98225

Lead Agency	Whatcom County Planning and Development Services Land Use Division 5280 Northwest Road Bellingham, WA 98226-9040
Responsible Official	Bill Florea, Land Use Division Manager Whatcom County Land Use Division
Contact Person	Roland Middleton, Deputy SEPA Official Whatcom County Land Use Division 5280 Northwest Drive, Suite B Bellingham, WA 98226
Required Approvals	Whatcom County Shoreline Substantial Development Permit (SHS 92-0020 6/18/92) Land Use Major Development Permit (MDP 92-0003 6/18/92) Clearing and Grading Permit Washington State Department of Ecology Certification of Consistency with Coastal Zone Management program NPDES Permit Industrial Wastewater Facility Approval Industrial Waste Discharge Permit Baseline General permit/Industrial Stormwater Permit Prevention of Significant Deterioration permit Short-term Modification of Water Quality Standards Washington Department of Fish and Wildlife Hydraulic Project Approval Northwest Air Pollution Authority New Source Construction Approval Air Contaminant Source Registration U.S. Army Corps of Engineers Section 10 Permit Section 404 Permit

Type and Timing of Subsequent Environmental Review	Shoreline permits and Major Development Permit apply to entire 1,092-acre site. Proposed action and environmental review in this EIS apply only to project elements described in this document. Phased review under SEPA (WAC 197-11-360(5)) is being followed. Subsequent environmental review will occur with submittal of specific development applications and/or changes in the proposal.
EIS Authors & Principal Contributors	Huckell/Weinman Associates 205 Lake Street South, Suite 202 Kirkland, WA 98033 Westmar Consultants 400-233 West 1st Street North Vancouver, B.C. V7M 1B3 Shapiro & Associates 1201 Third Avenue, Ste 1700 Seattle, WA 98101 David Evans & Associates 415 118th Avenue SE Bellevue, WA 98005 KJS Associates 500 108th Avenue NE, Ste 2100 Bellevue, WA 98004 Aqua-Terr Systems 1117 North Garden Street Bellingham, WA 98225 Golder Associates 4104 148th Avenue NE Redmond, WA 98052 McCulley Frick & Gilman 3400 188th Street SW, Ste 400 Lynnwood, WA 98037-4707
Environmental Documents Incorporated by Reference	*Map Folio of Fish and Wildlife Habitat*, Whatcom County; *Significant Wildlife Areas, Whatcom County, Washington,* (Eissinger), What. Co. Env. Resources Report Series; Cherry Point Industrial Park Draft EIS (November 1992) Cherry Point Industrial Park Final EIS (February 1993)

Location of Background Information	Whatcom County Planning and Development Services Land Use Division 5280 Northwest Road Bellingham, WA 98226-9040
Date of Issue	December 23rd, 1996
Date Comments Due	January 22nd, 1997, by end of the working day, 4:30 p.m., to Roland Middleton, Deputy SEPA Official, Whatcom County Land Use Division, Suite B, Bellingham, WA 98226
Public Hearing	January 8th, 1997, 10:30 a.m., Whatcom County Courthouse Council Chambers, 311 Grand Avenue Bellingham, WA 98225
Cost of Environmental Documents	The Draft EIS will be provided free of charge until the initial printing has been distributed. Subsequently, copies will be available for the cost of reproduction.

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Chapter One

SUMMARY

I. SUMMARY

Proposed Action

Project Location

The site proposed for development of a deepwater marine terminal facility consists of 1,092 acres in northwestern Whatcom County, approximately seven miles east of the City of Ferndale and approximately twelve miles northwest of the City of Bellingham. The site is located at Cherry Point which is a small promontory of land on the south side of the more prominent Point Whitehorn, south of Birch Bay, on the Strait of Georgia.

The site is characterized by mostly flat to gently sloping terrain on the uplands with steep bluffs bordering the westernmost 2,500 feet of beach. The site contains approximately 5,460 feet of shoreline characterized by rock cobbles, gravel, and coarse sands. Elevations range from sea level to approximately 220 feet above sea level, with most of the site lying between 60 and 160 feet in elevation. A small, unnamed intermittent stream flows into the Strait along the eastern boundary of the site.

The proposed terminal area is primarily in open fields, vegetated by grass and hay. The proposed loop track area is characterized by thick underbrush and stands of mature second-growth trees. The slopes are heavily vegetated with bushes and shrubs. Pasture land in the northwest and northeast segments of the site seasonally grazed by dairy cattle. An annual hay crop is harvested on pastures bordering the shoreline and pastures in the southwest.

Applicant's Statement of Project Purpose and Need

The intent of the Gateway Pacific Terminal project is to provide waterfront access and facilities for the existing and future shipping needs of local developed and undeveloped industrial areas. The facility will also serve as a transfer point for import/export marine cargo with truck and rail traffic. The project site is centrally located to large industrial tracts both to the southeast and northwest of the proposed dock. This particular location was identified many years ago as a potential marine terminal due to the relatively easy access to the deep water that is required of ocean-going bulk cargo ships. As a multi-user facility, the terminal will be able to handle a variety of products which may be imported to, or exported from any existing or future user.

Overview of the Proposed Action

The proposed action consists of marine and upland facilities to accommodate the off-loading, storage, loading and transshipment of a range of commodities and cargoes destined for domestic and Pacific Rim markets.

The proposed facility would receive commodities by train primarily from the Pacific Northwest and mid-western regions of the U.S. and Western Canada. The marine terminal would serve ocean going national and international trade for bulk commodities, break-bulk and other marine cargoes. Most shipments would be destined for export to Pacific Rim countries.

The proposed facility would provide deep water access to accommodate vessels that require a minimum draft of up to 80 feet. The facility would also provide access to major rail lines serving the Pacific

Northwest and northern states of the mid-west region of the U.S. where the majority of commodities to be shipped would originate. The portion of the total site to be used for the marine terminal facility would be large enough to accommodate sufficient train storage (100-110 car unit trains) and movement on-site to allow loading of bulk products to vessels at rates between 2,500 and 5,000 tons per hour depending on the product. One hundred acres would be required to accommodate a loop rail system that could incorporate 3 tracks and approximately 30,000 feet of trackage.

In the long-term, a wide range of commodities and other marine cargoes could be shipped from the facility by ship, including: alumina, automobiles, salt, scrap metal, aluminum ingots, aggregates, chemicals, grain, ores, green petroleum coke, calcine petroleum coke, liquid petroleum products, fertilizers, lime rock, phosphate rock, feed pellets, potash, sulfur and wood chips. Specific types of commodities would depend on market conditions.

In the near-term (i.e. next 5 years), products that would be received and shipped from the facility are anticipated to include the following:

- feed grains (wheat, barley, soybeans, corn and grain products);
- petroleum coke (calcined and green, including material from the adjacent Arco refinery);
- iron ore (pelletized and reduced/briquetted);
- sulfur (prilled);
- potash; and
- woodchips.

These commodities have been identified based on current world market conditions and their probable inclusion in the proposal; they are the focus of the analysis in this EIS. A broader list of potential products has been identified in this project description and in the Army Corps of Engineers public notice; these additional commodities are speculative at this time. Additional environmental review would occur, as determined by Whatcom County, when and if other commodities are proposed for handling, storage and shipment.

Marine Facilities: Pier and-Trestle. Marine facilities for berthing, loading and unloading ships and barges would consist of a 105-foot wide and 2,820 foot long pier and a 50-foot wide by 1,100 foot long approach trestle connecting the pier to the terminal storage area.

Upland Terminal Storage Facilities. The onshore terminal storage facilities would be located on an approximate 80-acre, triangular-shaped portion of the site adjacent to the shoreline but outside the 200-foot setback (refer to Figure 2). This portion of the project site would be used for handling (i.e. conveyor) and storage of commodities, as well as for site maintenance and operation facilities, including water quality treatment. The majority of the upland terminal site will be used for storage of commodities.

Rail. The terminal would be connected by a rail spur to the Burlington Northern Railway at Aldergrove Road to the BNR Intalco/Cherry Point branch line. The proposed railroad loop system would consist of nearly 30,000 lineal feet of track and could store up to three 100-to-110 car unit trains at the same time. The loop tracks would be located north of the terminal storage facilities with a spur track extending to serve the facility. The loop track and a portion of the spur line would be located partially on the adjacent Arco property.

Marine. The pier would be designed to accommodate three vessels ranging in size from 60,000 to 250,000 dwt simultaneously on the outside of the pier. Large vessels will be destined for foreign markets. Up to six

barges could be accommodated on the inside of the pier; barges will transport selected commodities to domestic markets (e.g. west coast of United States).

Related Features of the Proposal

The terminal would provide stormwater collection and treatment systems designed to minimize the discharge of process stormwater to the bay. The primary stormwater outfall will be through an engineered diffuser located at the face of the pier. The outfall to the pier will be sized to convey the 24 hour design storm with a reoccurrence probability of 1 in 25 years (25 year design storm). This outfall will be designed to increase the mixing of stormwater and salt water in order to create a broad band mixing zone that will reduce impacts to salinity, temperature, and other water quality impacts in the herring spawning zone. Small outlet pipes will be attached to the pier pilings and will discharge at depths ranging from 15 to 50 feet to provide vertical as well as horizontal separation of the discharge points.

The Whatcom County Public Utility District No. 1 is the designated water purveyor; on-site septic systems would serve the terminal storage facility.

The specific GPT methods and procedures used to minimize the potential for fire and explosion will be outlined in the facility operations and maintenance plan.

Added to the manual and automatic systems for detection of fires and the activation of sprinkler heads, sirens, and alarms at the local fire hall, are the following:

- Immediate evacuation of the facility by all personnel and gathering at distanced pre-designated gathering points for head count. If any personnel are missing, management personnel are notified, in turn notifying fire department personnel on arrival.
- A procedure to contact ambulances if necessary.

Spill Response. The procedures for reporting and handling spills will be specific and immediately implementable. In the event of a spill, the appropriate GPT personnel will contact previously identified individuals and agencies, alert them to the status of the situation, and work closely with the supervising agency to ensure that the matter has been adequately addressed.

Measures to reduce the risk of spills include:

- railcar unloading will be done inside an enclosed building equipped with a negative air system;
- the looped track and use of an indexer (which prevent jarring that loosens grain from the rail cars);
- closing hopper doors on the rail cars after they have been emptied;
- an emergency cable that runs the length of the shipping gallery so that the conveyors can be stopped immediately (chronic losses are not expected to occur with the type of conveyor used); and
- exhaust systems equipped with fabric filters will be located at all transfer points within the building.

Spill prevention procedures will be reviewed with GPT staff on a schedule outlined in the Emergency Response Plan.

History, Prior Planning and Environmental Review at the Cherry Point Industrial Area and Cherry Point Shoreline Management Area

A Shoreline Substantial Development Permit Application and Environmental Checklist were submitted to Whatcom County by Pacific International Terminals (PIT) for the subject property in 1992. An Application for a Department of the Army Permit for construction of the marine terminal and loop railroad system was submitted by PIT to the Army Corps of Engineers in 1993. A Notice of Application for Permit was published in December 1993 and re-issued in early 1996.

On October 22, 1992 Whatcom County issued a Determination of Significance (DS) and Request for Comments on the Scope of the EIS. A revised Scoping Notice was issued by the County on November 30, 1995.

Whatcom County is using phased environmental review to consider the Gateway Pacific Terminal proposal pursuant to the SEPA rules (WAC 197-11-060(5)). Phased review permits environmental documents to focus on elements of a proposal and environmental issues that are relatively certain at the time of initial application and environmental review, and to defer for future analysis those project elements that are less certain or are subject to ongoing planning and permitting. Some elements of the Gateway Pacific Terminal proposal—detailed design of the upland facilities, for example—are still conceptual in nature. The number and location of on-site lighting, for example, are not known with certainty at this time. In addition, some elements – such as the precise commodities that will be stored and shipped from the facility in the long-term – will be determined by future economic conditions in world markets and cannot be accurately predicted at this time. The overall proposal is, however, sufficiently well defined to permit environmental review to move forward. Supplemental environmental review will be conducted in the future when additional elements of the proposal become more specific (e.g. when building permits are requested and construction-level plans are prepared), or when specific commodities beyond those evaluated in this document are proposed for storage or transport at the facility. Environmental review only covers facilities identified in the proposal: i.e., development of 80 acres for marine terminal facilities, 100 acres for the rail loop, and pier construction. The application does not cover the rest of the property. Any future development of other portions of the 1,092-acre site will require supplemental environmental review.

See Chapter 2 for additional discussion of prior planning and environmental review.

Evolution of Site Planning and Consideration of On-Site Alternatives

This EIS considers two alternatives to the proposed action: no action, and construction of a proposed pier and shipping facility at another site (Cherry Point Industrial Park) to the south of the proposal.

Other on-site alternatives for the design and layout of the proposed action were considered by the applicant over a period of several years. Successive changes to these initial plans occurred as a result of ongoing site evaluation and consultation with state and federal agencies and tribes. Major changes that occurred as a result of this evaluation and consultation are outlined below. In general, ongoing planning has attempted to avoid and minimize wetland impacts associated with the railroad track loop, and marine resource impacts associated with construction and operation of a pier.

1992 Site Plan. The site plan originally proposed in 1992, shown in Figure 5, would have affected (i.e., filled or disturbed) approximately 50 acres of wetlands to construct the railroad loop. The tracks also crossed the seasonal stream located on the site. The pier design associated with this site plan had the trestle

crossing identified eelgrass habitat in a northeast/southwest direction, which could have caused significant shading impacts during some times of the year.

1993 Site Plan Revision. The 1993 site plan, shown in Figure 6, reflected modifications designed to reduce impacts to wetlands, streams and marine resources. A new route for the railroad loop was identified which reduced the wetland fill/disturbance to approximately 20 acres. This layout still involved crossing the seasonal stream. Based on development of a shading model, the pier and trestle were realigned (in a more north/south direction) to avoid direct construction impacts and to reduce potential shading impacts to eelgrass.

Changes Incorporated Into Current Proposal. The proposal has been designed in the context of this prior evaluation and project modification. The proposed railroad loop design occupies considerably less land and would reduce wetland fill or disturbance to 5.8 acres; crossing the seasonal stream would not be necessary. The orientation of the pier and trestle follows the north/south design intended to avoid and minimize eelgrass impacts due to construction and shading; this is based on ongoing refinement of the shading model. The upland storage area has also been reconfigured to use land more efficiently; covered storage structures and open storage areas are grouped.

In general, modifications intended to achieve the proponent's objectives at lower environmental cost have been incorporated into the proposed action. Further modifications could occur as a result of the environmental review process. No additional on-site alternatives have been identified for this Draft EIS.

Alternatives to the Proposed Action

No Action Alternative

Under the No Action alternative, the proposed marine terminal facility would not be constructed and the site would remain in its currently undeveloped state for the foreseeable future. Other industrial development would be likely to occur on the site and adjacent properties over time, consistent with the existing industrial zoning.

Alternative 1 - Cherry Point Industrial Park (CPIP)

Under this alternative, a marine terminal facility -- including a pier intended to accommodate deep water vessels, an upland terminal, and industrial facilities -- would be constructed on the Cherry Point Industrial Park (CPIP) property to the south of the proposed site. Only one new pier and marine terminal facility would be constructed in the Cherry Point area.

A Draft Environmental Impact Statement (EIS) for the CPIP was issued by Whatcom County in November 1992; a Final EIS was issued in February 1993. Those documents describe the proposed development and discuss significant impacts and mitigation measures. The CPIP project is still under review by the Corps of Engineers.

The CPIP alternative is intended to recognize the possibility that only one additional pier and marine terminal facility may be permitted in the Cherry Point area. The Department of Natural Resources (DNR), in correspondence to the County Council (October 5, 1995), reiterated that its decision to lease state tidelands must serve the State's long-term best interest. DNR determined that only one lease at Cherry

Point will be considered, and that their decision will be made only after all relevant information has been disclosed.

The Whatcom County Draft Comprehensive Plan being considered by the County Council as of this writing contains a proposed policy (2CC-2) which addresses the potential for additional docks at Cherry Point.

While the CPIP alternative would not accomplish the proponent's objectives -- since it is a competing project, and assumes that the Gateway Pacific proposal is not built -- it may be an alternative to the Gateway Pacific proposal in a practical sense. Including this alternative in the Gateway Pacific Terminal EIS is intended to allow decision makers and interested citizens to compare the relative environmental impacts of the two proposals. Information about the CPIP alternative is summarized from the published EIS for that proposal; readers desiring greater detail should consult the relevant environmental documents for that project.

Table 1-1
Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
EARTH **Impacts**		
No direct impacts to topography, geology or slope stability. However, if not controlled, surface water runoff from inland development could adversely affect slope stability.	None	No identified impacts on geology or slope stability. Erosion and soil compaction could occur due to upland construction, and could lead to sedimentation.
Mitigation Measures		
The proposed 100-foot minimum slope setback for facility improvements is adequate, provided that these recommendations are followed: • Site development and grading should direct surface water flow away from the crest of the site slopes and should be conveyed to a stormwater collection system. No surface water should be discharged on the site slopes. • The vegetation on the slopes should not be removed or significantly disturbed. Any significant slope failure occurring on the slopes during the life of the facility should be evaluated by a qualified geotechnical engineer and appropriate remedial action taken.	None	Same as the Proposed Action.
Significant Unavoidable Adverse Impacts		
With implementation of proposed runoff controls, no significant unavoidable adverse impacts on geology or slope stability have been identified.	None	Nearly the same as the Proposed Action.
AIR QUALITY **Impacts**		
During construction, dust from excavation, grading and road building would contribute to concentrations of suspended particulate matter and slight degradation of local air quality.	None	Not studied.
Dry bulk materials (such as grains, coke, iron ore, sulfur, potash and woodchips) handled at the terminal would generate fugitive emissions that would be controlled by use of best management practices (BMPs) specific to each type of material handled.	None	Not studied.
Vehicles, trains and ships would emit pollutants such as CO, SO_2, NOx and PM_{10}, but exceedance in standards for these pollutants is not predicted.	None	Not evaluated.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
AIR QUALITY **Mitigation Measures**		
During construction, emissions could be reduced by: • using relatively new, well-maintained equipment; • avoiding prolonged periods of vehicle idling and use of engine-powered equipment; • scheduling truck trips to minimize congestion during peak travel times.	None	Not evaluated.
During construction, fugitive dust could be reduced by: • spraying exposed soil areas with water or other dust suppressants; • paving roads and using vegetation or gravel on exposed unpaved areas; • wheel washing and covering of dusty truck loads, to reduce soil tracked off-site; • street cleaning near vehicle exits.	None	Not evaluated.
During terminal operations, pollutant emissions would be controlled by: • implementation of best management practices for materials handled at the terminal; • indexers would be used to handle unloading of railcars, reducing train engine idling; • ship emissions could be reduced by providing shore power to hotelling ships. Depending on vessel type and length of stay, this could be implemented with varying degrees of difficulty. Power requirements of ships are great and would be difficult to provide from shore (a five-year testing program in Los Angeles determined that substituting shore power is not feasible); • Use of electric conveyor equipment, and proper equipment/utility vehicle maintenance would reduce emissions.	None	Not evaluated.
Significant Unavoidable Adverse Impacts		
No significant unavoidable air quality impacts have been identified.	None	Not evaluated.
WATER RESOURCES—BEACH AND COAST **Impacts**		
Wave energy would be reduced by the wharfhead, primarily waves from the west- northwest. This could result in some sediment accretion in the vicinity of the creek, but this is not expected to be significant. No significant impacts on beach processes have been identified.	None	No significant impacts identified.
Mitigation Measures		
None are required.	None	None identified.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
WATER RESOURCES—BEACH AND COAST **Significant Unavoidable Adverse Impacts**		
No significant unavoidable adverse impacts to coastal features of littoral drift are anticipated to occur as a result of the proposed project.	None	None identified.
WATER RESOURCES—STORMWATER **Impacts**		
With the proposed stormwater control systems, stormwater in areas affected by terminal processes (and in areas not affected by terminal processes) would be controlled such that significant drainage quantity and quality impacts are not expected. Stormwater outfalls and emergency overflow facilities will be designed to minimize impacts. During the herring spawning season of March through June, process stormwater would be managed to minimize or eliminate stormwater discharge to the bay.	None, unless future development occurred.	Impacts would be generally similar to the Proposed Action.
Mitigation Measures		
Detailed stormwater facilities design and mitigation measures will be provided in the Stormwater Plan submitted with construction drawings. Additional stormwater management measures will be provided in the Stormwater Pollution Prevention Plan (SWPPP), as required for the NPDES permit. Other permitting may be required related to hydrocarbon or other specific product handling and spill prevention guidelines.	None	Similar to the Proposed Action.
The *Stormwater Management Manual for the Puget Sound Basin* outlines requirements and provides Best Management Practices for sedimentation and erosion control during construction.	None	Same as the Proposed Action.
A final SWPPP will be prepared in accordance with local, state and federal rules, designed to incorporate the following stormwater management goals: • To minimize or eliminate process impacted stormwater runoff during herring spawning season; • To supplement the water balance needs of existing and constructed wetlands; • To implement stormwater pollution controls consistent with facility BMPs and monitor stormwater quality during construction and operation to minimize impacts;	None	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
WATER RESOURCES—STORMWATER **Mitigation Measures (Continued)**		
Best Management Practices for the terminal operations include the following: • Segregate the contaminated stormwater and uncontaminated stormwater by grading and curbing throughout the site; • The stormwater treatment system will be designed to meet the 10-year/24-hour storm event. • Process wastewater and contaminated stormwater will be treated by an on-site collection and treatment system prior to discharging to the receiving environment. The stormwater treatment system will consist of: screening; flow equalization and gravity sedimentation basins; physicochemical treatment, including neutralization and pH adjustment, chemical precipitation, coagulation and flocculation; and sludge removal and dewatering system. • Regular maintenance of the bulk material handling areas will occur. • Bulk materials which settle in drainage ways and catchbasins will be removed on a regular basis to maintain the designed storage and operating capacity. • Fuel for terminal vehicles will be stored in double-walled tanks complete with overfill protection. • The goal of the BMPs is to handle and store all commodities in an environmentally safe and sound manner and to minimize impacts.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
No significant unavoidable adverse stormwater impacts have been identified.	None, unless future development occurred.	Similar to the Proposed Action.
PLANTS AND ANIMALS—AQUATIC PLANTS **Impacts**		
Construction for the pier pile emplacements would cause temporary siltation in the near vicinity, and some displacement of individual macroalgae plants. Macroalgae species would grow at a higher tidal elevation in areas shaded by the pier.	None, unless future development occurred.	Similar to the Proposed Action.
Mitigation Measures		
At present, there is no known negative impact on marine vegetation at the proposed GPT site, although it is anticipated there will be some shading effects from the proposed marine facility. Specific mitigation actions include the following: • Relocating and reorienting the trestle to a north-south aspect to create less shade on any one spot under the trestle; • Raising the trestle to create less shade;	None	Similar measures to the Proposed Action could be investigated.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
PLANTS AND ANIMALS—AQUATIC PLANTS **Mitigation Measures (Continued)**		
• Lengthening the spacing between the trestle pilings from 50 feet to 75 feet (up to 100 feet if necessary) to minimize potential littoral drift effects, which are not expected to be significant; and • Designing a stormwater collection and treatment system for the marine facilities (in addition to the upland system) so that discharged stormwater would exceed applicable water quality standards.	None	Similar to the Proposed Action.
Possible additional mitigation measures could include: • artificial daytime lighting; • under-trestle light-reflecting devices; • grating in the trestle deck; • enhancement of marine vegetation in other areas.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
Temporary increases in siltation and decreases in water quality would occur during construction of the pier. Marine flora and suitable substrate would be lost in the footprint of the piles supporting the piers. The submerged surface area of pilings would support attached macroalgae. The growth of some species of macroalgae may be somewhat impeded by shading of the proposed trestle.	None, unless future development occurred.	Similar to the Proposed Action.
PLANTS AND ANIMALS—WETLANDS **Impacts**		
Approximately 5.85 acres of wetland would be cleared and filled on the site, including 4.3 acres of farmed seasonally saturated palustrine emergent wetlands, 1.45 acres of seasonally saturated palustrine scrub-shrub wetlands and 0.1 acre of seasonally saturated palustrine forested wetland.	None, unless future development occurred.	Approximately 4.9 acres of wetland filling, about one acre less than the Proposed Action.
Mitigation Measures		
The proposed mitigation plan would directly and indirectly compensate for lost wetland acreage and function, with five goals: 1) to create 5.9 acres of palustrine forested/scrub-shrub wetland with greater functional value than filled wetlands; 2) to enhance a 16.2 acre monotypic stand of reed canarygrass into a diverse palustrine forested wetland habitat; 3) to assure protection of the on-site stream corridor (approx. 50 acres) by placing it in a conservation easement; 4) to conduct a study on a designated 1.5 acre plot researching the natural regeneration of vegetation within wetland regimes; 5) to provide compensation for the loss of western red cedar trees important to the Lummi Indian Tribe's cultural heritage.	None	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
PLANTS AND ANIMALS—WETLANDS **Mitigation Measures (Continued)**		
Monitoring for the mitigation plan would occur over a ten-year period. The mitigation site is located in a farmed 40 acre field southwest of Aldergrove and Gulf Roads and along the riparian corridor.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
The proposed action would result in the filling of 5.85 acres of existing palustrine scrub-shrub and palustrine emergent wetlands. The proposed wetland mitigation plan includes creation of 5.9 acres of palustrine forest/scrub-shrub wetland, and enhancement of 16.2 acres of reed canarygrass into a diverse palustrine forested wetland habitat.	None, unless future development occurred.	Approximately one acre less wetland clearing than the Proposed Action.
PLANTS AND ANIMALS—MARINE RESOURCES **Impacts**		
The proposed GPT Terminal would result in a small increase in the probability of marine pollution (spill) incidents per year, assuming historical rates of occurrence.	None, unless future development occurred.	Similar to the Proposed Action.
Benthic invertebrates in the immediate piling locations would be eliminated, although a greater amount of surface area would be available on the pilings for marine attachment.	None, unless future development occurred.	Similar to the Proposed Action, with additional impacts in a 25,000 sq.ft. area where cobble would be placed for macroalgae substrate.
The generation of turbidity during pier construction could cause minor impacts in adjacent areas on Dungeness crab. Normal operation of the facility would not have a noticeable effect on Dungeness crab.	None, unless future development occurred.	Similar to the Proposed Action, except for the additional changes described above.
During construction, turbidity from pile driving could result in shallow sediment deposition on substrate and aquatic vegetation, which could result in some minor covering of herring eggs. After construction, if runoff was not properly treated or retained, water quality could decrease and could affect herring egg and larvae survival.	None, unless future development occurred.	Similar to the Proposed Action, except for the additional changes described above.
Salmon migration patterns could be altered by shipping traffic, and salmon could be attracted to night lighting at the facility.	None, unless future development occurred.	Similar to the Proposed Action, except for the additional changes described above.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
PLANTS AND ANIMALS—MARINE RESOURCES **Mitigation Measures**		
The proponent would develop a spill prevention and response action plan, and maintain equipment and trained staff to implement the plan. The proponent would follow all protocols of local, state and federal agencies, as well as the National Resource Damage Assessment (NRDA) Team, to minimize damage to the environment, and provide adequate mitigation and compensation.	None	Similar to the Proposed Action.
Regarding benthic invertebrates, during construction and operation of the facility, Best Management Practices would be implemented for handling toxic substances; stormwater would be managed to meet state and federal requirements for stormwater discharge; and all required protocols would be followed to avoid vessel collisions and marine spills.	None	Similar to the Proposed Action.
New pilings would provide surface area for attachment of species such as barnacles, mussels and variety of other species. This would enhance the habitat for Dungeness crab and red rock crab.	None	Similar to the Proposed Action.
To protect herring, construction/maintenance of the piers would be scheduled during times of minimal biological activity. During herring spawning periods, these activities would be avoided.	None	Similar to the Proposed Action.
Project design modifications have been included to reduce shading effects on macroalgae species. If needed, the proponent would collaborate with agencies to design appropriate additional mitigation, such as grating and artificial lighting under the pier.	None	Similar to the Proposed Action.
During months when herring spawn or larvae are present (April through August), stormwater from the facility would not be discharged into marine waters, but would be retained on-site.	None	Similar to the Proposed Action.
Construction impacts on salmonids could be minimized by coordinating with the Washington Department of Fish and Wildlife to set seasonal restrictions on construction activities to protect migrating fish.	None	Similar to the Proposed Action.
On-site light sources could incorporate shields to avoid spillage of light off-site. The location of lighting could be designed to preclude or reduce attracting the number of salmonids.	None	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
PLANTS AND ANIMALS—MARINE RESOURCES **Significant Unavoidable Adverse Impacts**		
--Benthic invertebrates in the 0.18 acre covered by the footprint of the piles would be eliminated. --Dungeness crab would be displaced during construction. Silts and fine sediments suspended during construction would decrease water quality and could temporarily affect crab gills. Neither of these impacts is considered serious or long-term. --A small portion of prime herring spawning beach could be affected; it is not possible to determine how this could affect stock size, if at all. --Migration routes of adult and juvenile salmon likely would be altered. A potential exists for a small loss of the intertidal and subtidal habitat provides food sources and protection for juvenile salmon.	None, unless future development occurred.	Similar to the Proposed Action, except for an additional 25,000-square foot sandy area affected by placement of cobbles for additional substrate.
PLANTS AND ANIMALS—COMMERCIAL FISHERIES **Impacts**		
Increased loss of crab fishing gear could result if additional barge traffic is attracted to the terminal.	None, unless future development occurred.	Similar to the Proposed Action, except there could be a greater proportion of barge traffic, with associated risks.
The terminal could restrict or displace herring and salmon fishing in the vicinity of the wharf.	None, unless future development occurred.	Reduced herring fishing access and different fishing patterns; greater area of impact on salmon fishing.
Mitigation Measures		
• Investigate scheduling marine and commercial traffic to minimize conflict with the commercial crab fishery. New notification procedures could be developed to inform fishers of vessel movements.	None	Similar to the Proposed Action.
• Construction could be timed to avoid the herring fisheries, and would be limited during the spring months.	None	Similar to the Proposed Action.
• Fishers would be offered practical opportunities to use the proposed facility. This could include anchoring closed ponds to trestle pilings; tying off gill nets and line gear to prevent drifting; and gear transfers.	None	Similar to the Proposed Action.
• Commercial marine traffic could be assigned approach and departure corridors to minimize conflict with commercial and tribal herring fisheries.	None	Similar to the Proposed Action.
• Marine traffic could be coordinated to minimize conflicts with the timing of fishing. The proponent will meet with tribal fish commissions, commercial fishers and appropriate agencies to address vessel traffic-fishing interactions.	None	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
PLANTS AND ANIMALS—COMMERCIAL FISHERIES **Significant Unavoidable Adverse Impacts**		
--Crab pot gear loss could increase if there is an increase in barge traffic. Crabbers could be displaced from areas near the pier. --Construction of the proposed facility would permanently remove a fishable section of water from use because of the presence of the trestle and wharf. The project would alter herring fishing patterns of the nearshore herring fishing fleet. --The proposed facility would affect the use of the area by commercial and tribal salmon fishers. Fishing practices and patterns would change as a result of the proposed project. Nets would not be able to be set in the footprint of the proposed facility.	None, unless future development occurred.	Somewhat different and greater impacts than the Proposed Action.
PLANTS AND ANIMALS—RECREATIONAL/SUBSISTENCE FISHERIES **Impacts**		
Dungeness crab may be reduced during construction and there could be a temporary displacement of shore-based fisheries. Operation of the facility is not expected to permanently impact sport or subsistence fisheries, except in the event of a catastrophic toxic spill.	None, unless future development occurred.	Somewhat different and greater impacts than the Proposed Action, as discussed above.
Mitigation Measures		
The height of the trestle and the spacing of the pilings have been increased to allow continuous movement of small vessels under the trestle.	None	Similar to the Proposed Action.
Please refer to measures to mitigate effects of Dungeness crabs and benthic organisms in the Marine Resources section.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
No significant unavoidable adverse impacts are anticipated.	None identified.	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
PLANTS AND ANIMALS—MARINE & SHORE BIRDS, AND THREATENED/ ENDANGERED SPECIES **Impacts**		
Species of birds and mammals could be indirectly impacted by construction activities that could cause them to move away and use other areas for feeding and resting. Habitat value in the water area covered by the facility would be diminished. Accidental toxic material spills could, if big enough, taint prey organisms and thus potentially impact some predators feeding on the tainted organisms.	None, unless future development occurred.	Similar to the Proposed Action.
During operation of the facility, noise and increased human presence in and near feeding and resting areas could cause an incremental increase in the disturbance of the birds and mammals in the vicinity.	None, unless future development occurred.	Similar to the Proposed Action.
Mitigation Measures		
During construction and operation, BMPs would be used for handling any toxic materials. Coordination with resource agencies will identify critical periods for any threatened or endangered species in the project area so that potential impacts can be minimized.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
No direct significant unavoidable adverse impacts on threatened/endangered species have been identified. These species could be indirectly impacted by: construction activities disturbing area that could be used for feeding and resting; potential toxic spills; and increased noise and disturbance from proposed activities.	None identified.	Similar to the Proposed Action.
ENVIRONMENTAL HEALTH **Impacts**		
Types of risk generated by the proposed project include: • direct risks to human health (such as a train or auto accident), and indirect risks to human welfare originating from environmental degradation (i.e. increased risk of sickness from air or water pollution); and • direct risks to the natural environment.	None, unless future development occurred.	Similar to the Proposed Action.
There is a low potential for explosion with the proposed transporting and handling of commodities such as grains, green coke and calcined coke.	None	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
ENVIRONMENTAL HEALTH **Mitigation Measures** *Risk From Explosion* • Measures which may reduce negative effects to humans include locating administrative and maintenance facilities, and areas with high worker concentration away from grain and fuel storage areas. Additionally, limiting the number of train crossings and intersections encountered during product transport may reduce the risk of explosion. Adhering to proper traffic safety and transport regulations within the site, county and elsewhere will reduce the risk of an explosion caused by collision. *Risk of Traffic Accidents* • Separate timing of shift changes and train movements, adding larger shoulders to affected roadways, and improving the road paving and signalized railroad crossing at Henry Road west of Kickerville Road are measures that could be implemented to reduce the chance of an accident occurring. *Surface Waters* • Use BMPs during construction and normal operations, including the use of hay bales, silt fences and siltation ponds; • Operate and maintain an effective storm water drainage and recovery system; • store water soluble commodities in areas with runoff retention, and containing these commodities in enclosed storage facilities; and implementing a storm water drainage and recovery system, and spill prevention and recovery plan. *Vegetation* • Develop and implement a spill response and recovery plan. *Wildlife* Recommended measures reducing adverse effects of construction activities, spills, and explosions, include: • Maintaining buffer areas around the site, wetlands, and stream; • Maintaining a 100 foot vegetated buffer along the stream to maximize the buffer between the road and railroad; • Implementing a spill recovery plan on and off site. *Wetlands* Recommended measures include: • Maintain vegetated buffer zones between rail and road ways which are between riparian and transport areas; and • Adopt and implement a spill recovery plan which addresses spills into surface waters and wetland areas.	None None None None None None	Similar to the Proposed Action. Similar to the Proposed Action. Similar to the Proposed Action. Similar to the Proposed Action. Similar to the Proposed Action. Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
Significant Unavoidable Adverse Impacts		
There is an unquantified risk to human health and the environment from explosion and spills.	None identified.	Similar to the Proposed Action.
NOISE		
Impacts		
During construction, there would be temporary increases in sound levels near the terminal site, near road improvements and near the new rail line as a result of pile driving, excavation, grading and construction.	None, unless future development occurred.	Not studied in previous analysis.
No significant noise impacts from operation would occur to the nearest residences.	None identified.	Not studied in previous analysis.
Mitigation Measures		
Construction noise could be minimized with properly maintained equipment, noise muffling equipment or temporary barriers, minimizing incidence of equipment back-up alarms, and minimizing dragging of construction materials where feasible.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
No significant unavoidable adverse noise impacts are expected to occur.	None identified.	Not studied.
LAND AND SHORELINE USE		
Impacts		
Approximately 180 acres of the 1,092-acre site would be developed with industrial uses, permanently altering the physical character of the site. The proposed development would contrast with the open undeveloped character of surrounding lands. However, as vacant properties develop in accordance with the Heavy Industrial zoning designation, the proposed land use would be consistent with the future land use pattern planned for the general area.	None, unless future development occurred.	Generally similar to the Proposed Action.
Project development would preclude informal recreation activities in the area proposed for construction, but would allow continued access on the beach and in water, except during construction.	None, unless future development occurred	Greater impact on public access and recreational fishers & crabbers than the Proposed Action.
Mitigation Measures		
To assure continued public use of the low beach area at the foot of Gulf Road, permanent public access could be provided through donation, acquisition, easement or other means.	None	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

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Proposed Action	No Action Alternative	Alternative 1
LAND AND SHORELINE USE **Significant Unavoidable Adverse Impacts**		
No significant unavoidable adverse impacts to land use patterns are expected to occur.	None identified.	Generally similar to the Proposed action.
Any current unauthorized recreational uses of the development area (uplands or shoreline) would be precluded. This is not considered a significant unavoidable adverse impact.	None identified.	Somewhat greater impact than the Proposed Action.
AESTHETICS **Impacts**		
The proposed action would alter the visual character of the upland development site from farmed land to industrial in nature. Rail access would pass through existing fields.	None, unless future development occurred.	Greater visual impact from Gulf Road. Other aesthetic impacts similar to the Proposed Action.
Some of the industrial structures would be visible from Henry Road and might be visible from the beach. The pier structure would be visible from the water to a distance of approximately one mile.	None, unless future development occurred.	More visual impact from Gulf Road due to longer trestle.
In the immediate site vicinity, the pier structure would dominate the view from the beach and increase the industrial visual character of the marine area.	None, unless future development occurred.	Somewhat more visual impact than the Proposed Action.
Mitigation Measures		
Trees screening the site from the bluff and along the ravine would be maintained, reducing visual impacts from both the water and the beach.	None	Similar to the Proposed Action.
Neutral colors and materials not prone to reflection would be utilized in construction of the larger structures.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
Industrial development of the site would alter the visual character of the uplands and the shoreline. The marine structure and berthed ships would be visible from the beach and from passing watercraft. The upland storage area would be partially visible from the water, and from Henry Road near the site.	None	Somewhat greater visual impact than the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
LIGHT AND GLARE **Impacts**		
Night lighting on the pier, upland structures and ships would be present in views from the water or islands within visual range.	None, unless future development occurred.	Similar to the Proposed Action.
Mitigation Measures		
Other than lighting necessary for safe operation of the facility, lights would be provided with directional shielding to lessen the amount of light viewed from off-site sources.	None	Similar to the Proposed Action.
Reflective surfaces on structures or the pier would be avoided or painted to reduce glare or light reflection.	None	Similar to the Proposed Action.
The vegetation on the bank between the proposed storage areas and the water would be preserved to provide a natural screen for the upland impacts.	None	Similar to the Proposed Action, if applicable.
The vegetation immediately north of the beach area most often used for recreation would be protected to reduce impacts to users of the beach. In addition, as part of mitigation to the Lummi Nation, cedar trees would be reintroduced to appropriate areas to assist in vegetation screening.	None	Similar to the Proposed Action, if applicable.
Significant Unavoidable Adverse Impacts		
Lights from the pier and the storage areas would be visible from passing watercraft and from some portions of islands within visual range of the site.	None identified.	Similar to the Proposed Action.
HISTORIC AND CULTURAL RESOURCES **Impacts**		
Development would disturb the archaeological site 45-WH-1, a shell midden, and affect the integrity and information potential of the site. Development may also affect the integrity and data potential of the cobble-derived artifact scatter.	None, unless future development occurred.	Development would destroy the archaeological sites 45-WH-83 and 45-WH-84, and affect the integrity and information potential of these sites.
Other undetermined impacts to traditional cultural properties or to spiritual aspects of the site must be determined by the Lummi Nation.	None, unless future development occurred.	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
HISTORIC AND CULTURAL RESOURCES **Mitigation Measures**		
Mitigation of adverse effects to archaeological data at 45-WH-1 may be accomplished by several means. The extent of the site should be verified in order to insure that undiscovered portions are not inadvertently damaged. Data recovery is a possibility, however, excavation of new portions of the site may be unnecessary when results of previous work remain largely unexamined. A plan should be developed to review the existing assemblage of artifacts, level bags, samples, and documentation to determine whether complete analysis and reporting would fulfill the scientific promise of the site. In addition, following analysis, the collection should be prepared for curations and transferred to the Lummi Nation when adequate facilities are available.	None	Similar to the Proposed Action.
Test excavations should be completed to determine of the artifact scatter is a single site and if it is significant. Data recovery may be necessary to mitigate impacts to all or portions of the scatter, if determined significant. For the remainder of the project area, arrangements should be made to insure contingency measures to map, sample and report any site, and to collect, analyze, and curate any artifacts found during construction of the railway or other ground disturbing modifications. In the event human remains are encountered, work should halt and the County Coroner, the Office of Archaeology and Historic Preservation, and the Lummi Nation should be contacted.	None	Similar to the Proposed Action, as applicable to the identified sites.
The mitigation measures are designed to identify and salvage archaeological cultural resources. These archaeological measures may not address the traditional cultural properties and spiritual concerns of the Lummi Nation.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
• Disturbance of the native sediments or placing fill on this site for construction of the pier will destroy the integrity and information potential of 45-WH-1.	None identified.	Destruction of two identified sites, with a variety of artifacts and resources.
• Disruption of sediments may also destroy the integrity and data potential of the cobble-derived artifact scatter.	None identified.	Same as above.
• Other undetermined impacts to traditional cultural properties or to spiritual aspects of the site must be determined by the Lummi Nation.	None identified.	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
TRANSPORTATION **Impacts**		
The terminal would generate an estimated 500 daily vehicle trips. Henry Road would experience the largest impact, increasing from 200 daily trips to 700 daily trips, and from 25 trips to 100 trips during the PM peak hour. These increases would have little or no adverse impact on vicinity roadways, and there would be no measurable degradation in roadway level of service or intersection operations (LOS A conditions would continue on all studied roadways and intersections).	None, unless future development occurred.	Similar to the Proposed Action. Refer to the previous CPIP EIS.
Train activity could eventually average between two and three 100-car unit-trains per day. Train arrivals and departures from the site would block both Aldergrove Road and Grandview Road, for approximately three 8-minute periods each day.	None, unless future development occurred.	Similar to the Proposed Action.
An estimated 140 ship trips, or 280 marine shipping movements would be generated annually by the proposed terminal, or about one shipping movement per day in the Georgia Strait.	None, unless future development occurred.	Similar to the Proposed Action.
Mitigation Measures		
No significant impacts to rail or marine transportation facilities or operations were found. However, several issues involving roadway impacts were identified; recommended mitigation measures for these impacts are noted below: • Henry Rd. is currently built to substandard conditions based upon Whatcom County Roadway Design Standards for new development. Roadway improvements to Henry Rd. may be required to provide a minimum paved roadway width of 22-feet, and shoulders of at least 6-feet in width on both sides of the street to provide adequate travel lane width and shoulders.	None	Similar to the Proposed Action.
• All-weather roadway standards to Kickerville Road and the intersection of Henry Road and Kickerville Road may also be required.	None	Similar to the Proposed Action, as applicable.
• Railroad crossing improvements on roadways in the site vicinity are also recommended. The existing signalized railroad crossing on Henry Rd. west of Kickerville Rd. exhibits design characteristics that may be hazardous to large vehicles with distances between axles of more than 15 feet. This is due to sharp vertical curves on Henry Rd. in the immediate crossing vicinity. If improvements to this crossing are not made in the context of other improvements to Henry Rd., the proponent may be required to smooth the grade differential between the roadway surface and the railway surface through paving improvements to correct the roadway grade approaching this railroad crossing.	None	Similar to the Proposed Action, as applicable.
In addition, crossing treatments at new railway beds crossing Aldergrove Rd and Gulf Rd. will be required as part of constructing the proposed 3-track railroad loop system to the project site. Due to very low traffic volumes on these two roadways at the crossing points, vehicular traffic control may consist of stop signs only.	None	Similar to the Proposed Action, as applicable.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
TRANSPORTATION **Significant Unavoidable Adverse Impacts**		
None were identified.	None identified.	Similar to the Proposed Action.
PUBLIC SERVICES **Impacts**		
Construction and operation of the terminal would increase the annual number of response calls for the Whatcom County Fire District No. 7, although the District does not anticipate a significant increase in the overall number of calls. This would increase service demands on the existing personnel.	None, unless future development occurred.	Similar to the Proposed Action.
Some of the proposed buildings would be taller than the reach of the District's and Arco's ladder trucks.	None, unless future development occurred.	Similar to the Proposed Action.
Construction of the project would generate two types of impacts for the Sheriff's Office: increased patrol time and increased service calls to the project site. This would increase service demands on the existing personnel.	None, unless future development occurred.	Similar to the Proposed Action.
Roadways leading to the site would require increased maintenance services.	None, unless future development occurred.	Similar to the Proposed Action.
Development of the Gateway Pacific site would generate a significant amount of solid waste from commercial/industrial uses on the site.	None, unless future development occurred.	Similar to the Proposed Action.
Mitigation Measures ***Fire and Police Services***		
• The Fire District is involved in the implementation of an impact fee program for proposed developments within the County. This process could be implemented in the near future and would mean, at full buildout, the proponent could be responsible for a specified percentage of the cost of an additional aerial apparatus to aid in fighting fires in this industrial area.	None	Similar to the Proposed Action.
• During detailed designing of the proposed project facilities, the Whatcom County Fire Marshal and Fire District No. 7 would be consulted to assure adequate fire flows are supplied and that site design incorporates adequate safety precautions.	None	Similar to the Proposed Action.
• Site roads would be designed and constructed so that emergency access to all buildings and structures is provided.	None	Similar to the Proposed Action.

Table 1-1 (Continued) Summary of Impacts, Alternatives, Mitigation Measures and Significant Unavoidable Adverse Impacts

Proposed Action	No Action Alternative	Alternative 1
PUBLIC SERVICES **Mitigation Measures (Continued)**		
• On-site roads and buildings would be clearly signed and numbered for identification by police or fire personnel.	None	Similar to the Proposed Action.
• A security fence would be provided around the site, and access to the site would be controlled at the gates.	None	Similar to the Proposed Action.
• On-site private security would reduce the need for calls to the Sheriff's Office.	None	Similar to the Proposed Action.
Public Works Department • All roads used as access roads to the site would need to be upgraded to All-weather status to accommodate traffic volumes and type of traffic. The Public Works Department would require structural and widening improvements to Henry, Kickerville and Grandview Roads. These improvements would need to be in place before development began.	None	Similar to the Proposed Action.
Solid Waste • Recycling of solid waste would be encouraged on the site.	None	Similar to the Proposed Action.
Significant Unavoidable Adverse Impacts		
The proposed GPT site would put additional demands on the Whatcom County Sheriff's Office and Fire District #7.	None identified.	Similar to the Proposed Action.

Chapter Two

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. Description of the Proposed Action

Project Proponent

The proposal is sponsored by Pacific International Terminals, with offices located at Harbor Center, 1801 Roeder Avenue, Bellingham, WA, 98225.

Project Location

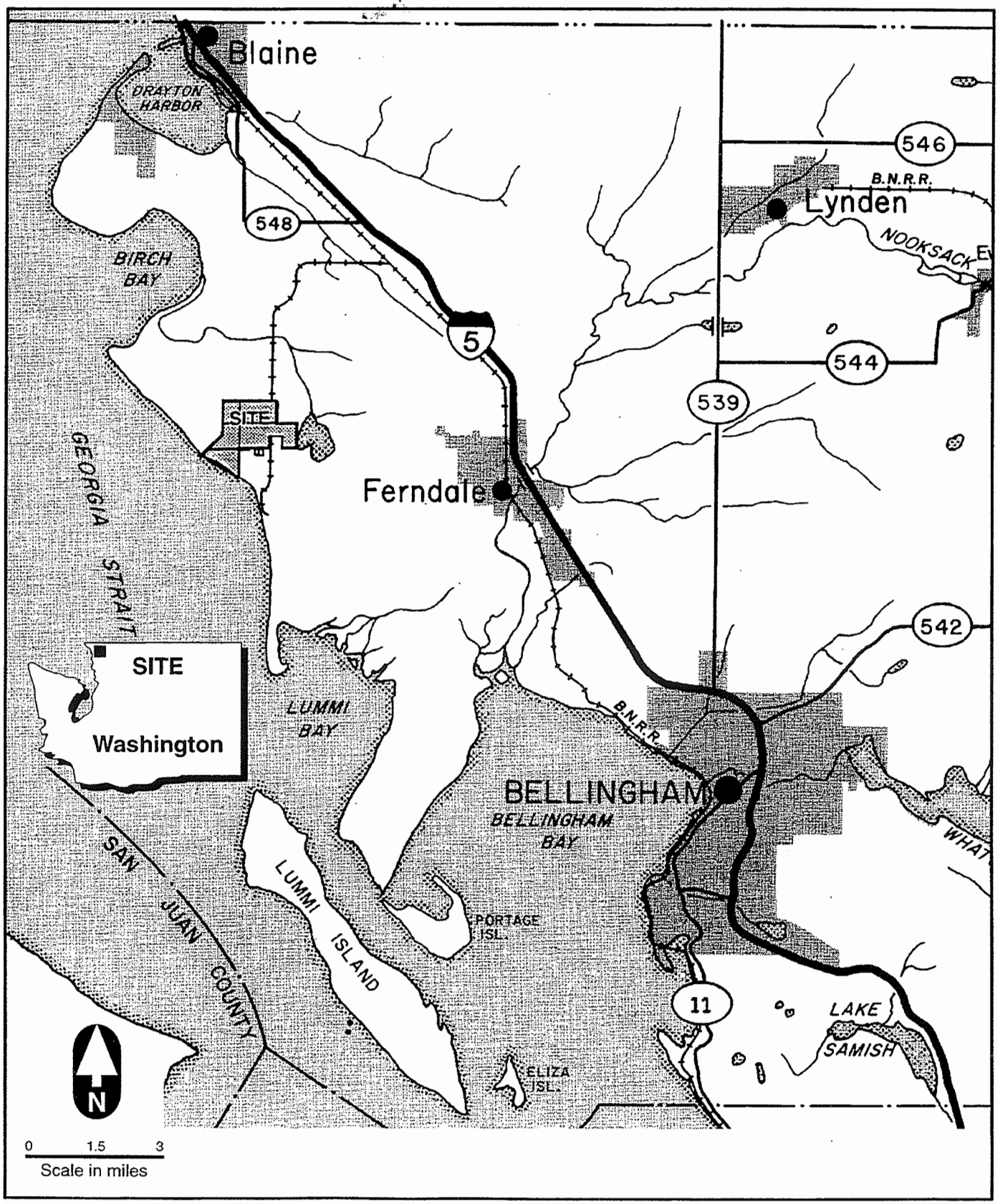
The site proposed for development of a deepwater marine terminal facility consists of 1,092 acres in northwestern Whatcom County, approximately seven miles east of the City of Ferndale and approximately twelve miles northwest of the City of Bellingham (see Figure 1). The site is located at Cherry Point which is a small promontory of land on the south side of the more prominent Point Whitehorn, south of Birch Bay, on the Strait of Georgia. Of the total site, approximately 80 acres would be used for upland terminal facilities for storage and handling of commodities for marine shipment, and 100 acres for a railroad-track loop to accommodate trains transporting commodities to the site (see Figures 2 and 3).

The site is bordered to the north and west by the Arco oil refinery, and to the southwest by the Strait of Georgia. The Intalco aluminum processing plat and the Tosco Oil Refinery are located approximately one mile to the southeast. The property immediately adjacent to the southeast, along the shoreline, is presently vacant and is proposed for development of a marine terminal facility on the shoreline and industrial development on the uplands (Cherry Point Industrial Park). Road access to the site is provided by Henry Road, which connects to Kickerville Road, and Powder Plant Road which connect to Aldergrove Road. Lake Terrell is located to the east.

Applicant's Statement of Project Purpose and Need

Background

The intent of the Gateway Pacific Terminal project is to provide waterfront access and facilities for the existing and future shipping needs of local developed and undeveloped industrial areas. The facility will also serve as a transfer point for import/export marine cargo with truck and rail traffic. The project site is centrally located to large industrial tracts both to the southeast and northwest of the proposed dock. This particular location was identified many years ago as a potential marine terminal due to the relatively easy access to the deep water that is required of ocean-going bulk cargo ships. As a multi-user facility, the terminal will be able to handle a variety of products which may be imported to, or exported from any existing or future user.


Blaine
DRAYTON HARBOR
548
BIRCH BAY
5
SITE
Ferndale
GEORGIA STRAIT
SITE
Washington
LUMMI BAY
546
B.N.R.R.
Lynden
NOOKSACK
544
539
542
B.N.R.R.
BELLINGHAM
BELLINGHAM BAY
WHAT
SAN JUAN COUNTY
LUMMI ISLAND
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Scale in miles

FIGURE 2 - GATEWAY PACIFIC

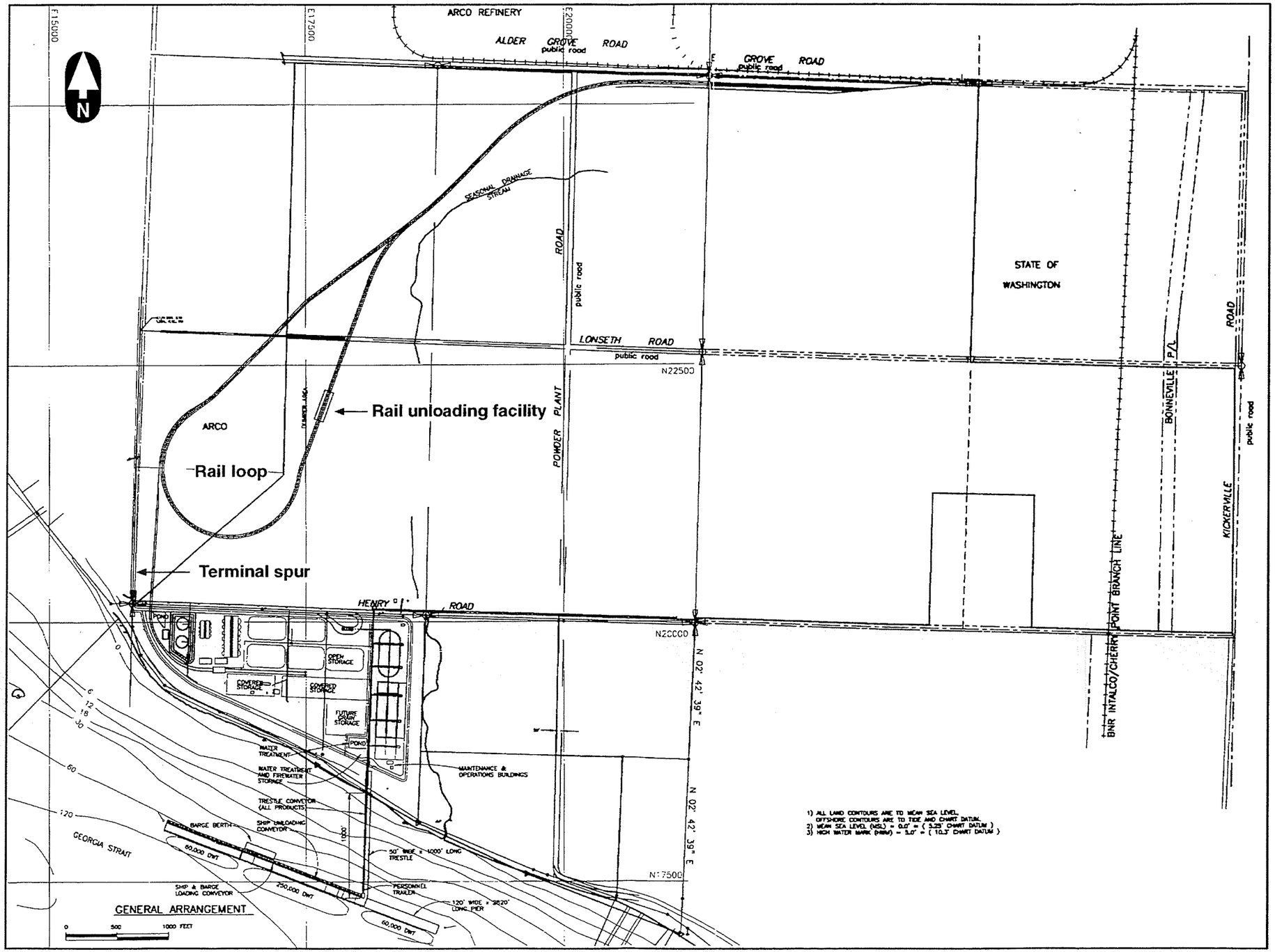
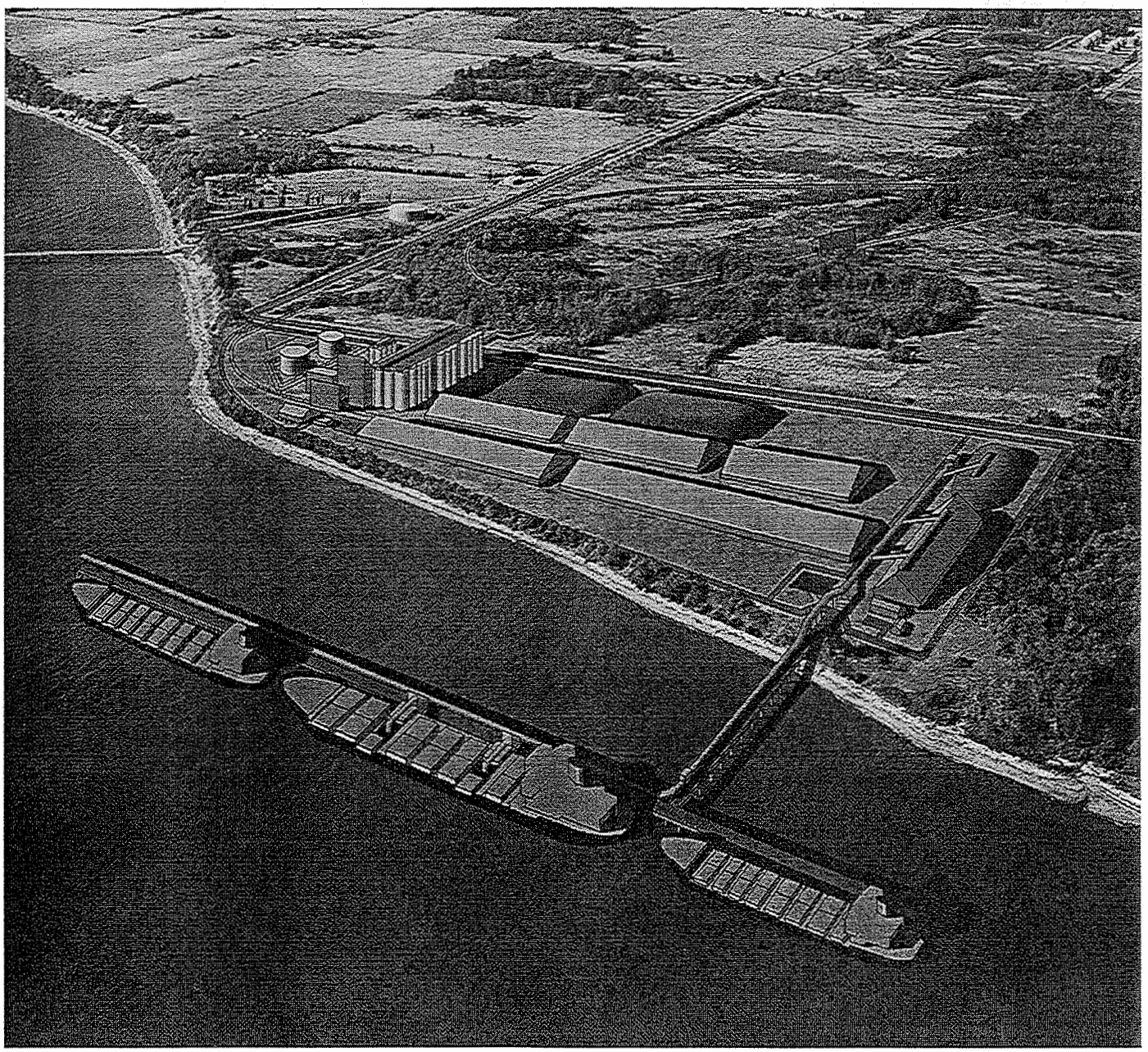


FIGURE 3 - CONCEPTUAL VIEW OF COMPLETED PROJECT



Site Selection Criteria

The project proponents undertook an in-depth survey of potential locations throughout the western United States for a facility to meet the needs of the international shipping community which also had capacity for indigenous industrial development that could utilize a terminal facility. The Gateway Pacific Terminals selection was based on the following criteria which were compared against all possible locations:

Specific Criteria

A. 80-foot water depth for berthing Cape Size Vessels
B. 250 acres of land with 3% grade topography or less for loop-track rail system
C. Rail service from producing regions to the West Coast

General Criteria

A. Terminal/Industrial Zoning in place
    1. Industrial grade infrastructure in place or available
        a. Interstate Highway Access
        b. Industrial Water Supply
        c. Power source and distribution systems in place
            1) Electricity
            2) Natural Gas
B. Marine/Shoreline Use Designation for Terminal Development
C. Minimal/Least Environmental Impact
D. Mainline Rail Service
E. All criteria able to be met within a reasonable time period.

Employment/Economic Investment

Gateway Pacific Terminals will provide living wage jobs for approximately 50 permanent full-time workers employed on the terminal for operations. Additionally, the proposed Feed Grain facility would employ 50 permanent full-time workers, again living wage jobs. In addition to the permanent jobs, engineers estimate 750,000 to 1,000,000 hours of construction labor will be needed to complete the Gateway Pacific Terminal facility. Construction labor for the Feed Grain facility would be in addition to this amount.

Pacific Rim Trade

Access to larger ships (up to 250,000 dwt) provided by Gateway Pacific Terminals will allow shippers from the Midwest to the Pacific Northwest to reduce throughput costs for products produced for, or imported from, the Pacific Rim. Asian and South American ports continue to upgrade their infrastructure to accommodate the larger vessels which are forming an increasing part of the marine trade. The addition of deep water marine facilities in the pacific northwest will allow the region to better compete in a rapidly expanding global market.

Major Site Features and Topography

The site is characterized by mostly flat to gently sloping terrain on the uplands with steep bluffs bordering the westernmost 2,500 feet of beach. The site contains approximately 5,460 feet of shoreline characterized by rock cobbles, gravel, and coarse sands. Elevations range from sea level to approximately 220 feet

above sea level, with most of the site lying between 60 and 160 feet in elevation. A small, unnamed intermittent stream flows into the Strait along the eastern boundary of the site.

The proposed terminal area is primarily in open fields, vegetated by grass and hay. The proposed loop track area is characterized by thick underbrush and stands of mature second-growth trees. The slopes are heavily vegetated with bushes and shrubs. Pasture land in the northwest and northeast segments of the site seasonally grazed by dairy cattle. An annual hay crop is harvested on pastures bordering the shoreline and pastures in the southwest.

History, Prior Planning and Environmental Review at the Cherry Point Industrial Area and Cherry Point Shoreline Management Area

Archaeological records indicate that the site was part of the coastal areas used by Native Americans for fishing and hunting since prehistoric times. In the late 1800's, the site was logged and homesteaded for farming by European settlers. Farming activities continued until the mid-1900's when much of the land in the vicinity of Cherry Point was acquired by industrial users including Arco and Intalco Aluminum.

Previous plans for development of marine terminal facilities near Cherry Point include the Kiewet Marine Facility (1984) and the Cherry Point Marine Construction Facility (1981), both on the CPIP site. Environmental impact statements were published by Whatcom County; neither of these projects was approved for construction, due to identified significant environmental impacts to fish resources, primarily eelgrass habitat. These two projects proposed construction and operation of graving docks, not pier-supported docks as proposed by PIT.

A Shoreline Substantial Development Permit Application and Environmental Checklist were submitted to Whatcom County by Pacific International Terminals (PIT) for the subject property in 1992. An Application for a Department of the Army Permit for construction of the marine terminal and loop railroad system was submitted by PIT to the Army Corps of Engineers in 1993. A Notice of Application for Permit was published in December 1993 and re-issued in early 1996.

On October 22, 1992 Whatcom County issued a Determination of Significance (DS) and Request for Comments on the Scope of the EIS. A revised Scoping Notice was issued by the County on November 30, 1995.

Whatcom County is using phased environmental review to consider the Gateway Pacific Terminal proposal pursuant to the SEPA rules (WAC 197-11-060(5)). Phased review permits environmental documents to focus on elements of a proposal and environmental issues that are relatively certain at the time of initial application and environmental review, and to defer for future analysis those project elements that are less certain or are subject to ongoing planning and permitting. Some elements of the Gateway Pacific Terminal proposal—detailed design of the upland facilities, for example—are still conceptual in nature. The number and location of on-site lighting, for example, are not known with certainty at this time. In addition, some elements – such as the precise commodities that will be stored and shipped from the facility in the long-term – will be determined by future economic conditions in world markets and cannot be accurately predicted at this time. The overall proposal is, however, sufficiently well defined to permit environmental review to move forward. Supplemental environmental review will be conducted in the future when additional elements of the proposal become more specific (e.g. when building permits are requested and construction-level plans are prepared), or when specific commodities beyond those evaluated in this document are proposed for storage or transport at the facility. Environmental review only covers facilities identified in

the proposal: i.e., development of 80 acres for marine terminal facilities, 100 acres for the rail loop, and pier construction. The application does not cover the rest of the property. Any future development of other portions of the 1,092-acre site will require supplemental environmental review.

Overview of the Proposed Action

The proposal consists of marine and upland facilities to accommodate the off-loading, storage, loading and transshipment of a range of commodities and cargoes destined for domestic and Pacific Rim markets.

The proposed facility would receive commodities by train primarily from the Pacific Northwest and mid-western regions of the U.S. and Western Canada. The marine terminal would serve ocean going national and international trade for bulk commodities, break-bulk and other marine cargoes. Most shipments would be destined for export to Pacific Rim countries.

The proposed facility would provide deep water access to accommodate vessels that require a minimum draft of up to 80 feet. The facility would also provide access to major rail lines serving the Pacific Northwest and northern states of the mid-west region of the U.S. where the majority of commodities to be shipped would originate. The portion of the total site to be used for the marine terminal facility would be large enough to accommodate sufficient train storage (100-110 car unit trains) and movement on-site to allow loading of bulk products to vessels at rates between 2,500 and 5,000 tons per hour depending on the product. One hundred acres would be required to accommodate a loop rail system that could incorporate 3 tracks and approximately 30,000 feet of trackage.

In the long-term, a wide range of commodities and other marine cargoes could be shipped from the facility by ship, including: alumina, automobiles, salt, scrap metal, aluminum ingots, aggregates, chemicals, grain, ores, green petroleum coke, calcine petroleum coke, liquid petroleum products, fertilizers, lime rock, phosphate rock, feed pellets, potash, sulfur and wood chips. Specific types of commodities would depend on market conditions.

In the near-term (i.e. next 5 years), products that would be received and shipped from the facility are anticipated to include the following:

- feed grains (wheat, barley, soybeans, corn and grain products);
- petroleum coke (calcined and green, including material from the adjacent Arco refinery);
- iron ore (pelletized and reduced/briquetted);
- sulfur (prilled);
- potash; and
- woodchips.

These commodities have been identified based on current world market conditions and their probable inclusion in the proposal; they are the focus of the analysis in this EIS. A broader list of potential products has been identified in this project description and in the Army Corps of Engineers public notice; these additional commodities are speculative at this time. Additional environmental review would occur, as determined by Whatcom County, when and if other commodities are proposed for handling, storage and shipment.

Commodities would originate primarily in the Pacific Northwest and northern mid-western regions of the United States; some products could originate in the central and western Canadian provinces. Most U.S.

origination sources are served by the Burlington Northern rail system. Commodities would include feed grains, such as corn and barley shipped from the mid-western regions of the U.S including North and South Dakota and Minnesota. Petroleum products would arrive from refineries in the Pacific Northwest and the oil fields of Alberta, Canada. Grain would be shipped primarily to ports on the Pacific Rim including China and Japan as well as India. Sulfur and similar products would be shipped primarily to Asia-Pacific markets. A few products, such as iron and woodchips, could arrive by ship or barge and be transported by barge or rail to domestic markets (e.g. western United States), as well as being shipped to foreign markets by ocean-going vessels.

An estimated 8.2 million metric tons of material could be moved through the marine facility annually at project completion.

The Gateway Pacific Terminal would operate 24 hours per day, 7 days per week when ships are being loaded. Vessel scheduling, therefore, would determine on-site activities. There would be little on-site activity (e.g. maintenance) when ships are not being loaded.

Construction is assumed to begin in 1997. Operation of the facility would begin in 1998-99.

Based on statements of the applicant, Gateway Pacific Terminals proposes to use the most environmentally sensitive equipment to provide protection to the environment from dust or spills. In recognition of the potential for negative impacts, GPT proposes that conveyors be covered over water, and transfer points enclosed with dust control systems. Terminal storm water will be separated and any runoff from the process areas will be adequately treated. Stormwater discharge will be minimized during herring spawning periods.

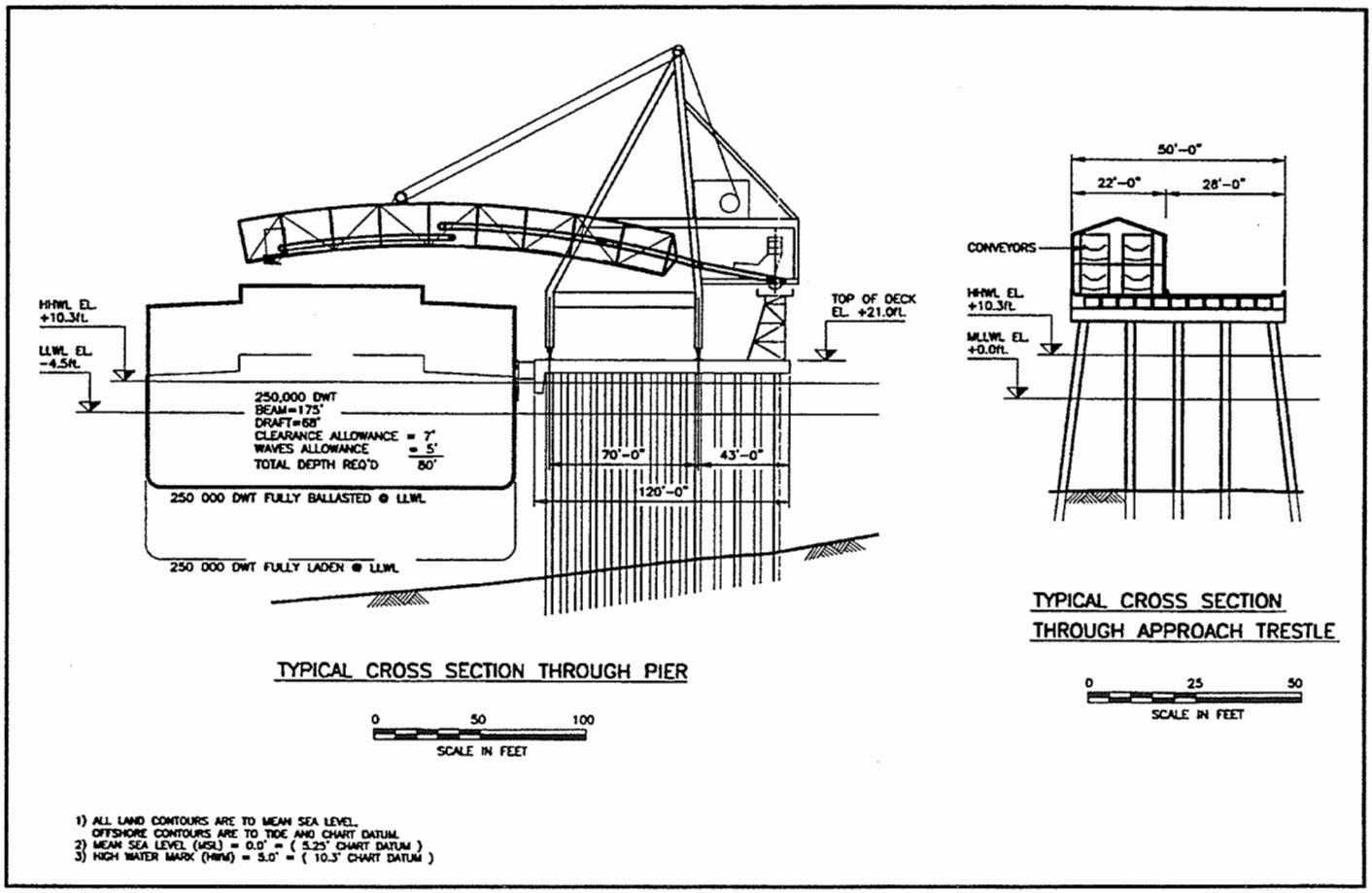
Major Project Elements

The proposal consists of construction and operation of three inter-related marine facilities: (1) a pier to provide berthing for deep water ships and barges, with an approach trestle connecting the pier to the upland terminal storage area; (2) an upland terminal facility to receive, store and handle cargo for loading onto ships and transport off-site; and (3) a loop rail track and access roads connecting the terminal facilities to rail and ground transportation systems. Each element is described in more detail below.

Marine Facilities: Pier and-Trestle. Marine facilities for berthing, loading and unloading ships and barges would consist of a 105-foot wide and 2,820 foot long pier and a 50-foot wide by 1,100 foot long approach trestle connecting the pier to the terminal storage area (see Figure 4). Conveyor system enclosures (approximately 22 feet wide and 18 feet high) would be constructed along the length of the trestle to support conveyors that would transfer materials between ships and the upland terminal. The conveyors would be enclosed where they pass over water to prevent potential spillage of materials. The pier and trestle would be supported on steel pipe piles (approximately 1,533 piles would be used). To minimize impacts on the intertidal beach, the structural framework for the trestle piles would be spaced approximately 135 feet from the nearshore area to a point where the depth is 30 feet below low water level.

The length of the trestle and design of the pier is intended to provide water depth for outer berths of up to 80 feet below low water level in order to accommodate ships of up to 250,000 dead weight tons (dwt) including "Panamax" and "Cape Size" class vessels. "Panamax" refers to the largest ship that can travel through the Panama Canal; "Cape Size" refers to ships that are too large to use the Panama Canal and con-

FIGURE 4 - PIER TRESTLE AND CONVEYOR DETAIL



sequently must sail around the Cape of Good Hope at the southern tip of South America to travel between the Atlantic and Pacific oceans.

Upland Terminal Storage Facilities. The onshore terminal storage facilities would be located on an approximate 80-acre, triangular-shaped portion of the site adjacent to the shoreline but outside the 200-foot setback (refer to Figure 2). This portion of the project site would be used for handling (i.e. conveyor) and storage of commodities, as well as for site maintenance and operation facilities, including water quality treatment. The majority of the upland terminal site will be used for storage of commodities.

The terminal storage facilities would provide space and facilities to receive, store, handle and reclaim bulk, break-bulk, and other marine cargoes. Both covered and open storage would be provided for a range of cargoes. Dry bulk cargoes, such as grains, petroleum coke and ores would be handled by covered conveyors to prevent windblown dust and spillage. A water treatment pond would be located near the onshore end of the trestle. Best management practices (BMPs) for water quality and air quality will be used to help design the handling and storage facilities.

Material Handling & Transport. Flowcharts, contained in Appendix D-2, identifies the transportation mode (in and out), product handling and storage for the commodities anticipated at the proposed terminal. Each commodity would be stored in a separate covered structure or open pile designed to safely and efficiently hold and convey materials for shipment. These are briefly summarized below. Best management practices, safety and emergency response procedures have been identified for each commodity.

> ***Grains***. Grains would arrive by rail. The train would be pulled by an electric engine (i.e., an "indexer") continuously over a receiving station containing an enclosed bottom dumper where materials will be dumped (2 cars at a time) into a hopper and moved to a conveyor. The conveyor, which will be enclosed to prevent spillage, will transport materials to a covered storage area or, depending on scheduling, directly to the dock for direct loading onto ships. Grain will be transferred to the loading conveyor, with a capacity of 5,000 tons per hour, for loading onto ships.
>
> ***Coke***. Coke may be delivered by train or truck (from nearby suppliers) and dumped into the receiving hopper. The unloading system will contain roll-up doors at both ends and a baghouse (i.e., vacuum) system to control dust emissions. A conveyor will transport the material to either an open stockpile (green coke) or to an enclosed building (calcined coke) for storage. Storage facilities will be equipped with bottom reclamation hoppers and tunnels. The tunnels will connect to the loading conveyor system connecting to the loading dock. Front end loaders may be used to move stock piled materials to the hoppers, where they will feed by gravity to the tunnel and conveyor system. The loading conveyor will transfer material to the loading dock at a rate of 1,500 tons per hour for loading onto ships.
>
> ***Iron Ore***. Iron ore and iron pellets will arrive at the facility by ship. Unloading will be accomplished within enclosed systems. Some ships will contain their own unloading equipment. The covered unloading conveyor, with a capacity of 5,000 tons per hour, will move material to a storage facility along Henry Johnson Road. After processing, the material (direct reduced iron [DRI] or hot briquetted iron [HBI]) would be loaded onto the same covered conveyor for transport (at a rate of 3,000 tons per hour) to the shipping dock for loading onto ships (for international transport) or barges (for domestic transport).
>
> ***Sulfur***. Sulfur would be received in solid (prilled) form by railcar. The unloading system would use a hopper for receiving solid material. A scrubber system would be used to control dust

emissions during unloading. Prilled sulfur would be conveyed to a covered storage area. The covered storage area will be equipped with bottom reclamation hoppers and tunnels. Dozers would be used to move material in the storage area towards the hoppers and the tunnels; the tunnels will connect to the loading conveyor system to the loading dock for loading onto ships. The loading conveyor will move material at a rate of 3,000 tons per hour.

Potash. Potash will be delivered to the site by train, dumped into a receiving hopper and loaded onto a conveyor for transport to an enclosed storage structure. The receiving station will be equipped with a scrubber to control dust emissions during unloading. The storage structure will be equipped with bottom reclamation hoppers and tunnels. The tunnels will connect to the loading conveyor system connecting to the loading dock. Materials will be conveyed at a rate of 3,000 tons per hour for transport by ship.

Woodchips. Woodchips will arrive at the facility by ship. Material would be unloaded from the ships to the conveyor for transfer to open storage piles. For shipment, material would be transferred to the loading conveyor by front end loader for loading onto railcars or barges.

An administration building would be located in the northeastern portion of the site, near the access to Henry Road. A maintenance and operations building would be located near the onshore portion of the trestle; a personnel trailer would be located on the pier near the trestle. Approximately 50 full time employees would work at the facility at completion of the project.

Rail, Road Access, and Marine Traffic

Rail. The terminal would be connected by a rail spur to the Burlington Northern Railway at Aldergrove Road to the BNR Intalco/Cherry Point branch line. The proposed railroad loop system would consist of nearly 30,000 lineal feet of track and could store up to three 100-to-110 car unit trains at the same time. The loop tracks would be located north of the terminal storage facilities with a spur track extending to serve the facility. The loop track and a portion of the spur line would be located partially on the adjacent Arco property.

An automated dumper and conveyor system would be constructed along the loop systems for the loading and unloading of bulk materials. Trains would be pulled by an electric engine (i.e., an "indexer") through a receiving or unloading station in a continuous operation; diesel locomotives would not be used for this stage of handling. Materials would be dumped in an unloading hopper connected to a conveyor system which will move it to the storage area, and from the storage area to the pier for loading onto vessels. The unloading station will be designed to unload a 100-to-110 car unit train in approximately 4.3 hours. At full operation of the marine terminal, train activity could average two to three 100-to-110 car unit trains per day.

Site access would be provided via Henry Road at its intersection with Kickerville Road. Depending on how traffic generation is calculated (based on ship berths or based on the acres of the upland terminal), 500 or 1,500 total daily trips could be generated at completion of the project. Little off-site truck traffic is anticipated; truck traffic would be limited to local trips, such as transferring bulk coke from the Arco facility to the Gateway Pacific Terminal.

Marine. The pier would be designed to accommodate three vessels ranging in size from 60,000 to 250,000 dwt simultaneously on the outside of the pier. Large vessels will be destined for foreign markets. Up to six barges could be accommodated on the inside of the pier; barges will transport selected commodities to

domestic markets (e.g. west coast of United States). An estimated 140 ship trips, or 280 marine shipping movements per year would be generated by the proposed marine terminal. This would result in an average of less than one vessel movement per day.

Related Features of the Proposal

Storm Water. Deck surfaces at the loading berth would be equipped to collect rainwater and any runoff for return to an oil/water separation facility for appropriate treatment and disposal. Two storage tanks located in the western portion of the terminal storage facility would be lined and bermed in accordance with current environmental and fire codes. The storm water management system would segregate clean water from potentially contaminated water by grading and curbing throughout the terminal site. The trestle and pier would also be curbed and stormwater directed to the treatment area. An onsite collection and treatment system would provide screening, gravity sedimentation, oil/water separation, physicochemical treatment, and sludge removal as required.

The primary stormwater outfall will be through an engineered diffuser located at the face of the pier. The outfall to the pier will be sized to convey the 24 hour design storm with a reoccurrence probability of 1 in 25 years (25 year design storm). This outfall will be designed to increase the mixing of stormwater and salt water in order to create a broad band mixing zone that will reduce impacts to salinity, temperature, and other water quality impacts in the herring spawning zone. Small outlet pipes will be attached to the pier pilings and will discharge at depths ranging from 15 to 50 feet to provide vertical as well as horizontal separation of the discharge points

GPT will seek to minimize the discharge of process stormwater to the bay. During the herring spawning season of March through June, process stormwater may be stored in a series of lined ponds and diverted via pressurized pipes to existing and newly constructed wetlands. The final Stormwater Pollution Prevention Plan (SWPPP) will include a design for the management of stormwater during the herring spawning season so that stormwater discharge impacts to the bay during this sensitive time of the year is minimized or eliminated.

In the event the lined detention pond storage volume is exceeded, an emergency overflow channel capable of conveying the 100-year design storm will be utilized. This overflow channel is located immediately east of the proposed facility footprint and is currently a seasonal stream. The drainage basin for this seasonal stream is normally dry and is separated from the saltwater by a gravel and cobble berm that is created by the form of the shore. By routing flows to this location, impacts to the riparian corridor will be reduced, as opposed to directing overflow runoff into the main stream channel. It is also expected that this outfall location will provide an added benefit in diffusing the freshwater discharge at the shore both by spreading flow through the gravel and cobble shore berm and by separating the release of stormwater from the site from that of the main stream channel, thereby providing a wider area of discharge of the freshwater plume.

Best management practices (BMPs) to maintain water quality have been developed for elements of the proposal and for each commodity expected to be handled and shipped from the Gateway Pacific Terminal. These BMPs are contained in Appendix D-2 and summarized in the *Water* section of this Draft EIS.

Water Supply. The Whatcom County Public Utility District No. 1 is the designated water purveyor for the Cherry Point Industrial area where the proposed facility is located. The PUD would supply fire protection water to the site via the existing 24-inch mains that presently serve the area. The PUD, together with Pacific International Terminals, is also developing groundwater resources, which have been determined to be not connected to the Nooksack River, to serve the consumptive water needs of the project.

Sanitary Sewer. On-site septic systems would be used to serve the terminal storage facility.

Safety Systems & Emergency Response Procedures

For the proposed GPT facility, preventative measures will be incorporated in all phases of the design.

Explosion and Fire. With most grain processing facilities, explosion and fire can be hazards since grain dust is a fuel source. Explosive conditions might occur when dust is thick enough that visibility is about one meter. Dust levels which could lead to explosion would be detected within working spaces long before this level was reached. With regard to operating practices, welding and torch cutting can be a major ignition source as well. As part of the facility personal protection and safety plan, there are very rigid procedures before cutting or welding of equipment can occur in a facility such as this. The equipment is shut down and surfaces are wetted down. The specific GPT methods and procedures used to minimize the potential for fire and explosion will be outlined in the facility operations and maintenance plan.

Added to the manual and automatic systems for detection of fires and the activation of sprinkler heads, sirens, and alarms at the local fire hall, are the following:

- Immediate evacuation of the facility by all personnel and gathering at distanced pre-designated gathering points for head count. If any personnel are missing, management personnel are notified, in turn notifying fire department personnel on arrival.
- A procedure to contact ambulances if necessary.

Spill Response. The procedures for reporting and handling spills will be specific and immediately implementable. In the event of a spill, the appropriate GPT personnel will contact previously identified individuals and agencies, alert them to the status of the situation, and work closely with the supervising agency to ensure that the matter has been adequately addressed.

Measures to reduce the risk of spills include:

- railcar unloading will be done inside an enclosed building equipped with a negative air system;
- the looped track and use of an indexer (which prevent jarring that loosens grain from the rail cars);
- closing hopper doors on the rail cars after they have been emptied;
- an emergency cable that runs the length of the shipping gallery so that the conveyors can be stopped immediately (chronic losses are not expected to occur with the type of conveyor used); and
- exhaust systems equipped with fabric filters will be located at all transfer points within the building.

Spill prevention procedures will be reviewed with GPT staff on a schedule outlined in the Emergency Response Plan.

Pest Management. Control of pest species related to storage and movement of grain cargoes will include:

- building design to reduce access and use by pest species,
- good housekeeping to remove spilled grain at the facility,
- weekly monitoring and clean-up of grain along the tracks as needed,
- compliance with other regulations related to pest control, and
- extermination.

Ballast Water. The issue of the disposal of ballast water is a world wide issue that is being addressed by the International Maritime Organization of the United Nations. They are proposing that all ballast water be handled during a mid-ocean ballast exchange. To be effective, these measures must be required and enforced at the international level. GPT is sensitive to the issue of local and regional contamination by ballast water and will include preventative measures in the facility operation and maintenance plan.

Emergency Response Plan Procedures. GPT will complete a final, site specific emergency response plan that will ensure that spills and releases are reported to the appropriate authorities and addressed in an manner that is consistent with local, state and federal rules and regulations. Development of the emergency response plan will be completed when the facility design is available. The plan will also involve discussions with neighboring industries (ARCO and INTALCO), Whatcom County, the Coast Guard, and all related agencies and individuals who should be notified in the event of a spill.

GPT's Emergency Response Plan will include the following:

- responsibilities of designated persons;
- alarms and reporting procedures (both in plant and offsite);
- immediate action to be taken or not taken;
- evacuation routes and procedures, assembly areas; and
- location of shut-off valves.

All products handled at the terminal will be included in the Emergency Response Plan. The Plan will be updated if new products which require a different response are added; however, the facility, at this time, will only handle dry bulk products. During the construction phase, all contractors will be required to have a written emergency response plan.

B. Alternatives to the Proposed Action

Evolution of Site Planning and Consideration of On-Site Alternatives

This EIS considers two alternatives to the proposed action: no action, and construction of a proposed pier and shipping facility at another site (Cherry Point Industrial Park) to the south of the proposal.

Other on-site alternatives for the design and layout of the proposed action were considered by the applicant over a period of several years. Successive changes to these initial plans occurred as a result of ongoing site evaluation and consultation with state and federal agencies and tribes. Major changes that occurred as a result of this evaluation and consultation are outlined below. In general, ongoing planning has attempted to avoid and minimize wetland impacts associated with the railroad track loop, and marine resource impacts associated with construction and operation of a pier.

1992 Site Plan. The site plan originally proposed in 1992, shown in Figure 5, would have affected (i.e., filled or disturbed) approximately 50 acres of wetlands to construct the railroad loop. The tracks also crossed the seasonal stream located on the site. The pier design associated with this site plan had the trestle crossing identified eelgrass habitat in a northeast/southwest direction, which could have caused significant shading impacts during some times of the year.

1993 Site Plan Revision. The 1993 site plan, shown in Figure 6, reflected modifications designed to reduce impacts to wetlands, streams and marine resources. A new route for the railroad loop was identified which reduced the wetland fill/disturbance to approximately 20 acres. This layout still involved crossing

FIGURE 5 - 1992 SITE PLAN

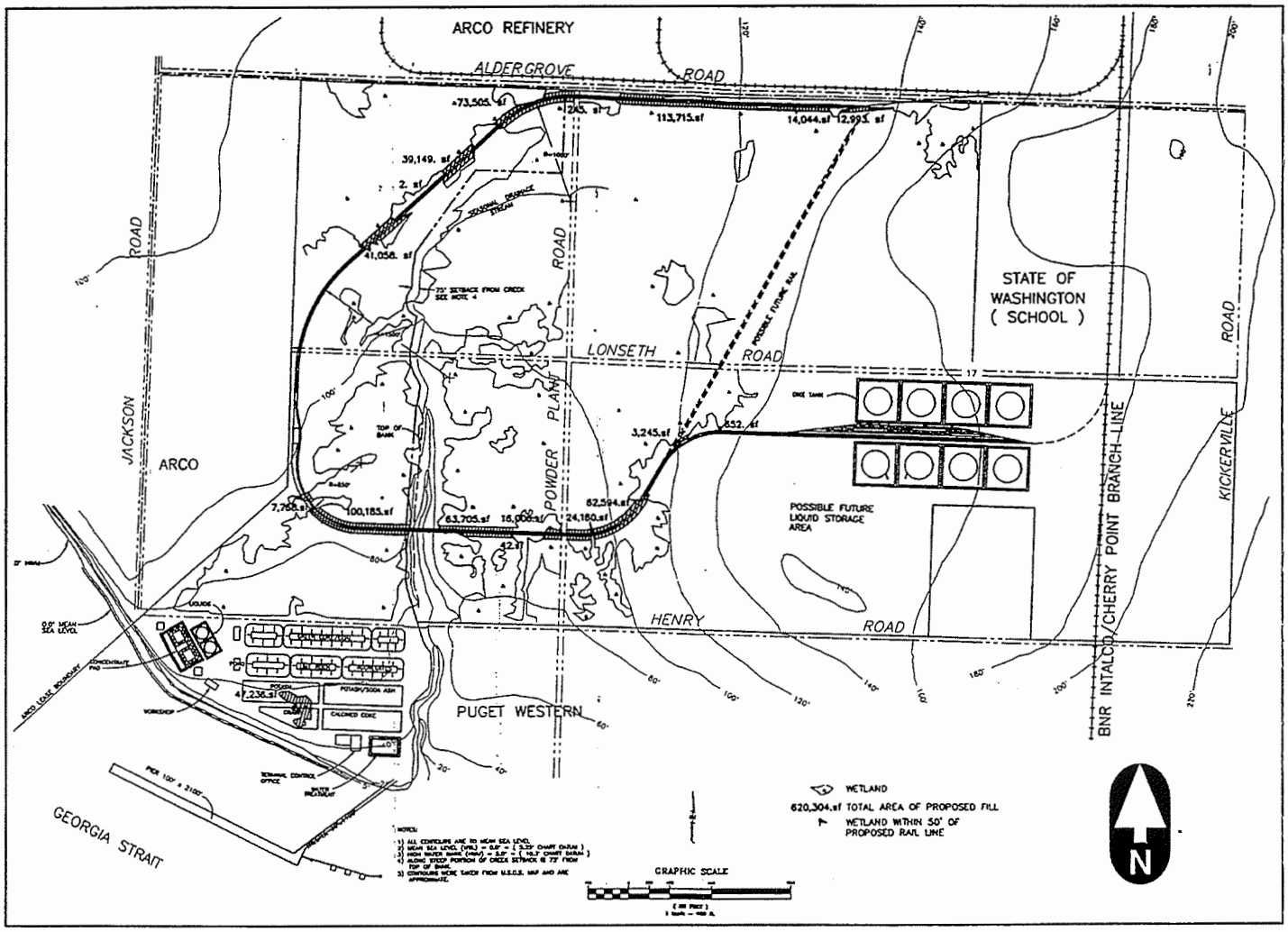
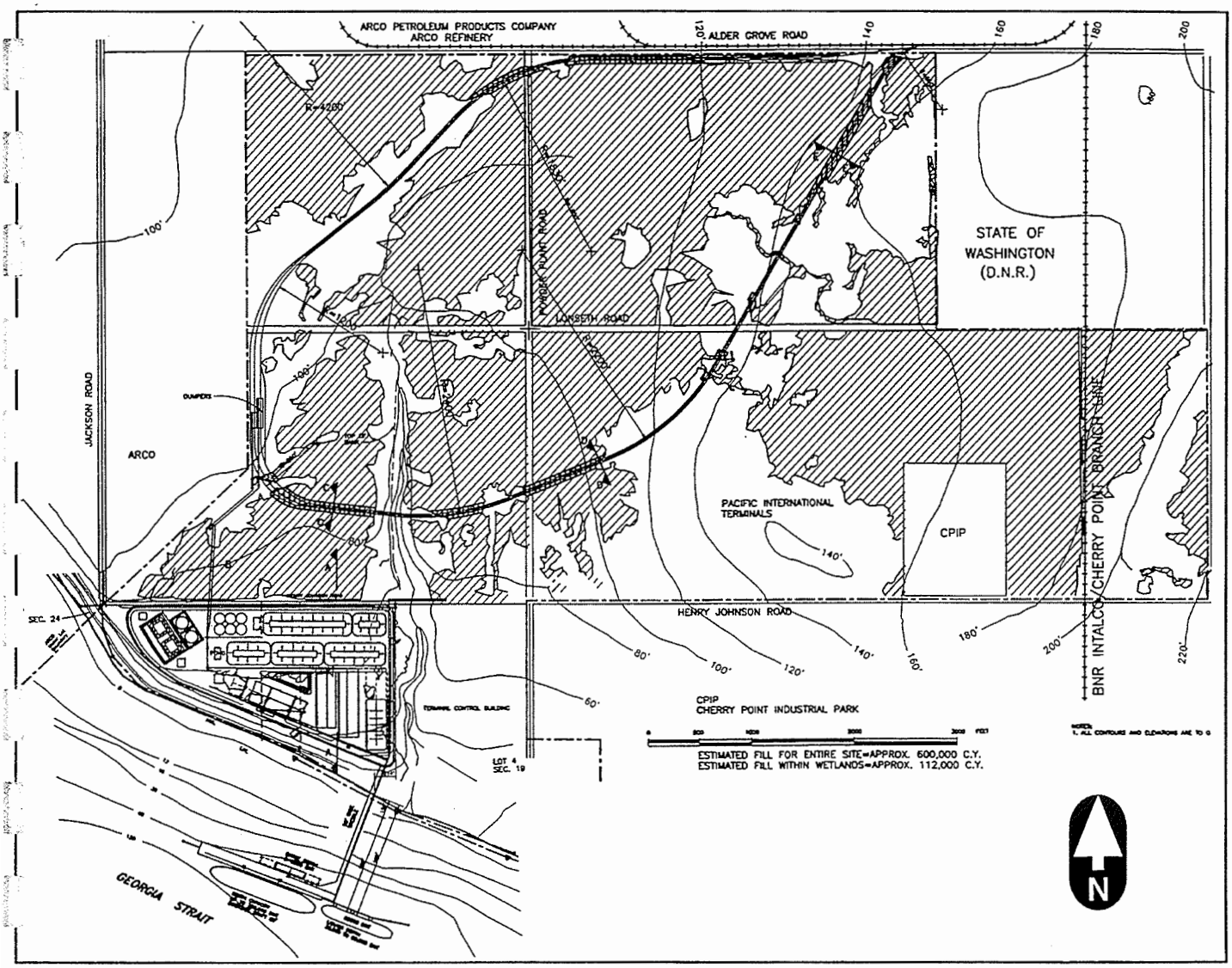


FIGURE 6 - 1993 SITE PLAN



the seasonal stream. Based on development of a shading model, the pier and trestle were realigned (in a more north/south direction) to avoid direct construction impacts and to reduce potential shading impacts to eelgrass.

Changes Incorporated Into Current Proposal. The proposal has been designed in the context of this prior evaluation and project modification. The proposed railroad loop design occupies considerably less land and would reduce wetland fill or disturbance to 5.8 acres; crossing the seasonal stream would not be necessary. The orientation of the pier and trestle follows the north/south design intended to avoid and minimize eelgrass impacts due to construction and shading; this is based on ongoing refinement of the shading model. The upland storage area has also been reconfigured to use land more efficiently; covered storage structures and open storage areas are grouped.

In general, modifications intended to achieve the proponent's objectives at lower environmental cost have been incorporated into the proposed action. Further modifications could occur as a result of the environmental review process. No additional on-site alternatives have been identified for this Draft EIS.

No Action Alternative

Under the No Action alternative, the proposed marine terminal facility would not be constructed and the site would remain in its currently undeveloped state for the foreseeable future. Other industrial development would be likely to occur on the site and adjacent properties over time, consistent with the existing industrial zoning.

Alternative 1 - Cherry Point Industrial Park (CPIP)

Under this alternative, a marine terminal facility -- including a pier intended to accommodate deep water vessels, an upland terminal, and industrial facilities -- would be constructed on the Cherry Point Industrial Park (CPIP) property to the south of the proposed site. Only one new pier and marine terminal facility would be constructed in the Cherry Point area.

A Draft Environmental Impact Statement (EIS) for the CPIP was issued by Whatcom County in November 1992; a Final EIS was issued in February 1993. Those documents describe the proposed development and discuss significant impacts and mitigation measures. The CPIP project is still under review by the Corps of Engineers.

The CPIP alternative is intended to recognize the possibility that only one additional pier and marine terminal facility may be permitted in the Cherry Point area. The Whatcom County staff report for the CPIP proposal (May 20, 1993) recommended that only one additional pier be permitted at Cherry Point. In their approval of the CPIP proposal, the Whatcom County Council noted that there were no adopted policies or regulations that would per se limit development to a single pier. While the Council acknowledged that it was possible that limiting development to one pier could serve the public interest, it did not have any information on which to make a comparative evaluation of the two proposals. The Department of Natural Resources (DNR), in correspondence to the County Council (October 5, 1995), reiterated that its decision to lease state tidelands must serve the State's long-term best interest. DNR determined that only one lease at Cherry Point will be considered, and that their decision will be made only after all relevant information has been disclosed.

The Whatcom County Draft Comprehensive Plan being considered by the County Council as of this writing contains a proposed policy (2CC-2) which addresses the potential for additional docks at Cherry Point.

While the CPIP alternative would not accomplish the proponent's objectives -- since it is a competing project, and assumes that the Gateway Pacific proposal is not built -- it is likely an alternative to the Gateway Pacific proposal in a practical sense, given the recent input summarized above. Including this alternative in the Gateway Pacific Terminal EIS is intended to allow decision makers and interested citizens to compare the relative environmental impacts of the two proposals. Information about the CPIP alternative is summarized from the published EIS for that proposal; readers desiring greater detail should consult the relevant environmental documents for that project.

Chapter Three

ENVIRONMENTAL ANALYSIS

EARTH

This section summarizes the Geotechnical Slope Reconnaissance study prepared by Golder Associates, Inc. This report is included as Appendix A to this document.

Affected Environment

Topography

The project site is located at Cherry Point, about 12 miles northwest of Bellingham, Washington. Cherry Point is a small promontory of land on the south side of the more prominent Point Whitehorn, south of Birch Bay, on the Strait of Georgia. The proposed project site of 1,092 acres is triangular in shape, about 2,000 feet wide by 3,000 feet long, and located on the south side of Cherry Point (refer to Figures 2 and 3). The site includes about 3,700 feet of beach front on the Strait of Georgia. The site interior is predominantly flat, situated at about elevation 60 feet. The site slopes down gently to about elevation 10 feet in the southeast corner. A small, unnamed, intermittent stream flows south into the Strait along east boundary of the site. Site surface water drainage appears to flow to the south and southeast.

The slopes on the beach along the site increase steadily in height from about five feet in the southeast to about 70 feet in the northwest corner. The slope angles range from about 2H:1V (Horizontal to Vertical) to near vertical in localized areas. The pier trestle head is located at the flattest slope angle.

The proposed loop rail track area is vegetated by grass and hay, punctuated by several localized stands of young trees. The slopes are thickly vegetated with bushes and shrubs, and in the north portion with thick underbrush and mature trees up to 24 inches in diameter.

Geology and Slope Stability

The project site is located within the Bellingham Basin, a structural basin which accumulated shallow marine and deltaic sedimentary vast deposits during the Tertiary and Quaternary Periods. The site soils exposed in the shoreline bluffs are derived from sediment deposited during the waning stages of the Frasier Glaciation which occurred from 18,000 to 10,000 years Before Present (BP). The Frasier Glaciation was marked by two glacier advances (Vashon and Sumas Stades) and retreats. The Everson Interstade and the Sumas Stade are the most significant events relevant to the site.

The soil conditions on the subject site have been mapped by Easterbrook (1976), and indicate the project site, including the site slopes, are predominantly underlain by a glaciomarine drift, named the Bellingham Drift. This unit was deposited during the Everson Interstade, a period of glacial quiescence in the north Puget Sound area (Easterbrook, 1963). The Everson Interstade was a time of temporary ice retreat from the area. The ice front was located to the north in British Columbia and the sea level was higher than present day. This resulted in a shallow sea in the Bellingham area. The ice front was actively calving sediment-laden ice which drifted south, melted, and deposited sediment on the sea floor (glaciomarine drift).

The site slopes, with the exception of a localized area at the south end, are underlain by the Bellingham Drift. There are abundant exposures of the Bellingham Drift on the site slopes, where it was composed of a silty clay, with some sand, gravel and cobbles. It is nonstratified and poorly sorted. The exposures observed were competent, in the very stiff to hard range. However, the near surface exposures are typically stronger due to desiccation (dewatering). The Bellingham Drift unit can be firm to soft below the

desiccated layer, which typically is 5 to 20 feet thick. The slopes were typically mantled by a layer of colluvium generally 2 to 5 feet thick.

The slopes in the southwest portion of the site in the vicinity of the intermittent stream have been mapped (Easterbrook, 1976) as Terrace Deposits of the Sumas Stade. The Sumas Stade was followed by the Everson Interstade. The Sumas Stade ice front never reached the Bellingham area; however, outwash sand carried by glacier-fed meltwater streams was deposited over much of the project area. As mapped by Esterbrook, the Terrace Deposits consist of well-stratified sand and gravel deposits. Fresh exposures of this unit were not observed during a field reconnaissance. The slopes in the area of the creek are low and thickly vegetated. The soils near the creek are highly weathered and consist of silty sand and gravels.

The beach is armored with cobbles and small boulders, making walking difficult. The relatively high energy of the wave action on this stretch of beach erodes the fine gravel, sand, silt and clay fractions of the soil that forms the matrix of the Bellingham Drift leaving behind the cobbles and boulders.

The slopes were evaluated for indications of existing or historic slope movements. The slope height increased from the southwest to the northeast. The slope angles on the lower slopes, south of Cherry Point, were steeper ranging from about 1H:1V to 1.5H:1V. North of Cherry Point, where the slopes were higher, the angles decreased to about 2H:1V. Still farther to the north, beyond the subject site, near the Arco Pier, the slopes were near vertical, and contained numerous recent sloughs.

No surface evidence of recent large rotational or slough type failures were observed on the site slopes. No large cusp-shaped areas of the slopes were observed along this straight linear beach. Small scale (10-30 feet high), shallow (1-5 foot thick) sloughs were observed infrequently along the beach and extended, in some cases, from the beach to the crest of the slope. Because of the thick vegetative cover, none of the sloughs appeared to have occurred recently. It would appear that the sloughing observed is likely predominantly controlled by a slow process of wave erosion at the toe of the slopes combined with rainfall saturation. Seepage was observed in nearly all areas of the slope and appeared concentrated at the contact between the colluvium and the Bellingham Drift.

The higher slopes, north of Cherry Point, were covered with extremely thick vegetation making general inspection of the slopes difficult. It appears that the slopes, although not particularly steep (2H:1V), have an irregular surface, possibly indicating that slow soil creep is occurring. There were no signs of large scale slope movements such as scarps.

.-0BSignificant Impacts of the Pdopose Action

Topography

Site development plans do not include any modifications to the shoreline slopes. The pier and conveyor will span the shoreline slopes. No impacts are anticipated.

Geology and Slope Stability

No development is proposed for the coastal slopes. No direct impacts would occur to geology and slope stability. Uncontrolled surface water runoff from the planned site development inland of the slopes could adversely affect slope stability. However, stormwater will be controlled to avoid uncontrolled runoff onto the slopes. The slopes will continue to slowly retreat due to the natural erosion processes, such as wave

erosion, slope creep, and weathering of the soils. No evidence of recent mass movement of slopes was observed in the project area.

Mitigation Measures

Topography

No mitigation measures are required as there would be no significant impacts to the topography.

Geology and Slope Stability

The planned facility will have an operating life of 50 to 100 years. According to the site plan provided, the proposed slope setbacks for facility improvements are a minimum of 100 feet. Based on field observations, this setback distance is adequate, provided that the recommendations presented below are followed.

- Site development and grading should direct surface water flow away from the crest of the site slopes and should be conveyed to a storm water collection system. No surface water should be discharged on the site slopes.

- The vegetation on the slopes should not be removed or significantly disturbed. Any significant slope failure occurring on the slopes during the life of the facility should be evaluated by a qualified geotechnical engineer and appropriate remedial action taken.

Significant Unavoidable Adverse Impacts

Topography

No significant unavoidable impacts have been identified.

Geology and Slope Stability

With implementation of proposed runoff controls, no significant unavoidable adverse impacts on geology or slope stability have been identified.

Impacts of the Alternatives

No-Action Alternative

Under the No Action Alternative, the proposed marine terminal facility would not be constructed and the site would remain in its currently undeveloped state for the foreseeable future, resulting in no impacts to topography, geology, or slope stability. Industrial development could occur in the future, with unknown impacts on topography, geology and slope stability.

CPIP Alternative

The following impacts were identified in the Draft EIS for the Cherry Point Industrial Park (CPIP) project:

Topography. Grading and site preparation would modify the existing topography of the site.

Geology and Slope Stability. Since the land at the proposed CPIP site has low slopes and site grading would be kept to a minimum, there would be no impacts on the geology or slope stability of the proposed site.

Soils and Erosion. Impacts of construction activities and regrading of portions of the uplands could result in erosion and soil compaction. Unvegetated soils are susceptible to weathering caused by stormwater runoff. Erosion of soils could lead to sedimentation of wetlands, ponds, and the intermittent stream.

AIR QUALITY

Regulations, Standards, and Guidelines

Three agencies have jurisdiction over the ambient air quality in the project area: the U.S. Environmental Protection Agency (EPA), the Washington Department of Ecology (WDOE), and the Northwest Air Pollution Authority (NWAPA). These agencies establish regulations that govern both the concentrations of pollutants in the outdoor air and contaminant emissions from air pollution sources. Although their regulations are similar in stringency, each agency has established its own standards. Unless the state or local jurisdiction has adopted more stringent standards, the EPA standards apply. Table 3-1 displays the outdoor, or "ambient" air quality standards that apply in the project area.

Some of the pollutants listed in Table 3-1 are subject to both "primary" and "secondary" federal standards. Primary standards are designed to protect human health with a margin of safety. Secondary standards are established to protect the public welfare from any known or anticipated adverse effects associated with these pollutants, such as soiling, corrosion, or damage to vegetation.

WDOE maintains a network of air quality monitoring stations throughout Washington State. In general, these stations are located where there may be air quality problems, and so are usually in or near urban areas or close to specific large air pollution sources. Other stations are located in remote areas to provide an indication of regional air pollution levels. Based on monitoring information collected over a period of years, the state (WDOE) and federal (EPA) agencies designate regions as being "attainment" or "nonattainment" areas for particular air pollutants. Attainment status is therefore a measure of whether air quality in an area complies with the federal health-based ambient air quality standards displayed in Table 1.

Affected Environment

Because of the predominance of industrial classifications at Cherry Point, there are a number of industrial air pollution sources. Since Whatcom County is a rural county lacking wide-spread urban transportation congestion (except for the City of Bellingham), industrial point sources contribute a large portion of the air contaminants emitted county-wide. A number of industrial sources are located in the project vicinity, including Arco oil refinery, Intalco Aluminum Corporation (aluminum processing), and Tosco oil refinery.

Ozone, particulate matter, and sulfur dioxide are measured in Whatcom County. The five most recent years of data indicated concentrations of these pollutants have met local, state, and federal health standards (Ecology 1994). Another pollutant of concern is carbon monoxide, and all except for SO_2 are addressed further below.

Ozone. Ozone is a highly reactive form of oxygen created by sunlight-activated chemical transformations of nitrogen oxides and volatile organic compounds in the ambient air. Unlike carbon monoxide concentrations which tend to occur very close to the source(s) of emissions, ozone problems tend to be regional in nature because the chemical reactions which produce ozone in the atmosphere occur over a period of time. During the lag time between emission and ozone formation, ozone precursors can be transported far from their sources. Transportation sources are one of a number of sources which produce the precursors to ozone formation.

Table 3-1
Ambient Air Quality Standards

POLLUTANT	NATIONAL PRIMARY	NATIONAL SECONDARY	WASHINGTON STATE	NWAPA
Total Suspended Particulate Matter (TSP)				
Annual Geometric Mean ($\mu g/m^3$)			60[a]	60[a]
24-hour Average ($\mu g/m^3$)			150[b]	150[b]
Inhalable Particulate Matter (PM10)				
Annual Arithmetic Mean ($\mu g/m^3$)	50	50	50	50
24-hour Average ($\mu g/m^3$)	150[c]	150[c]	150[c]	150[c]
Sulfur Dioxide (SO_2)				
Annual Average (ppm)	0.03[a]		0.02[a]	0.02[a]
30-day Average (ppm)				0.04[a]
24-hour Average (ppm)	0.14[b]		0.10[b]	0.10[a]
3-hour Average (ppm)		0.50[b]		
1-hour Average (ppm)			0.25[d]	0.25[d]
1-hour Average (ppm)			0.40[b]	0.4[a]
5-minute Average(ppm)				0.8[e]
Carbon Monoxide (CO)				
8-hour Average (ppm)	9[b]		9[b]	9[b]
1-hour Average (ppm)	35[b]		35[b]	35[b]
Ozone (O_3)				
1-hour Average (ppm)	0.12[c]	0.12[c]	0.12[c]	0.12[c]
Nitrogen Dioxide (NO_2)				
Annual Average (ppm)	0.05[a]	0.05[a]	0.05[a]	0.05[a]
Hydrocarbons (as methane)				
3-hour (ppm)				0.24[f]
Lead (Pb)				
Quarterly Average ($\mu g/m^3$)	1.5[a]	1.5[a]		

$\mu g/m^3$ = micrograms per cubic meter; **ppm** = parts per million

[a] Never to be exceeded

[b] Not to be exceeded more than once per year

[c] Standard attained when expected number of days per year with maximum hourly average above this limit is equal to or less than one.

[d] Not to be exceeded more than twice in seven days

[e] Not to be exceeded more than once in eight hours

[f] Not to be exceeded more than once in three hours, 6 a.m. to 9 a.m. April 1 through October 31.

Whatcom County is designated as an attainment area for ozone because no measured concentrations exceeded the limit listed in Table 3-1.

Particulate Matter (PM10). Total suspended particulate (TSP) is the total amount of particulate matter in the ambient air including particles up to about 75 micrometers in diameter. Until 1987, there were local, state, and federal regulations limiting TSP. In 1987 the federal total suspended particulate matter standards were replaced with standards based on the fraction of the total particulate less than or equal to about 10 micrometers in diameter (PM10). This is the important size fraction of particulate matter in terms of potential health impacts, because particles this size can be inhaled deeply into the human lung.

PM10 is generated by industrial activities and operations, fuel combustion sources like residential wood burning, motor vehicle engines and tires, and other sources. Such sources occasionally cause high PM10 levels in Washington State, and several areas in Seattle, Spokane, Vancouver, and Tacoma have been declared nonattainment areas because PM10 concentrations sometimes exceed health standards. The project site is not include in one of those areas.

At present, the proposed Gateway Pacific Marine Terminal site is characterized by flat to gently rolling terrain on the uplands with steep bluffs above the beach bordering the westernmost side. The inland portion is primarily open fields, vegetated with grass and hay. Therefore, the particulate matter emitted on the site is limited to intermittent farming activity.

Carbon Monoxide (CO). Carbon monoxide is the product of incomplete combustion, and it is generated by transportation sources and other fuel-burning activities like residential home heating, especially heating with solid fuels like coal or wood. CO is usually the pollutant of greatest concern related to transportation sources because it is the pollutant emitted in the greatest quantity for which short-term health standards exist. Short-term standards (as opposed to annual-average standards) are often the controlling, or most restrictive air pollution standards.

Unlike ozone, CO is a pollutant whose impact is usually very localized. The highest ambient concentrations of CO usually occur near congested roadways and intersections during periods of low temperatures, light winds, and stable atmospheric conditions. Because the impact occurs so close to the source, it is not possible to extrapolate CO concentrations from regional data or distant monitors.

There are no direct CO monitoring data for the project area, so there are no definitive indications of existing CO concentrations. The study area is in attainment for CO, therefore CO levels are considered to be within health standards.

Significant Impacts of the Proposed Action

Construction Impacts. The primary air quality impact during site construction would be wind-blown and resuspended road dust. During construction, dust resulting from excavation, grading, and road building would contribute to concentrations of suspended particulate matter. Construction contractor(s) would have to comply with DOE's regulations on development activity requiring reasonable precautions be taken to avoid dust emissions. This may include applying water or suppressants during dry weather, and taking other measures to prevent the transport of dirt and dust from the construction area onto nearby paved roads. Fugitive dust impacts would be limited both in area and duration, but could cause short-term emissions during the extended construction period.

Construction would require the use of heavy trucks and smaller equipment such as generators and compressors. These engines emit air pollutants that would contribute slightly to the degradation of local air quality. Hydrocarbon emissions from the hot asphalt would be released during paving

Operational Impacts. The potential for direct air quality impacts from the proposed action would come from bulk loading/unloading activities, marine vessels, automobile and truck traffic, and rail operations. The Proposed Action would provide an on-site intermodal rail system which would reduce trucking requirements.

Dry bulk Loading. Initially the Proposed Action would be designed to handle only the following commodities:

- feed grains (wheat, barley, soybeans, corn, and grain by-products);
- petroleum coke (green and calcined);
- pelletized and reduced (briquetted) iron ore;
- sulfur (prilled);
- potash; and
- woodchips

A detailed list of Best Management Practices (BMP) for project operations are described in the Water section of the EIS and in Appendix D-2. The Appendix describes each commodity handled by the receiving system, hourly operations, and average capacity.

Dust and fumes would be generated with each material handled. All other materials would not emit air pollution directly. For instance sulfur, potash, woodchips, grain, and coke would become airborne once handled or exposed to wind activity. This is known as "fugitive" emissions. During handling via unloading/loading operations (gravity dropping and rotary dumping) and moving methods (conveying and front-end loaders), fugitive dust impacts would occur.

Fugitive emissions are also generated by movement of vehicles across unpaved and soiled, paved surfaces. These are known as re-suspended fugitive dust emissions. These emissions depend on the number of tires, weight of vehicle, moisture content of material, and percentage of silt (light and wind-swept particles), and are the dominant contributor to total fugitive dust levels.

The proposed BMPs and best available technology for control of air emissions includes the use of:

- enclosed railcar or truck unloading station equipped with roll-up doors and vented through a baghouse dust collection system (filtration is one of the most reliable and efficient of the dust collecting techniques, exceeding 99.5+ percent collection efficiencies in some cases);

- water spray system to control fugitive dust at all conveyor points (and at the receiving hopper for iron ore);

- paved site and roads to control re-suspended fugitive dust emissions better than unpaved roads;

- totally enclosed structures for storing bulk materials such as potash and calcined coke, and equipped with a baghouse system to control dust emissions;

- a dust bin to store grain dusts from the baghouse and other dust collecting systems;
- highmast spray system to control fugitive emissions from the open stockpiles;
- wind covers for all conveyors (except the transfer conveyor to the traveling shiploader) to control fugitive dust emissions by preventing wind erosion of the conveyed material;
- telescoping chute that minimizes vertical free-fall distance for the commodities, to control fugitive dust;
- spilled materials reclaimed by loaders or vacuum sweepers for small spills, to control re-suspended road dust;
- sweeping of paved areas on a regular basis to minimize resuspended road dust; and
- drip pans or other collection devices for all conveyors to control spillage of silt-laden water onto surfaces used by vehicles.

Designing and operating the terminal with these BMPs, significant air quality impacts would not be likely to occur.

Ground Transportation. Emissions would be associated with the intermodal rail system, ships, truck traffic, and use of on-site equipment like front-end loaders and dozers. These sources are discussed in more detail below.

Vehicles - Air quality impacts from transportation sources are usually evaluated by examining the potential for detrimental concentrations of CO near congested intersections. EPA's CO modeling guidelines for intersections suggest that intersections with LOS C or better do not have sufficient traffic volumes and do not require further review (Schewe et al. 1990). For those intersections with LOS of D, or worse, however, an air quality analysis is warranted when people work or reside nearby. If intersections have LOS D or worse but are not worsened by a proposed project, then analysis of future impacts generally is not conducted.

Daily vehicle traffic is expected to increase from 200 to 700 trips per day along Henry Road. This would not significantly reduce LOS, but would cause a small increase in traffic-related air pollutants. As a result of the high emissions of idling vehicle queues at railroad crossings, CO impacts would primarily occur near intersections or near at-grade railroad crossings.

The Transportation section of this Draft EIS concludes there would not be any measurable degradation in roadway level of service or intersection operations due to this project. All intersections and roadways will continue to operate at LOS A with or without the proposed project. The predicted change in intersection efficiency would not likely cause CO violations of peak 1- or 8-hour CO standards, or generate significant air quality impacts.

Rail - According to the transportation analysis, 430 unit-train movements per year would occur with the Proposed Action. On average, 1 train per day (traveling into and out of the facility) would be generated with the maximum estimated at 4 trains per day. Each train would take 4 hours to load/unload. Upon reaching the receiving station, the train engine would be unhooked from the railcars and leave the site shortly thereafter. An electric engine known as an indexer would pull the railcars through the receiving

station during unloading activities. Therefore, train engines on the railroad loop could emit pollutants, but would not generate the amount of pollutants that would occur if the engines idled during the unloading period.

Marine Vessels - Vessels typically use main boilers for their main propulsion systems, auxiliary boilers for heat requirements, and ship service diesel generators for electrical requirements. These vessels normally operate an auxiliary boiler and one or more generators to supply shipboard power during the time vessels are moored at the berth for container unloading and loading (hotelling operations). The pollutants of concern for oil-fired boilers and generators are SO_2, CO, NO_x and PM10; SO_2 is of primary concern.

MFG analyzed the emissions of these substances in connection with the *Southwest Harbor Cleanup and Redevelopment Project*, which involved four large container ships along 3,775 feet of berth space. It is worth noting that the dispersion modeling performed for an assessment of Panamax size vessels in SW Harbor Cleanup (TRC, FEIS 1994) assumed very conservative (i.e., high) emission rates for all ships and assumed four ships would be present and hotelling for an entire 24-hour period. Even assuming these conservative conditions, the SO_2 standard was not approached by emissions from their proposed facility. Based on this prior analysis and the fact that Gateway Pacific Terminal would have one vessel per day along a 2,820 feet berth, marine vessels are not expected to significantly affect air quality.

Mitigation Measures

Construction. Emissions from construction equipment and trucks can be reduced by using relatively new, well-maintained equipment. Avoiding prolonged periods of vehicle idling and engine-powered equipment would also reduce emissions. Trucking materials to and from the site could be scheduled to minimize congestion during peak travel times and thereby minimize secondary air quality impacts caused by reduced travel speeds.

Dust produced by construction could be reduced by using a number of techniques. Areas of exposed soils such as storage yards and construction roadways could be sprayed with water or other dust suppressants. Roads and other areas that might be exposed for prolonged periods could be paved, planted with a vegetation ground cover or covered with gravel. Soils carried out of the construction area by exiting trucks could be minimized by wheel washing and covering dusty truck loads. Finally, soil that does escape the construction area on exiting vehicles could be reduced with an effective street-cleaning effort.

Operational. No further measures would be needed to reduce air quality impacts from the handling of bulk materials assuming best management practices are followed.

Assuming that indexers are used to handle the unloading of railcars and that train engines do not idle for long periods on the rail loop, no rail-related air quality mitigation measures would be needed.

Ship emissions from the ship's service generators could be considerably reduced by providing shore power to hotelling ships to enable them to "cold iron" (completely shut down on-board power) (TRC 1989). Depending on the vessel type and length of stay, cold ironing could be implemented with varying degrees of difficulty, because the power-generating technology of visiting ships varies considerably. While most ships reduce power considerably and only operate generators to power ship equipment, the power requirements are great and would be difficult to provide from shore. A five-year testing program at the Port of Los Angeles, which is governed by some of the most stringent air quality control measures in the world, determined that substituting shore power for on-board power generation was not feasible.

Air emissions from conveyor equipment could be minimized by purchasing electric equipment. Proper equipment maintenance could also keep utility vehicle emissions to a minimum.

Impacts of the Alternatives

No-Action Alternative

Under the No Action Alternative, the proposed marine terminal facility would not be constructed and the site would remain in its currently undeveloped state for the foreseeable future. Therefore, the No Action Alternative would not impact air quality. Industrial development could occur in the future, with unknown impacts on air quality.

CPIP Alternative

The CPIP EIS did not evaluate air quality impacts, so there is no basis to compare impacts.

Significant Unavoidable Adverse Impacts

No significant unavoidable air quality impacts have been identified.

1. Beach and Coast

Affecte Envidonment

The shoreline at the site is composed of gravels and rock cobbles on a gently sloping intertidal beach and is typical of many beaches of the inner waters of Washington State.

Waves. Physical processes that affect littoral drift at the shorelines of the site are dominated by wave attack from the south Strait of Georgia. Waves are generated by regional surface winds, which are generally directed by the regional topography. Fetch, (the distance of open water over which wind waves are generated), is a crucial factor controlling drift patterns. Greater fetch produces larger wind waves, which are the major force of littoral drift.

Waves at the site are generally from the south, southwest, west, and northwest generated by winds in the Strait of Georgia. Waves from the south, generated by storm winds of 50 miles per hour (mph), on a fetch of 15 miles, have a significant height of 8.5 feet and a period of 6.5 seconds. Waves from the southwest, generated by storm winds of 57 mph on a fetch of 10 miles, have a significant height of 8.0 feet and a period of 6.0 seconds. Waves from the west, generated by storm winds of 50 mph on a fetch of 21 miles, have a significant height of 9.0 feet and a period of 7.0 seconds. Waves from the northwest, generated by storm winds of 40 mph, have a significant height of 7.5 feet and a period of 6.5 seconds. In the northwest direction, the fetch is very long and the predicted wave height is not controlled by the fetch distance.

Reflection and transmission of waves through the piles of the pierhead and the trestle was calculated to determine the effect on the waves passing through the rows of piles to the shoreline. Waves from the south and southwest sectors would be reduced in height by approximately 1 percent as measured at the contact with the shoreline. Waves from the west and northwest would reduced by less than 0.1 percent as measured at contact with the shoreline.

Currents. Currents at the site may be due to tides, wind-induced currents and wave-induced currents. Tidal currents in deeper water near the site are of order 0.7 - 1.0 ft/sec and are directed to the northwest (flood tide) or the southeast (ebb tide). Wind-induced currents are present near the water surface and may become significant for high wind speeds. Wave-induced currents include a drift current in the wave direction, and hence, usually, the wind direction). Also, waves approaching a shoreline obliquely give rise to a longshore current parallel to the shore.

Sediment Transport. Sediment is set into motion when the local flow velocity exceeds a threshold velocity. It is then transported with the prevailing current, and finally settles in locations where the local current falls below the threshold velocity. Because of the relatively large sediment sizes at the site, any sediment transport tends to occur as bed-load rather than as suspended load. Wave breaking is generally a critical factor in sediment transport behavior on beaches.

Most open ocean sand beaches undergo continual changes ranging from a "summer profile", developed under relatively calm low swell conditions, to a "winter profile" associated with storm waves: during calmer conditions, wave action moves sediment shoreward to build up the beach face in the upper foreshore; and during storm conditions, the beach profile is lowered as sand is moved offshore to form a bar near the breaker zone. Apart from the onshore-offshore movement of sand, usually there is also a

general movement of sand parallel to the beach, termed littoral drift, which is associated with waves, and wave-induced and tidal longshore currents parallel to the beach. Typically, the sediment is set into motion by wave action, either from breaking waves or the oscillatory flow of non-breaking waves, and is then transported by the longshore current.

Although coastal engineering literature has extensive coverage of sand beaches on open coastlines, gravel and cobble beaches have been studies to a lesser extent. In the present case of a cobble armored beach, changes in beach profile are known to occur primarily on the upper portion of the beach. When typical profile changes are compared for a sandy beach and a cobble beach, the zone of elevation changes for sandy beaches extends significantly below LLW, whereas for cobble beaches, which applies in the present case, this zone does not extend below the MSL.

Significant Impacts of the Proposed Action

Wave Sheltering. The potential impact of the proposed facility may be assessed in a general way by considering the reduction of wave energy on the sheltered side of the structure, and then considering how this change in wave energy may influence sediment transport behavior. A number of studies have been carried out to investigate waves transmitted past one or more rows of cylindrical piles, and these may be used to estimate the wave transmission coefficient (ratio of transmitted wave height to incident wave height), and thus the energy reduction associated with the waves as the propagate past rows of piles.

For a wave direction parallel to the rows of piles (pile bents), there is relatively little reduction in wave height associated with wave propagation past the piles, since the 30 foot span between bents is sufficiently wide so as not to reduce the wave height noticeably. However, when waves approach the wharfhead more obliquely, they need to propagate through the much smaller pile gaps within each bent, and they may need to propagate through several rows of piles (pile bents). Thus, there may be a greater potential for a reduction in wave height, and a corresponding reduction of wave energy, when the waves approach the wharfhead obliquely (see Figure 8 in Appendix C). On the basis of the references cited above, the transmission coefficient may be estimated from a knowledge of the wave height, period and direction, the pile diameter, the pile spacing within each row, the length of each row, and the spacing between each row. The transmission coefficient for waves approaching from the south, southwest, west and west northwest has thereby been estimated for both the wharfhead and approach trestle, and corresponding results are given in Table 3-2. For reference, the frequency of occurrence of the various wave directions is also included in the table.

Table 3-2 indicates that, for the wharfhead, waves from the south and southwest are hardly attenuated by the piles; waves from the west undergo a slight reduction; and waves from the west northwest would be reduced more significantly, since the waves would then need to propagate past many rows of piles. The approach trestle has a larger pile spacing within each bent, and the table indicates that there is no significant reduction in wave height for any of the four wave directions considered. In fact, the results given in the table are expected to underestimate the wave conditions on the sheltered side since some wave energy will also propagate into the sheltered area by diffraction around the ends of the wharfhead, and this has not been taken into account in the table.

Table 3-2
Estimated Wave Transmission Coefficients, by Wave Direction

Wave Direction	Frequency of Occurrence (%)	Transmission coefficient			
		Wharfhead		Approach Trestle	
		Single Row	Overall	Single Row	Overall
South	12.9	~ 1	~ 1	0.998	0.974
Southwest	6.4	~ 1	~ 1	0.996	0.996
West	9.9	0.985	0.86	~ 1	~ 1
West Northwest	7.2	0.987	0.30	~ 1	~ 1

Source: Westmar Consultants, 1996

Effects on Sedimentation. Any reduction of wave energy would normally be associated with the deposition of material. However, none of the situations in Table 3-2, with the possible exception of waves from the west, are expected to give rise to significant sediment deposition at the beach. In particular, waves from the west-northwest propagating along the longitudinal axis of the wharfhead should not reach the beach near the site, and wave diffraction around the downwave end of the wharfhead would then act to restore the incident wave height behind the narrow sheltered side.

Waves from the west would give rise to the greatest reduction in wave energy on the sheltered side of the wharfhead. Taking account of wave diffraction around the ends of the wharfhead, wave heights at the shore will be somewhat reduced in the vicinity of the creek to the east southeast of the approach trestle, and consequently, there may be the potential for some sediment accretion here. However, this is not expected to be significant, particularly as the more frequent waves from the south would tend to disturb any such accumulation.

Conclusion. Taking account of the various factors described in this report, including the wave climate at the site, the nature of the prevailing currents, the sediment and beach characteristics, the fluid velocities required for the onset of sediment motion, the wave breaking behavior, the nature of beach profile changes associated with cobble armored beaches, and the effect of the piled structures on wave propagation, there should not be any significant impact of the proposed facility on the beach processes at the site.

Cumulative Effects

This section is taken from the Draft EIS on the CPIP project:

Structures that would potentially affect littoral drift in the Point Whitehorn to Sandy Point coastal segment (from north to south) are the existing piers for Arco, Intalco, TOSCO, and the Sandy Point marine entrance and riprap jetties. A pier and barge dock are proposed for the Cherry Point Industrial Park (CPIP) south of the site.

The Arco pier does not significantly impact littoral drift. The Intalco and TOSCO piers are built on fill aprons that extend from the base of the bluff seaward into subtidal waters. Sediment accumulation adjacent to these structures since construction now allows some sediment to pass around the fill aprons on

the lower foreshore. The Intalco and TOSCO piers are now considered to be partial barriers to littoral drift (Schwartz 1986, Schwartz and Terich 1979, Norman Associates 1979, Jacobsen 1980), although earlier studies by Bauer (1974) and the Coastal Zone Atlas (1977) concluded that these piers were absolute barriers to littoral drift.

Since there would be no fill aprons at the base of the proposed pier to obstruct littoral drift and pier piling would not block any significant amount of longshore sediment at any point, the addition of the proposed pier is not expected to result in significant cumulative impacts to littoral drift.

Mitigation Measudes

None are required.

Significant Unavoi able A vedse Impacts

No significant unavoidable adverse impacts to coastal features of littoral drift are anticipated to occur as a result of the proposed project.

Impacts of the Altednatives

No Action Alternative

The No Action alternative would cause no impact to the marine waters in the site vicinity.

CPIP Alternative

The following impacts were identified in the EIS for the Cherry Point Industrial Park (CPIP) project:

Coastal Features. Unloading gravel barges at the proposed CPIP barge pier would result in some loss of material. However, all types of gravel that would be imported are within the range of natural beach sediment sizes, and volumes of gravel loss are not anticipated to impact the beach environment.

Building setbacks from the crest of the bluff would be a minimum of 200 feet. This setback should be adequate to avoid impacts to bluff slope stability. Curtain drains would be installed upgradient of the bluff to intercept most shallow sub-surface drainage that formerly drained through the bluff face, to direct it through site drainage features. This would be expected to reduce the frequency of mass wasting events, thereby reducing bluff recession rates slightly until a new equilibrium between mass wasting events and wave-induced bluff toe erosion is attained.

No impacts have been identified with respect to beach morphology. The accretional shoreform located west of the proposed project site is not expected to be impacts by the proposed project. The CPIP stormwater management plan is expected to maintain post-development water input to the seasonal stream, at volumes equivalent to pre-development levels, so that the salt marsh does not receive off-site impacts resulting in changes in drainage from the CPIP.

Littoral Drift. The proposed pier would extend seaward from the top of the bluff at an elevation of approximately 33 feet. The pier would be constructed on pilings with no fill placed on the bluff, beach, or subtidal areas. The trestle (the main arm of the pier extending from land to the wharf) would be 1,975 feet

long and built on 4-foot diameter steel pilings placed at 80-foot intervals. The pilings would block approximately 5 percent of the longshore sediment pathway, leaving the remainder of the are open. The trestle would be 33 feet above MLLW, leaving enough unobstructed space beneath the trestle to allow wind and waves to pass beneath it without being significantly diminished.

The barge dock would extend seaward approximately 554 feet from the top of the bluff at approximately 22 feet in elevation. The barge dock would be constructed atop 3-foot diameter steel pilings, with no fill placed on the bluff, beach, or subtidal areas. Pilings would be placed 50 feet apart, resulting in approximately 6 percent blockage of the longshore sediment pathway. The barge dock deck would be 22 feet above MLLW. This would leave unobstructed space beneath the barge dock that should allow wind and waves to pass beneath it with minor interference to surface winds.

The proposed pier and barge dock configurations would allow sediment transported by littoral drift to continue across the site with minimal physical interference caused by the piles supporting the trestle and barge dock. Therefore, impacts on littoral drift caused by the proposed action are anticipated to be minimal.

The sediment supply from the site to the beach and nearshore area would possibly be increased slightly during the construction phase of the proposal. However, in light of the moderately-large volumes of littoral drift in this area, and moderate energy levels present (that would likely cause sand and finer sediment to be transported by wave action or in suspension), the potential impacts to sediment supply to the littoral system during construction are considered minimal.

During project operation, no impacts to the beach or near-shore sediment supply are expected. A minor reduction in bluff recession rates at the site may occur with installation of curtain drains upgradient of the bluff, although this impact is expected to be insignificant. The bluff contributes a minimal amount of sediment to the Cherry Point to Sandy Point littoral system; feeder bluffs within this coastal segment are located between Point Whitehorn and Cherry Point, with bluffs contributing lesser volumes of sediment along Intalco Corporation property. A slight reduction in bluff recession would not cause any significant off-site impacts. The proposed project does not include any operations on the beach. Incoming waves may be altered slightly by diffraction caused by the pier pilings, but this potential impact is considered to be minimal.

2. Stormwater

The terminal site exhibits a gradual slope toward a bluff above the shoreline, generally in a southerly direction except at the easterly margin of the site, where the grade drops to the unnamed seasonal stream to the east of the site. The shoreward area to be affected by fill and grading operations is currently mixed fields and second growth trees and brush with an average slope of approximately 1.5 percent. Soils underlying the site are listed as "Whitehorn" in the SCS Soil Survey for Whatcom County. The Soil Survey lists "Whitehorn" as a hydrological Group D soil. The potential for drainage from off-site areas to affect the site is minimal because ditches along Henry Road intercept flow approaching the site from the north.

The proposed trestle and pier are located in an important herring spawning area that extends from Sandy Point in the south, to Point Whitehorn in the north. Incubating and larval herring have been demonstrated to be sensitive to salinity, turbidity, temperature, and other water quality parameters. Fluctuations of temperature during incubation of the eggs is known to have an impact on incubation time. The specific

tolerance of the herring in the early stages of their life cycle to water quality parameters other than temperature are not well known. Preservation of the water quality in the spawning area located in the tidal and subtidal zone to depths of ± 20 feet along the shore has been identified as a high priority in successful development of the terminal site.

The area where the railroad is to be constructed is primarily young deciduous forest with heavy brush and abandoned fields. Drainage from this area currently flows south and easterly to the same unnamed seasonal stream that discharges to the Strait of Georgia at the southerly boundary of the terminal site. The stream passes under Henry Road in a deep ravine that flows through a five-foot diameter concrete culvert. At Lonseth Road the stream channel is much less well defined.

Stormwater from the trestle and pier would be pumped to the stormwater treatment facilities that would be located near the shoreward end of the trestle and ultimately discharged to the Strait of Georgia.

Significant Impacts of the Proposed Action

Analysis Methods. Guidelines used for the development of this analysis include those contained in the following publications: *Stormwater Management Manual for the Puget Sound Basin* (WDOE Manual), and *Biofiltration Swale Performance, Recommendations, and Design considerations,* the *Stormwater Pollution prevention Planning for Industrial Facilities* (WDOE), and the *Whatcom County Development Standards, Chapter 2, Stormwater Management.*

The WDOE Manual was used in conjunction with the SCS Soil Survey for Whatcom County to determine the curve numbers used for the runoff calculations provided in this report. These curve numbers, based on soil hydrologic group, ground cover type, and percentage of impervious surfaces, describe the combined effect of the basin characteristics which determine the portion of rainfall volume in the design storm events that is absorbed by the basin and the portion that contributes to stormwater runoff. Isopluvial rainfall distribution maps contained within the WDOE Manual were used to determine precipitation quantities for the Cherry Point area for the various design storm events. Precipitation quantities are as follows:

Storm Frequency & Duration	Rainfall (inches)
2 Year, 24-Hour	1.8
10 Year, 24-Hour	2.7
25 Year, 24-Hour	3.4
100 Year, 24-Hour	3.9

The WDOE Manual also suggests that a Type IA hyetograph be used to model rainfall distribution for storm events in Western Washington.

All preliminary basin hydrograph calculations were made using "Waterworks," a computer program designed to aid in the modeling of the effects of various design storms and in the design of stormwater quality treatment and streambank erosion control facilities. A simple "Waterworks" model of the terminal site was developed to estimate peak flows needed to develop a preliminary estimate of the size of the

conveyances and control structures that will regulate the rates of the stormwater flow from the facilities. A more detailed analysis will be required for actual design of the stormwater management facilities.

Non-Process Impacted Stormwater. A primary component of the stormwater management system for the site will be to maintain separation of stormwater that has had potential contact with the industrial contaminants stored and handled on the site from stormwater runoff that is generated from surfaces that are expected to be free of industrial contaminants. Stormwater that has had potential contact with the industrial materials handled on site is referred to in this report as "process impacts stormwater," and will be discussed in a later section of this report.

The majority of the stormwater that reaches the ground within the proposed terminal area will be treated as process impacted stormwater and will be conveyed to treatment facilities designed to remove the contaminants that are typical to the materials handled on the site. Stormwater gathered from roofs and other areas that have not been subject to potential contact with specific process related contaminants will be treated according to the guidelines in the *Stormwater Management Manual for the Puget Sound Basin*. The only exception to the WDOE guidelines will be that streambank erosion control measures will not be implemented for stormwater released through the submerged diffuser outfall located at the pier. Streambank erosion control is a stormwater management practice that has been adopted to protect the banks of drainage courses from erosion. Because the outfall for this project would be located offshore, the need for streambank erosion control does not exist. A lesser level of detention for stormwater released at the pier outfall than that which is called for in the WDOE Manual may be considered during the final design stages of the project. This may be done to keep the stormwater conveyance to the pier at a reasonable size or as may be required to reduce water quality impacts to the tidal and subtidal habitats in the vicinity of the outfall.

Where possible, non-process stormwater will be collected and conveyed by open ditches located at the southerly and easterly perimeter of the site. Stormwater from roofs and other non-process areas within the site will be conveyed by catch basin and pipe networks to the perimeter ditches. Because a significant component of the water conveyed by the perimeter ditch will not require water quality treatment, treatment facilities, i.e., biofiltration swales, sedimentation basins, and water quality ponds, as required, will be provided adjacent to the facilities being served.

The proposed railroad loop and spur located north of the terminal area will consist of approximately 2.7 miles of trackbed and a transfer area for dumping of rail cars. Assuming that the footprint of the track fill section covers an average width of 70 feet, the trackbed will cover approximately 25 acres. Ditches will be constructed, as necessary, along the railroad. At undetermined intervals, culvert crossings will be constructed. These culverts will be placed to maintain flows to existing significant drainage courses and low areas and to reduce the impact of channelization along the railway on the unnamed stream.

Process-Impacted Stormwater. All areas subject to storage or handling of potential contaminants at the terminal and railroad loop facilities will be paved and curbed to contain potentially contaminated runoff. In addition, an automatic vehicle washing station will be provided at the exit from the material handling area. All potentially contaminated runoff will be routed to treatment facilities designed to remove the specific contaminants with which the runoff may come into contact. These facilities may include sedimentation, oil/water separation, and chemical addition/flocculation systems, depending on the actual materials to be handled. The treatment system is proposed to be sized to treat a 24-hour design storm with a reoccurrence probability of 1 in 10 years. More specifics of the design of the water treatment facilities for process water will be addressed in the permit documents required for the proposals to construct facilities for specific materials.

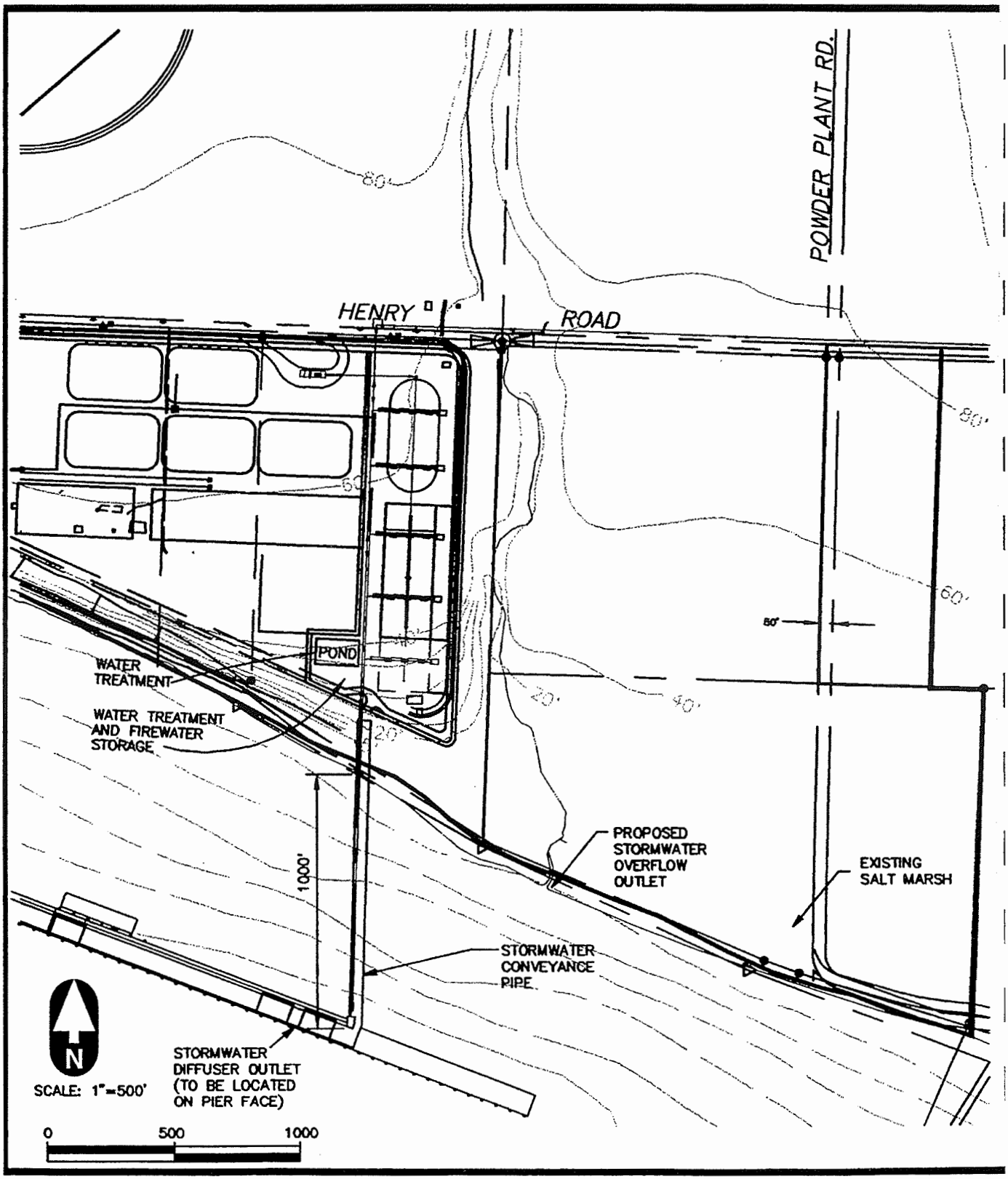
Stormwater Outfall and Emergency Overflow. The primary stormwater outfall will be through an engineered diffuser located at the face of the pier. The outfall to the pier will be sized to convey the 24-hour design storm with a reoccurrence probability of 1 in 25 years (25-year design storm). This outfall will be designed to increase the mixing of stormwater and salt water in order to create a broad band mixing zone that will reduce salinity, temperature, and other water quality impacts in the herring spawning zone. A stormwater main (18" - 24"± diameter) will carry stormwater down the trestle to a header pipe (18" - 24"± diameter) at the pier. Stormwater will be discharged via a diffuser at depth by a series of small pipes (4" - 6"± diameter) feeding from the header pipe. These small outlet pipes will be attached to the pier pilings and will discharge at depths ranging from 15 to 50 feet to provide vertical as well as horizontal separation of the discharge points. Final diffuser design will be determined through plume modeling at the time of the actual facilities design.

The proponent will seek to minimize the discharge of process stormwater to the bay. During the herring spawning season of March through June, process stormwater may be stored in a series of lined ponds and diverted via pressurized pipes to existing and newly constructed wetlands. The final SWPPP will include a design for the management of stormwater during the herring spawning season so that stormwater discharge to the bay during this sensitive time of the year is minimized or eliminated.

In the event the lined detention pond storage volume is exceeded, an emergency overflow channel capable of conveying the 100 year design storm will be utilized. This overflow channel is located immediately east of the proposed facility footprint and is currently a seasonal stream (see Figure 7). The drainage basin for this seasonal stream is normally dry and is separated from the saltwater by a gravel and cobble berm that is created by the form of the shore. By routing flows to this location, impacts to the riparian corridor will be reduced, as opposed to directing overflow runoff into the main stream channel. It is also expected that this outfall location will provide an added benefit in diffusing the freshwater discharge at the shore both by spreading flow through the gravel and cobble shore berm and by separating the release of stormwater from the site from that of the main stream channel, thereby providing a wider area of discharge of the freshwater plume. The discharge from this outfall is not expected to adversely impact the brackish water wetlands further to the southeast. The feasibility of using the seasonal stream to carry additional flow during a severe rainfall event will be determined as the facility is designed and the SWPPP is prepared.

Streambank erosion control may be considered for any stormwater releases to the seasonal stream. This provision will be considered in relation the reduction of expected salinity impacts at the overflow outfall. In addition, if not provided elsewhere in the final design of the stormwater management facilities, the detention pond will be lined with an impermeable membrane and the detention pond outlet structure will be fitted with automatic valves to allow all release from the detention pond (except emergency overflow) to be shutoff in the event of a spill occurring at any time that the pier outfall may be non-functional.

FIGURE 7 - PROPOSED STORMWATER MANAGEMENT SYSTEM



Mitigation Measures

The goal of managing stormwater generated by rainfall on the site is to re-introduce stormwater to the bay and the regional aquifer via a number of on-site physical and biological treatment and discharge systems. Detailed stormwater facilities and mitigation measures will be provided in the Stormwater Plan that will be submitted with construction drawings. Additional stormwater management measures that will primarily address the industrial activities that will be conducted on site will be provided in the Stormwater Pollution Prevention Plan (SWPPP), as required under the *State of Washington Baseline General Permit for Stormwater Discharges Associated with Industrial Activities* (NPDES permit). Other permitting may be required related to hydrocarbon or other specific product handling and spill prevention regulations.

The *Stormwater Management manual for the Puget Sound Basin* outlines requirements and provides Best Management Practices (BMPs) for sedimentation and erosion control during construction. A separate NPDES permit for construction activities is required for sites disturbing areas greater than five acres or creating more than 5,000 square feet of impervious surfaces. The SWPPP prepared for the construction permit will outline the specific application of the erosion control BMPs that will be used during construction. These BMPs may be expected to include silt fencing, straw bale check dams/barriers, sedimentation basins and stabilized construction exits.

A final SWPPP will be prepared as the proposed Gateway Pacific Terminal design is completed. The stormwater plan will be prepared in strict accordance with applicable local, state, and federal rules. Specifically, the plan will be designed to incorporate the following stormwater management goals:

- To minimize or eliminate process impacted stormwater runoff during herring spawning season;
- To supplement the water balance needs of existing and constructed wetlands per Army Corps of Engineers wetlands management requirements;
- To implement stormwater pollution controls consistent with facility BMPs and monitor stormwater quality during construction and operation so that adverse impacts to human health and the environment are minimized.

Best Management Practices for the Terminal Operations include the following:

- Segregate the contaminated storm water and uncontaminated storm water by grading and curbing throughout the site.
- All paved area will be graded with a minimum slope of 1.5 percent to minimize the pooling of storm water on the terminal.
- The terminal site will be curbed along the shoreline and appropriate boundaries to minimize the discharge of contaminated storm water to the receiving water. The approach trestle and wharfhead will also be curbed and the storm water will be pumped to the treatment area.
- Curbing will be placed along the perimeter of the truck/equipment maintenance area to prevent the run on of storm water from outside the designated area.

- The contaminated storm water treatment system will be designed to meet the 10 year/24 hour storm event.

- Process wastewater and contaminated storm water will be treated by an on-site collection and treatment system prior to discharging to the receiving environment. The process wastewater and contaminated storm water treatment system will consist of:

  screening;
  flow equalization and gravity sedimentation basins;
  physicochemical treatment, including neutralization and pH adjustment, chemical precipitation, and coagulation and flocculation; and,
  sludge removal and dewatering system.

- Regular maintenance of the bulk material handling areas will be undertaken.

- Spilled bulk materials at the transfer points and loading/unloading areas will be reclaimed either by front end loaders for large spills or by vacuum sweepers for small spills. Cleanup of spilled materials by wash down will be kept at a minimum.

- Sweeping of paved areas will be implemented on a regular basis to minimize the transport of bulk materials to the storm water collection facilities. The benefits of sweeping include:

  minimize the accumulation of dry bulk materials in the storm water collection facilities (catchbasin/wet ponds);
  decrease the catchbasins/wet ponds maintenance/cleaning requirements; and,
  decrease the solid/pollutant loadings to the wastewater treatment facilities.

- Regular maintenance of the storm water conveyance system will be undertaken per the facility SWPPP.

- Bulk materials which settle in drainage ways and catchbasins will be removed on a regular basis to maintain the designed storage and operating capacity. As a general guideline, these storm water facilities will be cleaned if the sludge/sediment depth is greater than one third of the storage depth.

- Storage of fuel for terminal vehicles will be by double-walled tanks complete with overfill protection.

- The goal of the BMPs described herein is to handle and store all commodities in an environmentally safe and sound manner. The BMPs for each commodity are designed so that the potential for impact to rainfall and stormwater runoff from the facility is minimal.

  In accordance with State of Washington Department of Ecology regulations regarding stormwater management, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared as the final facility design is completed. The BMPs will be incorporated into the SWPPP so that the plan addresses the potential stormwater impacts specific to the commodities that will be handled. Additions and amendments to the BMPs and SWPPP will be made as new or different commodities are considered.

Significant Unavoidable Adverse Impacts

No significant unavoidable adverse stormwater impacts have been identified.

Impacts of the Alternatives

No-Action Alternative

Under the No Action Alternative, the proposed marine terminal facility would not be constructed and the site would remain in its currently undeveloped state for the foreseeable future. No stormwater impacts would be generated by the site. Industrial development could occur in the future, with unknown impacts on stormwater.

CPIP Alternative

The following impacts were identified in the Draft EIS for the Cherry Point Industrial Park (CPIP) project:

During project operation, a drainage collection system is proposed for the wharf. The trestle extending from the shore to the wharf would not have a drainage collection system, and could be a source of some vehicular pollutants to marine waters.

Bulk solid products would be transported along the trestle via enclosed conveyors to minimize material loss. Bulk liquid goods would be transported via welded pipelines that would be instrumented with pressure sensors and automatic shut-off valves. Containers would be handled by cranes and transported on the trestle by trucks. Small amounts of material could be lost from the wharf and trestle during materials handling.

A potential tenant of the CPIP that would produce industrial wastewater would need to demonstrate the ability to treat the wastewater to regulated standards, and obtain the required permits in order to discharge the water to the Strait.

PLANTS AND ANIMALS

Plants

1. Aquatic Plants

Affected Environment

Vegetation and substrate types in the Point Whitehorn to Sandy Point nearshore area have been described in studies by Whatcom County (1981, 1984), the Anvil Corporation (1983), Campbell and Geiger (1978), and Shapiro and Associates, Inc. (1994a). The Point Whitehorn to Sandy Point coastline encompasses 24,728,000 square feet (about 568 acres) of intertidal area from 0.0 feet to -6.0 feet MLLW, of which about 12,330,000 square feet (about 283 acres, or 52%) was estimated to be vegetated. Macroalgae comprised 95% of the total vegetated area (Anvil Corporation, 1983). Sparse communities of *Zostera* (eelgrass) in sandy substrate between -2 and -13 feet MLLW were found scattered in this zone (Campbell and Geiger, 1978).

A vertical zonation of macroalgae was generally observed (Campbell and Geiger, 1978). Green algae (primarily *Ulva* sp.), red algae (*Gigartina* sp.), and brown algae (*Fucus distichus*) were found in the lower intertidal zone (especially in the northwest sector). Dense aggregations of red algae (*Iridaea* sp., *Odonthalia* sp., *Cryptophleura-Botryococuss* sp., and *Plocamium* sp.) and brown algae (*Laminaraia saccharina, Nereocystis leutkeana, Alaria marginata*, and *Desmarestia aculeata*) extend to just beyond -10 feet. Thinning to sparse occurrences of brown algae (*Laminaria saccharina*) and red algae (*Gracilariopsis* sp.) extend to just before -20 feet. Additionally, isolated patches of nonvegetated soil occur in the northwest section of the area. *Laminaria saccharina* appeared to be the predominant algae.

The lower depth limit of plant growth varied considerably in the area, with growth east of the Tosco Pier ending around -10 feet MLLW while growth, though sparse, continued at both Sandy Point and Point Whitehorn to beyond -30 feet. Plant growth generally ceases near -20 feet in the Cherry Point area. Factors regulating the depth of plant growth in this area appear to be the presence of stable substrate for plant attachment (cobble-boulders) and sufficiently strong currents to retard siltation. Although silt substrates at lower depths are not suitable for plant growth, a variety of animals were observed in these areas, including sea pens (*Ptilosarcus gurneyi*), several species of plume worms, nudibranchs, starfish, and Dungeness crab (*Cancer magister*).

Species diversity (i.e., number of species) also varies with tidal elevation. Sixty species of algae were identified by Smith and Webber (1978). Of these, 33 were red algae, 13 were green algae, and 6 were brown algae. The most abundant of the red algae was *Gigartina*, which was found at all elevations below +2 feet. Other common red algae were *Ahnfeltia* sp., *Microcladia borealis*, *Odonthalia* sp., *Polysiphonia* sp., and *Rhodomela larix*. Campbell and Geiger (1978) report 3 taxa of green algae, 7 taxa of brown, 21 taxa of red, and 1 taxa of eelgrass in the area. *Enteromorpha linza*, a green algae, was the most abundant and widespread species. It was found from the +5 foot MLLW elevation down to the lowest sampling point. The only other abundant green algae were *Ulva* sp. and *Monostroma* sp. found at the +1 foot to +2 foot MLLW elevation.

Species occurrence and biomass for the intertidal algae community occurring approximately 330 feet north of Gulf Road have been reported by Nyblade (1979). At 5 feet above MLLW, no algae was found. At 2 feet above MLLW, the algae community was characterized by two species of green algae (*Ulva* sp. and

Enteromorpha linza) and nine species of red algae dominated by *Gigartina papillata* (Nyblade, 1979). At the lowest level examined (1 foot below MLLW), the algae assemblage consisted of 34 species, including three species of brown algae dominated by *Fucus distichus* and 26 species of red algae dominated by *G. papillata*. Total algae biomass at this level was reported to be 531.5 grams per square meter (Nyblade, 1979).

Most sandy areas below 0.0 feet and above 3 feet depth support small patches of eelgrass. A site survey in August 1983 found 76 irregularly shaped patches of eelgrass ranging in size from less than 1 square foot to about 2,800 square feet, concentrated between 0.0 and -3 feet (Anvil, 1983). Fifty-one percent or more of the eelgrass patches were relatively sparse, with fewer than five plants (turions) per square foot; the remainder had densities ranging from 10 to 20 plants per square foot (Anvil, 1983). Most of the eelgrass blades supported epiphytic red algae (*Smithora naidium*). Important eelgrass beds in others areas of Puget Sound generally can be described as continuous large beds (several acres in size) with consistently more than seven turions per square foot (Vining, 1978).

In studies conducted for Mobil Oil, the presence and amount of cover by algae were found to be dependent on the availability of stable substrate (Geiger and Campbell, 1979). Substrate changes were suggested to have occurred during heavy storms between 1977 and June 1979. Yearly differences in species present in the study area is most likely attributable to natural variables rather than the effects of industry or other human influences (Geiger and Campbell, 1979; Whatcom County, 1981, 1984).

Surveys of marine vegetation (Shapiro and Associates, Inc., 1994, 1996) by the applicant have shown that a bed of diverse species of attached green, brown, and red macroalgae exists on the cobble substrate at the proposed Gateway Pacific Terminal (GPT) project site.

Intertidal macroalgae and eelgrass studies of the proposed GPT project vicinity were conducted in November 1992, and two dive surveys were conducted at the project site following WDFW protocol in August 1993 (Shapiro and Associates, Inc., 1994) and August 1996 (Shapiro and Associates, Inc., 1996a). No algae or eelgrass were observed on the predominantly cobble substrate in the upper intertidal area between about +3 and +5 feet MLLW. There were also no algae or eelgrass below about -16 to -20 feet MLLW, which is the depth zone that marks the beginning of the sand and mud substrate. There are sparse communities of macroalgae, generally covering less than or equal to about 50 percent cover, between MLLW and +3 feet MLLW and between -13 and -16 MLLW.

Dense macroalgae communities generally forming 80 to 100% cover occur between about MLLW and -13 feet MLLW. The general vertical zonation pattern observed at the time of this survey (August 1996) was a band of *Ulva* sp. and *Porphyra* sp. in the upper intertidal between about +3 and -2 feet MLLW followed by a narrow band dominated by species of *Fucus* and *Gigartina* between about -2 and -3 feet MLLW. Below this community at approximately the same depths but in primarily sand substrate is a narrow belt dominated by *Rhodomela* sp. with *Soranthera* sp. attached. From about -3 to -11 feet MLLW is a wide band dominated by a diverse assemblage of red and brown algae, including *Sargassum* sp., *Cryptopleura* sp., *Laminaria* sp., *Nereocystis* sp., and *Iridaea* sp. Between -11 and -13 feet MLLW, a narrow band is dominated by species of *Laminaria* and *Gracilaria*. From about -13 to -16 feet MLLW, macroalgae is sparse and consists of scattered *Gracilaria* sp. on the sand and mud substrate. Macroalgae ends between about -16 and -17 feet MLLW.

Two relatively wide bands of kelp (*Nereocystis lutkaena*) are approximately 260 and 460 feet offshore between about -5 and -15 feet MLLW. At the time of this investigation, the floating blades of the kelp formed surface mats approximately 40 to 60 feet wide.

No eelgrass was found in the footprint of the proposed trestle. The nearest eelgrass is a sparse patch that begins 25 feet west of the footprint of the proposed trestle, located approximately 205 to 260 feet offshore at depths of about -3 to -5 feet MLLW. Sparse patches of eelgrass contain less than or equal to about 8 turions per 0.25 meter. This eelgrass patch continues westward for at least 50 feet becoming more dense (30 to 36 turions per 0.25 meter).

Based on the results of previous macroalgae studies at Cherry Point and in the vicinity, it is clear that species composition and density vary both seasonally and annually. Although some of the variability observed in past studies may be attributable to use of different sampling methods, the literature indicates that seasonal and annual variation in macroalgae communities is common and may result from changes in substrate composition and illumination, scouring from storms, and biological factors (e.g., predation, light requirements, and thermal optima). In general, the macroalgae community in the vicinity of the proposed pier is dominated by red and brown algae. Red and brown algae have pigmentation that is more effective in capturing and utilizing the longer wavelengths of light that are typically transmitted through the somewhat turbid waters of the Strait of Georgia. The physical transmittance properties of the water in the vicinity, water temperature, macroalgae adaptations, and the physical and chemical tolerances and requirements of these macroalgae contribute to the typical zonation patterns observed at Cherry Point

Based on aerial photointerpretation and recent baseline studies, the GPT trestle "footprint" would cover about 23,500 square feet (about 0.54 acre) of the primary (>5% cover) vegetative zone. Macroalgae coverage in this zone was 20,000 square feet (averaging 85%) and represents about 0.46 acre of vegetated area. The vegetated area under the proposed trestle constitutes approximately 0.16% of the total vegetated area between Sandy Point and Point Whitehorn. The actual area of vegetation potentially affected by pier shading could be larger or smaller, depending on the height of the trestle.

Significant Impacts of the Proposed Action

Construction activities for the pier pile emplacements would cause temporary siltation in the near vicinity; however, these effects should be localized and have no long-term impact because of current and tidal conditions in the area. Some displacement of individual macroalgae plants is expected during construction of the pier trestle. However, if the surrounding existing substrate remains, most of the area near the construction site probably would be recolonized by marine macroalgae.

Eelgrass is the most shade-intolerant marine flora in the Cherry Point area. Due to lack of presence at the proposed GPT project site, however, shading of eelgrass by the trestle is not an issue.

Macroalgae densities may be affected by pier shading. Shade has been implicated in reducing marine plant densities under other piers (Penttila and Doty, 1990). The potential effects of shading on macroalgae under the proposed trestle has been modeled (Appendix E-2). The model is based on predicted effects on two representative genera for which light requirements are known (*Ulva* and *Laminaria*). Genera tend to occur in bands at different depths where the conditions favor their growth, allowing them to out-compete other algae for space. Light is a major factor in their ability to compete. The optimum depths for the modeled algae species were taken from a transect of species relative to depth below MLLW at Cherry Point. Results of the model suggest there would be some reduction in incident light to areas beneath and adjacent to the proposed trestle, but not to the extent that algae are eliminated from beneath the structure. The most significant effects would be immediately below the centerline of the trestle, and the effects would decrease with distance from the trestle.

More important than the reduction in incident light, however, is the actual effect on the vegetation. Few if any of the species present in the area can actually take advantage of all the light available. In fact, under undisturbed circumstances, the photosynthetic compensation point (i.e., the light intensity at which maximum productivity is accomplished) is generally well below the total light available. To compensate for the reduced available light, the algal species would recolonize at shallower elevations, depending on availability of substrate. Macroalgae species would grow at a higher tidal elevation ranging from 2 to 4 feet depending on the season and cloud cover. The results of the studies indicate that is reasonable to conclude that there is very little risk that macroalgae communities under the proposed trestle would disappear or be noticeably different in function and value from habitat adjacent to the trestle. If there is any loss in biomass due to the proposed construction, it would be indirectly mitigated by vegetation growing on the piles associated with the trestle.

If unmanaged, stormwater runoff from the upland and marine components of the proposed project could increase turbidity that may affect plant growth. Project proponents propose to detain all stormwater and washwater in upland treatment facilities and discharge treated water either at the end of the wharf or in the adjacent creek, as advised by the agencies with jurisdiction.

It is the policy of the Washington Departments of Fish and Wildlife and Natural Resources that development projects result in no net loss of habitat. It would be difficult to measure a net loss of marine algae with statistical precision because of the natural variability of macroalgae distribution. The agencies believe a net loss occurs if marine vegetation in the predicted shadow zone of a proposed trestle has a high risk of disappearing. According to the shading model (see Appendix E-2), the macroalgae important to herring spawning would not disappear, but would grow at a shallower depth in response to shading. The model also suggests that effects from shading would have a low likelihood of resulting in net loss of habitat. The proponents will be meeting with State and tribal agencies in late 1996 to discuss the risk to macroalgae habitat from shading based on new information provided by the shading model.

Mitigation Measures

At present, there is no known negative impact on marine vegetation at the proposed GPT project site, although it is anticipated there will be some shading effects from the proposed marine facility.

Specific mitigation actions include the following:

- Relocating and reorienting the trestle to a north-south aspect to create less shade on any one spot under the trestle;

- Raising of the trestle (for example: from 22.0' MLLW to 37.3' MLLW at the 0.0' MLLW contour and from 22.0' to 26.3' MLLW at the -20' MLLW contour) to create less shade;

- Lengthening the spacing between the trestle pilings from 50' to 75' (with an option to 100', if necessary) to minimize potential littoral drift effects, which are not expected to be significant (Whatcom County, 1992); and

- Designing a stormwater collection and treatment system for the marine facilities (in addition to the upland system) such that all stormwater would be collected and treated to exceed standards prior to discharge in the Strait of Georgia at the end of the pier.

Possible additional mitigation measures, such as artificial daytime lighting, under-trestle light-reflecting devices, grating in the trestle deck, or enhancement of marine vegetation in other areas, could be established in collaboration with agencies.

The applicant will discuss with agencies of jurisdiction research that predicts potential shade effects of the proposed project on attached macroalgae species. If it is determined that there is a high risk that attached macroalgae would be significantly affected, then the applicant would collaborate with agencies to design appropriate additional mitigation. Such mitigation could include maximizing the use of gratings or other translucent elements in the trestle, installing sunlight-reflection devices or daytime artificial lighting under the pier, and other structures that would not impact existing beach habitats. In addition, macroalgae could be encouraged to grow on the pilings.

Significant Unavoi able A vedse Impacts

Temporary increases in siltation and decreases in water quality would occur during construction of the pier. Marine flora and suitable substrate would be lost in the footprint of the piles supporting the piers. The submerged surface area of pilings would support attached macroalgae. The growth of some species of macroalgae may be somewhat impeded by shading of the proposed trestle.

Impacts of the Altednatives

No Action Alternative

Under the No-Action Alternative, the pier would not be constructed, therefore, the macroalgae and eelgrass communities in the Point Whitehorn to Sandy Point nearshore area would not be affected. Industrial development could occur in the future, with unknown impacts on aquatic plants.

CPIP Alternative

Impacts from the CPIP Alternative would be similar to those discussed above. Impacts at the GPT pier location (Preferred Alternative) appear to be less than at the CPIP pier location because of the reduced cover of macroalgae and eelgrass located within the footprint and shade area of the site proposed for pier construction. The new GPT pier's north-south orientation would minimize shading effects and also would not directly impact eelgrass patches identified in the 1992 intertidal surveys (Appendix E-2).

2. *Wetlands*

A wetlands report was prepared for this project by Aqua-Terr Systems, Inc., and is included as Appendix F-1 to this report.

Affecte Envidonment

Methodology

Preliminary data included the review of public resource documents to provide initial site information on soils, vegetation, and hydrology. These documents include the National Wetlands Inventory maps, the USDA Soil Conservation Service soil survey and hydric soils list, and current and historical aerial

photographs. On-site investigations were conducted between August 1994 and August 1995, with most of the data being collected between May and August of 1995. Wetlands were identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology as described in the Corps of Engineers *Wetland Delineation Manual (1987)* to fulfill requirements for both Whatcom County and the Army Corps of Engineers. Under normal circumstances, all three parameters must be present for an area to be considered a jurisdictional wetland.

The wetland rating system that was used, ratings of Categories I-IV, is based on the Washington State Department of Ecology's and Whatcom County's Wetland Rating Systems. These ratings systems attempt to differentiate between wetlands based on their sensitivity to disturbance, rarity, irreplaceability, and the functions and values they provide. Category I wetlands are usually pristine and have a very high value while Category IV wetlands are smaller, isolated and have less diversity than the higher value wetlands.

Vegetation

The site includes upland forest, upland fields, upland shrub, palustrine emergent wetlands, palustrine forested wetlands, and palustrine scrub-shrub wetland communities. Historically, the large parcels making up the study area were cleared and converted to agricultural fields and pasture. Today, fields south of Henry Johnson Road and along Aldergrove Road continue to be farmed in forage crops, but others have been abandoned and support forested and shrub vegetation. Most of the fields remain in use today as pasture and hay crops with minimal maintenance to ensure their productivity.

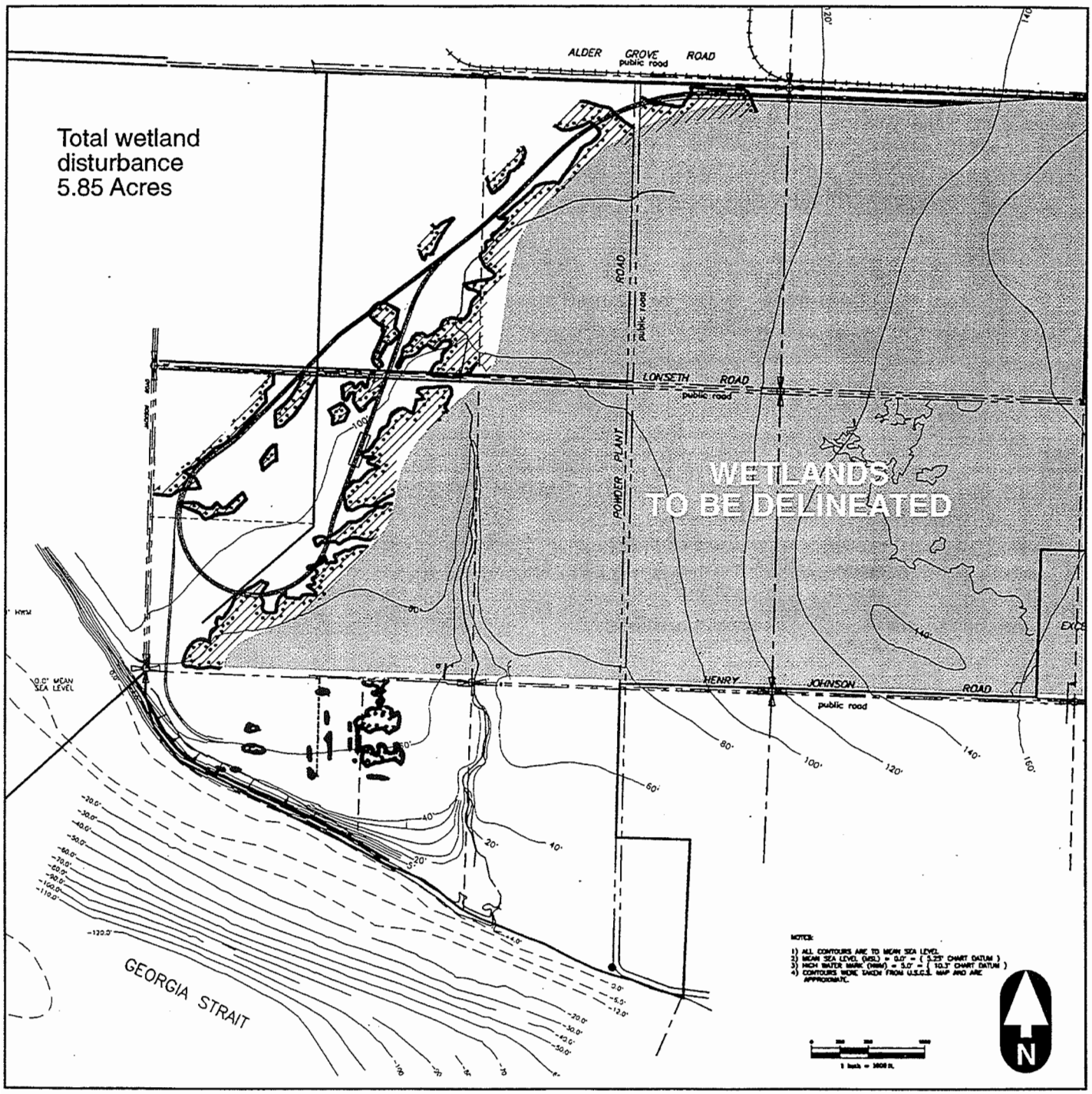
Seasonally saturated palustrine emergent wetlands are located in depressions and along drainages in fields and are dominated by non-native herbaceous plant species. Data also indicated both upland and wetland (PEM) fields had similar grasses and forbes present generally displaying a facultative neutral status and varied with the seasons as to dominance. Seasonally saturated palustrine forested and scrub-shrub wetlands are located within upland forests and shrub habitats and are dominated by native plant species. A description of on-site vegetation communities follows (see Figure 8 for locations of on-site wetland areas).

Upland Forest. Upland forest occupies the northwestern one-third of the property, as well as patches within fields and along the seasonal drainage on the east side of the parcel. Most of the upland forest is a deciduous forest dominated by red alders intermixed with paper birch, western red cedar, and Douglas fir. Understory species include vine maple, snowberry, Indian plum, red elderberry, salmonberry, sword fern, and trailing blackberry. The herbaceous layer is shaded out and sparse in most areas.

Upland Shrub. Upland shrub dominates logged areas and abandoned agricultural fields. This habitat type is most prominent at the southeast corner of Aldergrove and Gulf Roads, in the logged areas north of Lonseth Road and in isolated patches on the north and south sides of Henry Road. This habitat is typified by a regenerating canopy 15 to 20 feet high of red alder and paper birch. A dense shrub layer contains Himalayan and evergreen blackberries, salmonberry, red elderberry, snowberry, thimbleberry, trailing blackberry and bracken fern standing 6 to 10 feet high. Except for exceptionally tall species, the herbaceous layer has been shaded out.

Upland Fields. Upland fields dominate along Aldergrove Road, the southwest ridge from Aldergrove Road towards Lonseth Road, and fields south of Henry Road. The fields are dominated by a facultative community of non-native pasture grasses. Representative species include red fescue, vernal sweetgrass, meadow foxtail, velvet grass, redtop, hop clover, Canadian thistle, oxeye daisy, reed canarygrass, English and common plantains, and white clover.

FIGURE 8 - WETLAND IMPACT AREAS



Palustrine Emergent Wetlands (PEM). PEM wetlands are located within shallow depressions and shallow swales within the upland fields and along the northern portion of the seasonal drainage. The wetlands are composed of a single vegetation class (herbaceous) with little complexity. They support non-native and invasive plant species including reed canarygrass, meadow foxtail, red fescue, soft rush, velvet grass, sawbeak sedge, hare's-foot sedge, slough sedge, bird's-foot trefoil, white clover, redtop, and Pacific silverweed.

Palustrine Forested (PFO)/Scrub-Shrub Wetland (PSS). Very few true forested wetlands are located within the study area, most are dominated by shrub species within the wetland, but have an upland canopy that extends over the wetland. Wetlands completely consisting of scrub-shrub vegetation include portions of Wetland L and K. PFO/PSS wetlands typically have a 50 to 70 foot canopy of red alder and paper birch that is rooted in the uplands, but provides a canopy over the shrub wetland. The actual wetland plants include salmonberry, black twinberry, hardhack, Nootka rose, Hooker's willow, Pacific willow, and slough sedge.

In other areas, a dense shrub layer averaging 6 to 10 feet tall is interspersed with patches of PEM wetlands (Wetlands M, S and portions of Wetlands T and K). Dominants within the shrub layer include hardhack, Nootka rose, Hooker's willow, Himalayan blackberry and black twinberry. The herbaceous layer is composed of the grass and sedge species mentioned in the above PEM description.

Soils

The Soil Conservation Service (SCS) indicates the presence of five soils series with the study area. The dominant soil series is Whitehorn silt loam, which occupies approximately 90 percent of the site. Whitehorn silt loam id listed as hydric on the local Hydric Soils List (SCS 1991). A ridge of non-hydric Birchbay silt loam extends from the corner of Aldergrove and Gulf Roads southwest to the end of Lonseth Road. A ribbon of non-hydric Kickerville silt loam parallels the southwestern Birchbay soil (on the west portion of the site), but most of this has been extensively disturbed by barrow pit activities. Non-hydric Whatcom silt loams are found on the western portion of the property between Aldergrove and Henry Roads as well as within the ravine on the eastern side of the parcel. Non-hydric Neptune very gravelly sandy loam occurs along the marine shoreline.

Indicators of wetland hydrology and vegetation were often difficult to distinguish within the agricultural fields. In those cases, the soil criteria was used as the primary indicator for wetland determination in combination with any wetland hydrology or vegetation indicators available. Most on-site agricultural fields are underlain by Whitehorn silt loam. Although this soil series is indicated as hydric, hydric indicators were not located at all sample plots. Below is a description of the on-site soils.

Birchbay Silt Loam. This soils was observed along a pronounced ridge that extended from immediately west of the Aldergrove-Gulf Road intersection southwest to immediately north of the western terminus of Henry Road. This soil is listed as non-hydric by the SCS. It is classified as moderately well drained and typically has a seasonal high water table at two to four feet from the surface December through April. Data collected from soils pits on site contained no indicators that hydric soils were observed at any sample plot identified as a Birchbay silt loam.

Kickerville Silt Loam. Kickerville soils were observed south of Lonseth Road and north of Henry Roads. This soil series was located in areas that had been disturbed by past barrow pit actives. The soil is listed by the SCS as a non-hydric soil. It is well drained and is not typically subject to a seasonally high water table.

Whatcom Silt Loams. Although listed, no Whatcom silt loams were identified within the study area. This soil is indicated to occur west of the Kickerville series and within the ravine. Because there are no proposed impacts in the ravine, this area was not sampled. The area west of the Kickerville series was extensively disturbed from past barrow pit activities and identification of the soil series was not possible. Whatcom silt loams are listed as non-hydric on the local Hydric Soils List.

Whitehorn Silt Loams. Based on the SCS Soils Survey, Whitehorn silt loams are the dominant soil type within the study area. Whitehorn silt loams are listed as hydric on the local Hydric Soils List. They are classified as poorly drained soils. Typically, this soil series is subject to a seasonally high water table which is at a depth of 0 to 1 foot from November to May.

Neptune Very Gravelly Sandy Loam. This soil series was not encountered within the study area.

Hydrology

The topography of the project site is generally flat to gently rolling terrain with shallow swales and small ridges. Moderate to steep bluffs are located along the marine shoreline and within the ravine located in the southeast corner of the study site. Site surface and subsurface drainage is directed towards the south. The majority of the site's surface drainage either directly or indirectly drains into the unnamed stream, which flows into the Strait of Georgia approximately one-quarter mile west of Gulf Road. However, numerous ditches and roads intercept the natural hydrology of some of the wetlands; for example, the ditches along Henry Road are effective in intercepting lateral surficial flow. Wetland L lies at the headwaters and remains associated in the middle reaches of the site stream. Wetland K was hydrologically isolated from the stream, but has been artificially connected via ditches. Wetlands A-J and M-S remain hydrologically isolated.

The primary factors influencing the hydrology on this property are direct precipitation, stratigraphy, topography and soil texture. Precipitation and a seasonally high perched water table appear to be the driving forces behind this site's wetland hydrology. The average annual precipitation is 30-40 inches, with most falling in the months of November, December, January, February, and March. The average growing season is approximately 180 days and begins mid-March and ends the first part of November. The majority of the site wetlands are underlain by Whitehorn silt loam, which has a seasonal perched high water table at a depth of 0 to 1 foot from the surface November through May. The stratigraphy of Whitehorn silt loams is a series of slowly permeable soil horizons that are composed of layers of silt loams, loams, and sandy loams. Typically, subsoils underlying the wetlands had a silty clay subsoil, but some were very sandy. Dense silty clay prevents surface water collected from direct precipitation from percolating downward, resulting in saturated or inundated conditions, whereas sandy subsoil lenses may be further influenced by a perched high water table saturating the soils.

Hydrology within the agricultural fields is not well defined. No primary field indicators of wetland hydrology were observed, but secondary indicators included oxidized root channels in the upper 2 to 3 inches of the soil and local soil survey data indicating the presence of a seasonally high perched water table early in the growing season. Interviews with local farmers suggest that this area can be farmed (plowed) by late April in most years, indicating that wetland hydrology is present only very early in the growing season.

The NWI maps indicate both seasonally saturated and seasonally flooded hydrologic conditions within the site wetlands. However, on-site data and field observations indicate that the majority of the site wetlands are seasonally saturated (not flooded) during the growing season.

Wetland Functions and Values

In order the assess the functional values of the on-site wetlands, the Wetland Characterization sheets developed by the Washington Department of Ecology were used. Wetland functions are divided into primary categories of wetland condition, buffers, wildlife habitat, fisheries habitat, hydrology, cultural values, shoreline stabilization, and heritage value. Within these primary categories individual functions are assessed point values of 1-3. Functions having values of 1 are considered low value; functions with values of 2 have moderate value; and functions with 3 points have high values.

Palustrine Emergent Wetlands. Table 3-3 indicates the functions addressed for the palustrine emergent wetlands (Wetlands A through J south of Henry Road and Wetlands O, R and portions of N, P, Q and L on the west and north portions of the study site) and their associated values. Only water quality functions received values "moderate" or greater. The remaining functions received "low" values.

Table 3-3
Functions and Values for Palustrine Emergent Wetlands South of Henry Road

FUNCTION	VALUE
Human Impacts to Wetlands	1.5
Buffer Structure and Function	1.5
Breeding, Rearing, Feeding, and Wintering Habitat for Fish and/or Wildlife	1
Water Quality	2
Flood and Storm Drainage Protection	1
Support of Baseflow	1
Shoreline Stabilization	N/A
Sea Level Rise	N/A
Groundwater Exchange	1
Cultural Values	0
Heritage Value	0

The overall wetland condition has a "high-low" value. The site has been extensively impacted by past agricultural practices on the majority of the site and some industrial filling and earth moving on the western portion. The acreage south of Henry Road has been actively farmed for over 50 years. All PEM wetlands and surrounding uplands are fields dominated by non-native pasture grasses that are presently mowed for hay. Most of the PEM wetlands within this area are under one-half acre in size and are hydrologically isolated or altered, except Wetland L. Hydrological alterations include ditches within the fields and along all roads. The ditches along Henry Road may have the greatest impact by separating wetlands in the southern fields from upgradient surface and subsurface drainage from wetlands on the north side of Henry Road.

The buffer surrounding these wetlands is closely mowed upland fields dominated by non-native grasses and small areas of forested/shrub habitat. The wetlands are greater than 100 feet from any other habitat type, but marine, forest, and shrub habitats are located within one-quarter mile. The vegetation cover between the wetlands and other habitats is mowed grass, providing low cover values.

Habitat value within these wetlands is low. The low value is associated with the small size of the wetlands, their isolated nature, and lack of structural diversity. As mentioned previously, most PEM wetlands are under one-half acre in size and hydrologically isolated. The buffer area is predominantly open grassland. Vegetation within the wetlands is dominated by non-native plant species consisting of a single vegetation class. The wetlands have a simple shape and no interspersion of wetland classes, reducing the edge habitat. No significant habitat structures, such as downed logs, snags, or perches, were observed within these wetlands or their associated buffers. The only connection to other habitat types is via mowed open fields. There is no connection to fish habitat.

These wetlands serve "low" to "moderate" hydrological functions. Most of the wetlands are located in shallow depressions underlain with silt and clay. The average slope around most wetlands is low (<3 percent). There is no apparent inlet or outlet to the wetlands, except Wetland L. The wetlands are isolated and water is removed primarily through evapotranspiration. The ditches have altered the natural hydrology of the wetlands, separating them from upgradient drainage. The wetlands are moderately vegetated with emergent vegetation, which may aid water quality during the growing season, but not in the winter.

Cultural and Heritage values of these wetlands are "low". This is based on the small size, disturbance, location on private property, and because the parcel is not known to be listed as a local, state or federal heritage site.

Based on the Whatcom County's and the DOE Wetland Rating System, most of the palustrine emergent wetlands (Wetlands A-J, I, R, P and Q) are unregulated (Whatcom County) Category IV wetlands; and the remaining PEM wetlands (Wetlands N and portions of L) are regulated Category IV wetlands due to size and connection to the seasonal stream. The DOE's four tiered rating system designates these wetlands as Category IV wetlands. These ratings are based on small size (less than one-half acre in size), isolation, hydrological alteration, and the presence of a single wetland class dominated by vegetation that is primarily non-native, invasive wetland species.

Palustrine Scrub-Shrub Wetlands. Table 3-4 indicates the functions addressed for the palustrine scrub-shrub wetlands (portions of Wetland L and K) and their associated values. Functions that have the highest values are human impact, buffer structure and function, wildlife habitat, water quality, flood and stormwater protection, and support of baseflow. The remaining functions received "low" values.

Table 3-4
Functions and Values for Palustrine Scrub-Shrub Wetlands

FUNCTION	VALUE
Human Impacts to Wetlands	2
Buffer Structure and Function	2.5
Breeding, Rearing, Feeding, and Wintering Habitat for Fish and/or Wildlife	2
Water Quality	3
Flood and Storm Drainage Protection	2
Support of Baseflow	2
Shoreline Stabilization	N/A
Sea Level Rise	N/A
Groundwater Exchange	1
Cultural Values	0
Heritage Value	0

The human impact to these wetlands has been moderate. The wetlands have experienced alterations resulting from past logging, agriculture, and livestock grazing. Based on aerial photographs and interviews with local farmers, most of the fields were cleared and used for agricultural crops and livestock grazing. The fields have lain fallow and now support dense shrub communities. Other disturbances include logging within wetlands and ditches that have interrupted the natural hydrology to the wetlands. The wetlands are dominated by non-native vegetation, but also include native plants. Probable pollutants could include sedimentation and nutrient input from past agricultural and logging activities.

The wetlands are buffered by a mix of forested/shrub, mowed agricultural fields and roads. The buffer is greater than 100 feet where forest, shrub and fields occur.

These wetlands have moderate wildlife habitat values. The wetlands include both palustrine emergent and palustrine scrub-shrub wetland classes with moderate interspersion and shape. Little open water is present and the wetlands are dry during the summer. Clumps of willows and small trees serve as perches for raptors in these fields. No other habitat features were identified. The wetlands are connected to other habitats via the on-site seasonal stream, but much of the riparian vegetation is limited to reed canarygrass. Fish do not inhabit these wetlands.

Water quality functions have "high" values. These wetlands combined large size, moderate level of disturbance, slow rate of water movement, and dense vegetation combine to provide these wetlands with the ability to serve significant water quality functions. These same features combined with the wetlands direct and indirect association with the on-site stream allow them to provide moderate values in flood and stormwater abatement and support of the baseflow of the stream. There is little date associated with the wetlands interaction with groundwater, but some site wetlands have a sandy subsoil indicating some possible interaction.

Cultural and Heritage values of these wetlands are "low". This is based on the disturbance, location on private property, and because the parcel is not known to be listed as a local, state, or federal heritage site.

Based on Whatcom County's Wetland Rating System, these palustrine scrub-shrub wetlands (portions of Wetlands L and K) are Category III wetlands. The DOE's four-tiered rating system designates that wetlands as Category III wetlands. These ratings are based on combined size of greater than five acres, hydrological connection to a seasonal stream, and the presence of two wetland classes dominated by both non-native and native vegetation.

Palustrine Forested Wetlands. Table 3-5 indicates the functions addressed for the palustrine forested wetlands (Wetlands M, S, and portions of Wetlands L, T, and K) and their associated values. Functions that have the highest values are the overall wetland condition, buffer structure and function, water quality and flood and stormwater abatement. The remaining functions received "low" values.

Table 3-5
Functions and Values for Palustrine Forested Wetlands

FUNCTION	VALUE
Human Impacts to Wetlands	3
Buffer Structure and Function	2.5
Breeding, Rearing, Feeding, and Wintering Habitat for Fish and/or Wildlife	1.5
Water Quality	3
Flood and Storm Drainage Protection	2
Support of Baseflow	1
Shoreline Stabilization	N/A
Sea Level Rise	N/A
Groundwater Exchange	1
Cultural Values	0
Heritage Value	0

The human impacts to these wetlands have been moderate, although logging has occurred in the near past. In some areas logging had reduced the total canopy and allowed non-native blackberries to invade and in others the wetlands have recovered from logging that occurred more than 10 years ago. Peripheral ditches along the roads may have altered the original hydrology, but sufficient hydrology remains to support these communities. Past logging may have temporarily increased sediment loads, but no pollutants are currently apparent.

Buffers around the wetlands are composed of forest and shrub vegetation greater than 100 feet wide.

These wetlands have low to moderate wildlife habitat functions. Little or no open water component is present and the wetlands are dry in the summer. Palustrine forested and scrub-shrub wetland classes are present. Emergent vegetation is present, but makes up less than 10 percent of the community. Simple interspersion occurs between the wetland classes with moderate to complex wetland shapes. Habitat features include fallen logs, small snags and perches. There is no documentation no field observations indicating that these wetlands are connected to a fishery habitat.

Water quality functions have "high" values. The wetlands are moderately (30 to 75 percent areal cover) vegetated with persistent and non-persistent vegetation. Because the wetlands are located in isolated depressions water movement is slow to non-existent. The area surrounding the wetlands has low slopes. These features provide the wetlands with high nutrient trapping features.

Cultural and Heritage values of these wetlands are "low". This is based on the disturbance, location on private property, and because the parcel is not known to be listed as a local, state, or federal heritage site.

Based on Whatcom County's Wetland Rating System, these palustrine forested wetlands (Wetlands L, M, S and portions of Wetlands T and K) are Category III wetlands. The DOE's four tiered rating system designates that wetlands as Category III wetlands. These ratings are based on a total size of greater than 5 acres, hydrological isolation, moderate complexity, forested class and vegetation dominated by a mix of non-native and native plant species.

Significant Impacts of the Proposed Action

Direct Impacts

The proposed project requires clearing and filling 5.85 acres of wetlands on the site. Of the 5.85 acres proposed to be filled, 4.3 acres are farmed seasonally saturated palustrine emergent wetlands (PEM), 1.45 acres are seasonally saturated palustrine scrub-shrub wetlands (PSS), and 0.1 acre is seasonally saturated palustrine forested wetland (PSS/FO).

Wetlands that occur in agricultural fields (annually cut for a hay crop) make up 4.3 acres or 73.5 percent of the total impact area. These wetlands occur in minor depressions within the fields about eight inches below the adjacent upland areas. Basically, they are scattered throughout the fields in broad low areas that are an upland/wetland complex where seasonal saturation occurs. The plant community that occurs within these fields are non-native grasses mixed sporadically with facultative wetland to facultative upland species. The distinguishing characteristic between the "upland" and "wetland" edge was the determination of the depth to saturation. The functions the wetlands serve are similar or the same as the adjacent upland field areas. The functions and values associated with the impacted wetlands would be lost in these areas, and perhaps for the entire wetland, depending upon how much of the overall area is affected in each wetland. Most of these palustrine emergent wetlands (2.91 acres) occur in the fields south of Henry Road. This is the location where the industrial complex will be constructed. The remaining impacted wetlands (1.4 acres of PEM, 1.45 acres of PSS and 0.1 acres of PSS/FO) will be impacted by the rail loop.

Clearing of native vegetation for construction of roads, rail lines, buildings and utilities would eliminate wildlife habitat, resulting in the direct loss and displacement of individual animals utilizing these areas. Animals with all or significant portions of their home ranges within the cleared areas would be displaced initially, and likely either fail to reproduce or suffer some type of mortality in their new surroundings. Construction activities would also cause temporary displacement of species more sensitive to disturbance, such as ground- and shrub-nesting birds, carnivores and raptors. Use of heavy equipment during clearing would create the greatest disturbance to wildlife.

Human occupation and use of this area after development would disturb remaining wildlife. Train traffic and human activities would be the primary causes of disturbance that would discourage use of the remaining habitat by some wildlife species.

Ground-dwelling mammals and herpetofauna could suffer high mortality rates during road or rail crossings. Species whose normal home range includes the area to be used for construction of the railroad could also be displaced.

Contiguous undeveloped lands such as wetlands, streams, steep slopes and associated buffers would provide corridors for wildlife movement across the site. Retained and enhanced natural areas contiguous with undeveloped or agricultural properties on the site perimeter would accommodate continued wildlife movement through this area.

Reduction in native wildlife habitation and changes in habitat conditions would likely promote the establishment of replacement species more tolerant of human disturbance. These include the European starling, common crow, house sparrow, finch, robin, dark-eyed junco, mice, opossum, and raccoon.

Mitigation Measures

A mitigation plan has been completed for this project and is included as Appendix F-2 to this document.

The mitigation plan would directly and indirectly compensate for lost wetland acreage and function (see Figure 9 for an illustration of the mitigation plan). Five goals have been established for this mitigation plan. The first goal is to create 5.9 acres of seasonally saturated palustrine forest/scrub-shrub wetland to provide a 1:1 areal replacement ratio with greater functional value for wetlands filled. The second goal is to enhance a 16.2 acre monotypic stand of reed canarygrass into a diverse palustrine forested wetland habitat. The third goal is to assure the protection of the on-site stream corridor by placing the stream channel and the associated riparian area in a conservation easement recorded on the property deed (this encompasses approximately 50 acres). The fourth goal is to conduct a study on a designated 1.5 acre plot researching the natural regeneration of vegetation within seasonally saturated, palustrine emergent agricultural fields and also investigating the success of selected facultative upland and facultative wetland plants planted over a range of hydrogeomorphic regimes. The fifth goal is not directly related to wetland disturbance but addresses cultural functions lost on a regional basis. This goal would provide compensation for the local loss of natural resources, in this case western red cedar trees, important to the Lummi Indian Tribe's cultural heritage. Monitoring would occur over a ten-year period on a seasonal basis with reports written the first, third, fifth, seventh, and tenth years post construction/planting.

Site Selection

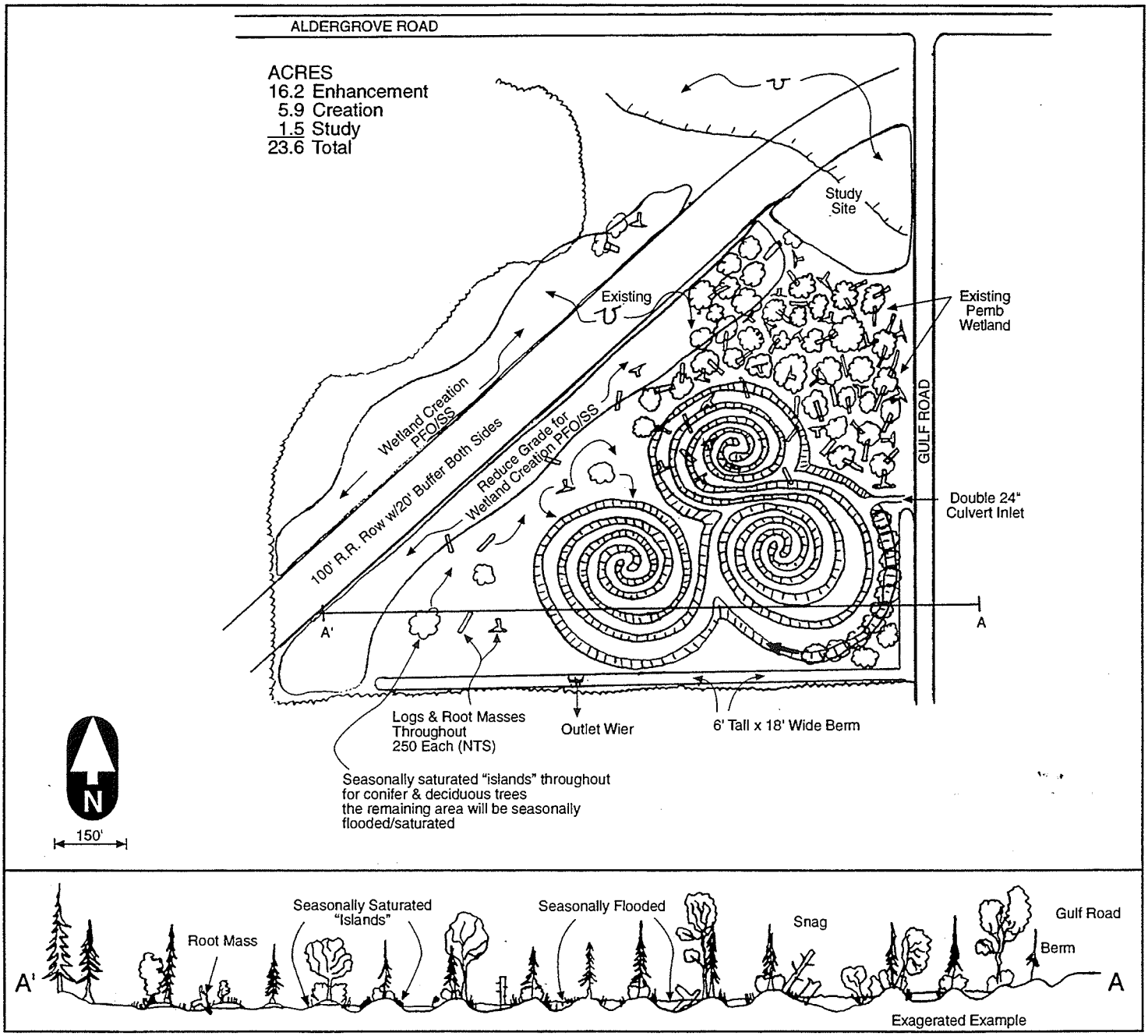
The proposed mitigation area is located on the project site and within the on-site watershed. The mitigation area is located in a farmed 40-acre field in the southwest corner of Aldergrove and Gulf Roads and along the riparian corridor. This site selection was based on future protection, connection to an existing riparian corridor, degraded conditions of existing wetlands, access for heavy equipment, and ownership. Since much of the immediate area is presently designated as wetland palustrine forested (PFO), palustrine scrub-shrub (PSS), palustrine emergent (PEM), or high quality upland, a degraded 16.2 acre, low value PEM wetland and ditched stream channel were chosen for enhancement. In addition, 5.9 acres of PFO/PSS would be created in the same area, further enhancing this area.

The site currently supports wetlands and the upland soils have a silty/clay subsoil that is suitable for wetland creation. The primary factors influencing the hydrology in the mitigation area are seasonal flooding, direct precipitation, and topography. Seasonal flooding from the on-site seasonal stream and upgradient runoff appear to be the forces driving on-site wetland hydrology.

The site is currently buffered by field and forest vegetation. The buffer within 100 feet of the existing wetland is dominated by non-native grasses on the northwest side, Gulf Road on the east, and regenerating shrub and forest vegetation on the south. A shrub and forested community forms a dense riparian system up and down gradient of the on-site stream. The on-site reach on the seasonal stream lies within a ditch choked with reed canarygrass. Prior to ditching, the stream was probably a headwaters wetland with no channel. The ditch was presumably dug to facilitate drainage for agricultural use.

The silty Whitehorn silt loam soils on this site are suitable for wetland enhancement as is the neighboring Kickerville silt loam. They would provide sufficient hydrology as evidenced by the existing wetland. A silty-clay subsoil, found in both soil series, ensures slow percolation rates.

FIGURE 9 - WETLAND MITIGATION SITE



Expected Wetland Functions Post-Creation and Enhancement

Functional value would increase with most functions and at a minimum remain the same as a result of the proposed enhancement activities (see Table 3-6). The only functions not expected to increase in value after enhancement are groundwater exchange and heritage value (heritage should increase significantly as the created and enhanced wetlands mature). The soils underlying the wetland have a dense silt-clay layer restricting interaction with groundwater, enhancement activities would not change this. Heritage values are based on the presence of rare wetland communities and/or the presence of rare or sensitive plants or animals. Although the mitigation project would create palustrine forested wetlands, it would take many decades before the site would fit the description of a mature forested wetland.

Table 3-6
Expected Changes in Wetland Functional Values within Enhanced Wetlands

FUNCTION	CURRENT VALUE	POST-ENHANCEEMNT VALUE
Human Impacts to Wetlands	2	3
Buffer Structure and Function	1.5	3
Breeding, Rearing, Feeding, & Wintering Habitat For Fish and/or Wildlife	1	3
Water Quality	3	3
Flood and Storm Drainage Protection	2	2
Support of Baseflow	3	3
Shoreline Stabilization	2	3
Sea Level Rise	N/A	N/A
Groundwater Exchange	1	1
Cultural Values	1	2
Heritage Value	1	1

Surrounding landscapes would include forested and shrub habitat to the south and west and a connection to the protected stream corridor. This adjoining stream corridor is a naturally vegetated corridor that extends from the mitigation site to the marine environment. This mitigation proposal places the stream corridor (100 feet on both sides of stream high water mark) in a conservation easement recorded on the property deed.

A rail line would be located approximately 50 feet west of the enhancement area and would lie between the creation areas. The area surrounding the rail line would be planted with native upland shrubs and trees to provide sound and visual buffers. Gulf Road is adjacent to the east side of the project with no upland buffer, however the current emergent vegetation would be enhanced with native tree and shrub species, providing a buffer with more diversity and structure.

The wetland lies at the headwaters of the seasonal stream. Wetland hydrology is currently provided by a straight ditch surrounded by non-native, herbaceous vegetation. The ditch would be rerouted to flow through a series of seasonal pools and re-vegetated with native herbaceous, shrub, and tree species. Water movement through the existing wetland is slow and passes through dense emergent vegetation. Water movement through the mitigation area would continue to be slow and pass through a dense combination of herbaceous and woody vegetation. Although the wetland currently provides significant water quality

functions, addition of woody plant species and increased structural diversity of the topography and vegetation would further increase water quality functions.

Current human impacts to the on-site wetland include ditching, road run-off, seasonal mowing, and past logging in the forested buffer to the south. Much of the water entering the wetland originates from road side ditches along Gulf Road. This water may contain some pollutants typical of road runoff (e.g., petroleum products and heavy metals). Increased channel area and floral diversity would increase the mechanical and biological treatment of pollutants within the mitigation area.

Habitat value within the mitigation area would increase in functional value. The wetlands are currently dominated by a single vegetation class (dominated by an invasive plant species) with no interspersion between wetland classes. No significant habitat features currently exist within the wetland. Enhancement of this area would increase the number of wetland classes from one to four and increase the percentage of native wetland plants. Habitat features (e.g., snags, logs, perches, islands) would be added during the construction and also would naturally form as the community matures. As mentioned previously, the mitigation area is connected to a larger riparian-marine corridor that would be protected under a conservation easement.

At present there is little cover over the stream channel other than reed canarygrass. Plantings of dense woody plant species would provide a canopy that would shade the water to maintain low water temperatures. Large organic matter (e.g., logs and root masses) would provide shelter for invertebrates and amphibians, add structural diversity, and would act as nurse logs.

The mitigation plan includes performance standards for the water regime and vegetation structure that would be monitored by a qualified biologist at periodic intervals for a ten-year period.

Significant Unavoidable Adverse Impacts

The proposed action would result in the filling of 5.85 acres of existing palustrine scrub-shrub and palustrine emergent wetlands. The proposed wetland mitigation plan includes creation of 5.9 acres of palustrine forest/scrub-shrub wetland, and enhancement of 16.2 acres of reed canarygrass into a diverse palustrine forested wetland habitat.

Alternatives

No Action Alternative

Under the No Action Alternative, no development would occur and no wetlands would be filled. Industrial development could occur in the future, with unknown impacts on wetlands.

CPIP Alternative

The CPIP Alternative would result in filling of approximately 4.9 acres, approximately one acre less than for the proposed action. A mitigation plan similar to that described for the proposed action would be implemented.

Animals

1. Marine Resources

Affected Environment

A multitude of marine animals inhabit the intertidal, subtidal, benthic, and open-water portions of the proposed site or use this area at some time each year. These include benthic invertebrates, Dungeness crab (*Cancer magister*), groundfishes, Pacific herring (*Clupea harengus pallisai*), and salmon species. Marine mammals and a variety of sea birds also occur in the area.

Benthic Invertebrates. The benthic invertebrate fauna of the project area has been described in numerous studies (Battelle Northwest, 1974a, 1974b; Campbell Geiger, 1977, 1978; Geiger and Campbell, 1979; Nyblade, 1979; Smith and Webber, 1978; Sylvester, et al., 1966; and Whatcom County, 1981, 1992). An extensive literature review of benthic invertebrate communities in the project vicinity was conducted by Whatcom County (1984). The following material was taken from Appendix F of that report (1984), which described the environment in the vicinity of the proposed Kiewit project site, immediately southeast of the proposed project site.

> "The same substrates that control the species composition and abundance of the macroalgae assemblages also largely determine the characteristics of the invertebrate community. Thus, the invertebrate fauna occurring on the uppermost loose sand-gravel berm is restricted to only those amphipod species that use the drift vegetation near the mean high water level. An important feature of the mixed cobble intertidal habitats below the gravel berm is the availability of a large number of microhabitats. A cobble boulder bed provides living space for invertebrates not only on the exposed surfaces, but also in the protected crevices between individual rocks and under rocks that are not deeply imbedded. This variety of living space tends to significantly increase species diversity in comparison to other more uniform habitats such as sand and gravel. In the mixed cobble habitat on and adjacent to the Kiewit site the number of species in the intertidal increases with depth until at -1 foot where approximately 100 are found. The characteristic epifaune, those species that reside on the surface of sediments, on and near the Kiewit site include barnacles, snails, chitons, limpets, mussels, and seastars. During the October and November 1983 site surveys, red rock crabs were also common on the surface of the cobbles. Under and between the cobbles and boulders are found small shore crabs, active polychaete worms, and tide pool shrimp.
>
> The intertidal infauna, those invertebrates living within the sediments of the mixed cobble and sandy eelgrass habitats is dominated by annelid worms. Also common are a burrowing anemone, amphipods, and a variety of clams. These clams include those sought after by recreational clam diggers, such as cockles, native littleneck, and butter. In the most recent survey, evidence of recreational harvesting in the form of numerous shallow pits and piles of sediment was found on the project site.
>
> The invertebrate fauna of the subtidal kelp bed and adjacent gravelly sand habitat is characterized by seastars, red rock crabs, small shrimp, and a wide variety of infauna species such as polychaetes and small clams. Small shrimp are the only common epifauna. Juveniles of the commercially important native littleneck clam, common in the lower intertidal, are present in similar numbers in the subtidal mixed-fine habitat.
>
> The deeper soft mud habitat is characterized by a sparse epifauna which includes the sea pen, nudibranchs, Dungeness and tanner crabs, and small crangonid shrimp. The infauna of this soft mud if

dominated by a small sea cucumber. Besides this echinoderm, only low numbers of polychaete, bivalve, burrowing anemone, and brittle star species characteristic of soft mud habitats are present."

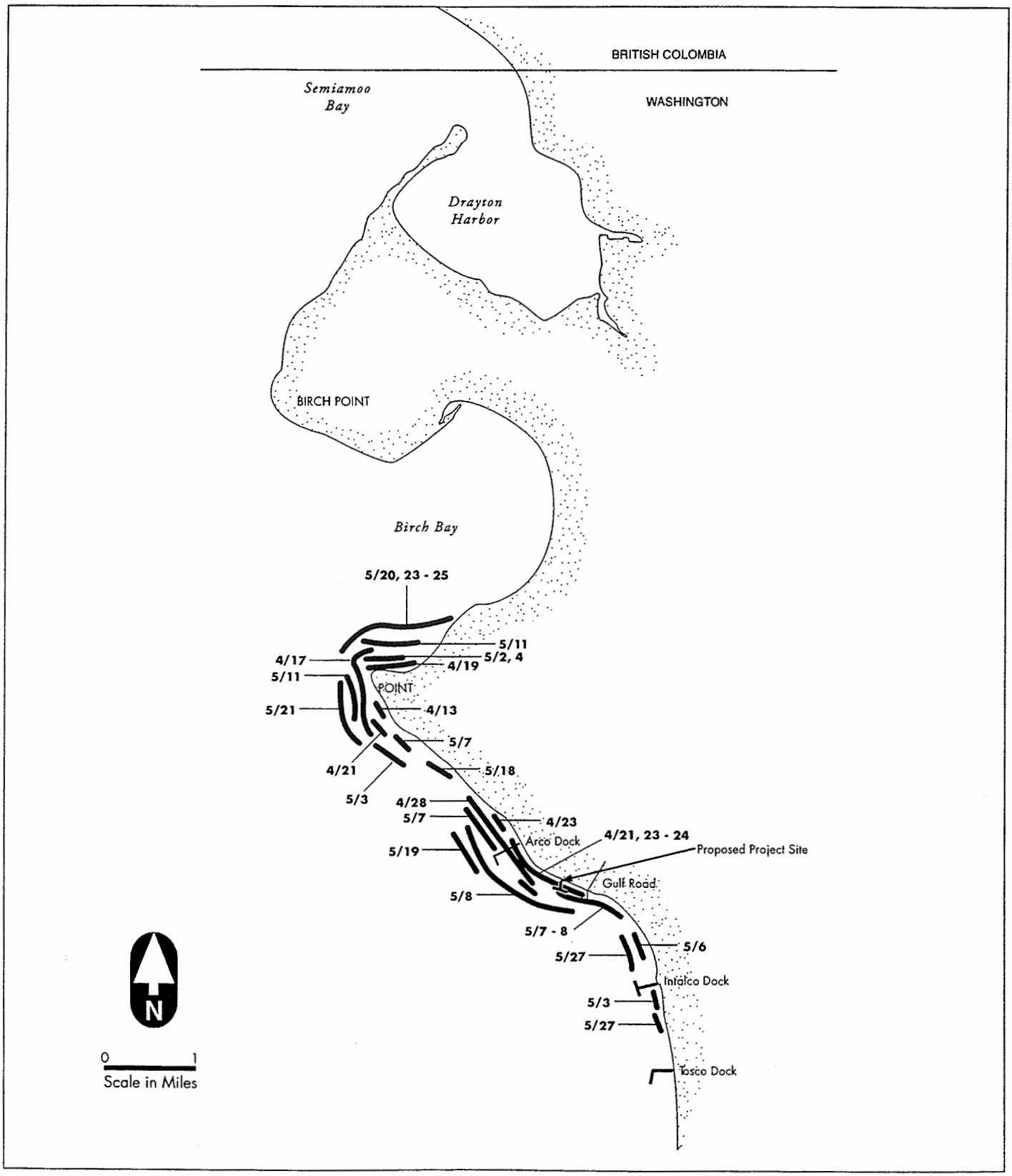
Dungeness Crab. Adult Dungeness crab are common along the nearshore area of Whatcom County, and juvenile Dungeness crab inhabit intertidal areas. Large numbers of adult crabs appear in incidental catches of purse seiners in the vicinity during the spring months. During some years, the commercial salmon fishery has been closed at this site to preclude capture in fishing nets of large numbers of crab. They appear to be uncommon during most of the year in the intertidal level near the proposed GPT site. Occasionally, adults were observed in the lower intertidal zone during surveys (Battelle 1974a, 1974b; Campbell and Geiger 1978; WDF, 1970). The immediate vicinity of Cherry Point, however, is an important area for molting (growth) and mating during late May and early June. Planktonic crab larvae have been collected from March through September in waters next to the project site (WDF, 1979).

Herring. Pacific herring is the most important baitfish species in Washington (Stick, 1990a) and WDFW data indicate the proposed project site is located within the most important herring spawning area in the state (Point Whitehorn to Sandy Point) (see Figure 10). This species is important as a forage fish which are fed on by salmon, groundfish, sea birds, and marine mammals during all of its life history stages (eggs, larvae, juveniles, adults) (Simenstad, et al., 1979; Palsson, 1984). One reason for their importance is their abundance. Relatively large quantities of eggs are spawned, and Miller, et al. (1980) suggest that juveniles and adults may be the most numerically abundant fish in Washington's marine waters. Herring are known to be highly susceptible to changes in environmental conditions, although the factors affecting the species are not well understood. A number of publications address herring stocks at the site (see Fisheries Technical Report, Appendix E-1).

The largest stock of herring in the state (Cherry Point stock) spawns from April through early June along the southern shore of Birch Bay, around Point Whitehorn, Cherry Point, Sandy Point, and then south to Hale Pass (Stick, 1995). Pacific herring spawn adhesive demersal (associated with the substrate) eggs in intertidal and shallow subtidal locations usually between +3 and -15 feet MLLW, although spawning has been documented to a depth of -33 feet (Hart, 1973). The eggs are deposited on eelgrass, algae, boulders and cobbles, piles, and other suitable substrates. Little is known concerning how suitable substrate is selected by the herring, and the preferred substrate seems to vary with location. After deposition, the eggs hatch in about two weeks, depending on the temperature, salinity, and dissolved oxygen of the location. The larvae drift nearshore with the currents for a few weeks after hatching, and then they disperse offshore. The zone of potential herring spawning substrate under the proposed project's trestle is the narrowest between the Arco Dock and the Intalco Pier when compared to the rest of the spawning region.

The Point Whitehorn-Sandy Point area is exposed to prevailing winds. The upper half of the intertidal zone is characterized as wave-churned cobbles or sandy gravel, and the upper limit of significant cover of perennial marine vegetation suitable for herring spawning substrate is around +2 feet in tidal elevation. The lower depth limit of significant marine vegetation and herring spawning substrate is largely determined by the lower limit of hard substrates, below which flat silty bottom dominates and the macroalgae community disappears. This depth limit is variable, but generally occurs in the -10 foot to -15 foot MLLW, although traces of red algae have been observed to -20 feet MLLW.

FIGURE 10 - HERRING SPAWNING AREA



In the area between point Whitehorn and Sandy Point, the intertidal and shallow subtidal zone used by spawning herring is a complex system of substrate types, ranging from areas covered with large boulders to large areas of rippled sand. Eelgrass beds are present throughout the area in sand-mud areas. Areas of exposed cobbles and boulders are often of broad extent, low relief, pocked with small tide pools, and foster the growth of a complex community of marine algae, some species of which are also used as herring spawning substrate. The zone of marine vegetation is generally quite broad in the vicinity of Point Whitehorn, then narrows just south of Cherry Point, then widens again to the north of the Intalco pier. From the Intalco pier south, however, bare sand becomes more dominant and rock patches become fewer, so that along much of the length of the Sandy Point peninsula, the vegetated zone is often only a few yards wide. The zone of potential herring spawning substrate occurring under the proposed project's trestle is the narrowest between the Arco Dock and the Intalco pier. It is not possible to quantify the importance of a particular stretch of beach to the propagation of herring using current scientific information (Whatcom County, 1984).

There was a substantial decline in total run size for the Cherry Point stock from 15,000 (short) tons in the early 1970s to 3,100 tons in 1987. The stock appeared to stabilize over the next five years at 4,000 to 5,000 tons, then increased to 6,300 tons in 1994. 1995 escapement was estimated to be about 3,900 tons (O'Toole, 1996).

Salmon. Several species of salmonids may be present during some stage of their life history near the project site. These include chinook salmon (*Oncorhynchus tshawytscha*), silver salmon (*O. kisutch*), pink salmon (*O. gorbusha*), sockeye salmon (*O. nerka*), chum salmon (*O. keta*), steelhead salmon (*O. mykiss*), and cutthroat trout (*O. clarkii*). Juvenile salmonids use the protected intertidal and subtidal shores of Puget Sound to feed and grow during the first few months of their marine life (Iwamoto and Salo, 1977).

Information on salmon in the Strait of Georgia 2Uand in the vicinity of the proposed project was obtained from Miller, et al., 1976, 1977a, and 1977b, and is contained in the Kiewit Project EIS main text and Appendix E-1 (Whatcom County, 1984). These data indicate that pink and chum juvenile salmon migrate closer to shore than other salmon species because of their small size (<35 mm) to avoid predation. Juvenile chinook and coho migrate and feed farther from shore because of their larger size (>50 mm). No sockeye or steelhead juveniles were caught in the vicinity of the project site. It is believed that sockeye move into deep water offshore immediately after migrating downstream from their natal streams.

Along nearshore areas of northeastern Puget Sound, the appearance of spring natural wild runs and the release times from hatcheries determine the appearance and peak abundance of juvenile salmonids. In waters along the project site, juvenile pink and chum salmon are most abundant in April and May, while coho and chinook juveniles appear in July and August. By July, pink and chum salmon have moved beyond the littoral zone adjacent to the site. No juvenile salmon were caught in the project area after September.

Juvenile pink salmon are most evident in sand/eelgrass and mud/eelgrass habitats in the proposed project site vicinity. Chum fry exhibited a high degree of preference for areas with some form of cover or protection (Miller, et al., 1976, 1977a). Food habits of juvenile salmon depend upon those organisms available. Smaller fish feed primarily on epibenthic and benthic organisms in the littoral zone. Fry move offshore and adopt a more pelagic plankton-feeding existence later in the season (Miller, et al., 1976, 1977a, 1977b; Iwamoto and Salo, 1977).

In waters along the project site, juvenile pink and chum salmon are most abundant in April and May. Coho and chinook juveniles appear in July and August, respectively, in greatest numbers. By July, pink and chum salmon have moved out beyond the littoral zone adjacent to the site. No juvenile salmon were caught in the project area after September (Miller, et al., 1976, 1977a, 1977b; Whatcom County, 1992).

Adult salmon and steelhead and cutthroat trout migrate through the Strait of Georgia on their way to natal streams. The greatest abundance of pink and sockeye salmon occurs during August. Peak months for chinook are from mid-April through mid-July, although they can be found throughout the year. Winter-run steelhead trout appear from November through May (Whatcom County, 1984). Cutthroat trout and coho and chum salmon appear primarily from August through November.

Significant Impacts of the Pdopose Action

General - Potential Increase in Risk of Petroleum Pollution Resulting From Project Vessel Traffic

The movement of vessels in and out of all ports in Puget Sound poses a risk that a negative incident, or accident, could occur. Vessel pollution incidents include any vessel incident that releases pollutants into the water that can affect marine resources. An analysis of vessel traffic issues as they relate to natural resource elements in the marine environment was prepared for this EIS (Appendix E-4). The study area for this analysis included not only the proposed project vicinity, but all of the Strait of Georgia, waters of the San Juan Islands, and the Strait of Juan de Fuca.

One objective of the study was to analyze existing data to ascertain relative current and future risk of vessel pollution incidents related to implementation of the proposed project. Risk assessment consists of probabilities of events that may possibly occur, whereas impact assessment deals with probabilities that are reasonably certain to occur (Whyte and Burton, 1980).

A wide range of potential incidents have a probability of occurring. Collisions (two vessels colliding), allisions (one vessel colliding with a stationary object), and petroleum spills were examined in the report. The risk, or probability, that a particular incident would occur is defined as the number of incidents per total number of vessel movements. Data from the Washington State Office of Marine Safety (OMS) for the study area were used to establish the number of cargo vessel traffic movements. Data from the U.S. Coast Guard (USCG) Marine Casualty Data Base (MCDB) were used to estimate the number and size of the incidents.

The usefulness of the pollution incident data for this study is limited by the lack of data on number of vessel transits in the northern Puget Sound area prior to 1993. Without this information, the probability of incidents per vessel movements cannot be calculated. Information regarding marine casualties and pollution incidents were recorded in two separate data bases until 1992, and incidents between 1985 and 1991 were often, but not always, recorded in both data bases. In this study, to avoid duplication of incident data, only information since 1992 could be used for probability calculation. This is the best information available for purposes of estimating the potential for accidents.

As of 1992, the existing terminals at Cherry Point received an estimated average of 28 entering transits per month (Collins, 1993), equivalent to approximately two one-way transits per day. The OMS records the movements of cargo and passenger vessels in Washington waters. Quantitative information on vessel traffic was available only for 1993 through 1995. This traffic is recorded as "entering transits." An entering transit is the passage of a vessel from sea or Canadian waters into Washington state waters. The passage of the vessels back to sea or Canadian waters from Washington state waters is not counted. Therefore, each entering transit represents a vessel's entry to, and exit from, Puget Sound. Entering transits for vessels bound for Puget Sound ports via the Strait of Juan de Fuca and Strait of Georgia are shown in Table 3-7.

OMS and USCG records entering transits and vessel incidents resulting in a pollution event, as well as the resulting frequency or probabilities of a pollution incident, are shown in Table 3-7. Frequency of pollution incidents also can be expressed as the likelihood, or probability, of a pollution event occurring on a given vessel movement. The calculation for this probability is the number of incidents divided by the number of vessel movements.

Table 3-7
Number of Pollution Incidents Recorded in Northern Puget Sound and Probability of Incidents

	1993	1994	1995
Total Entering Transits	5,653	6,375	5,952
Total Vessel Movements	11,306	12,750	11,904
Pollution Incidents (<1,500 gallons)	175	145	110
Pollution Incidents (<25,000 gallons)	0	0	0
Pollution Incidents (above 25,000 gallons)	0	1	0
Total Incidents	175	146	110
Probability	**1.55%**	**1.15%**	**0.92%**

Source: Shapiro and Associates, 1996

As shown above, the rate of pollution incidents has dropped approximately 20 percent per year during this period while the number of entering transits remained relatively stable.

These statistics are for the entire northern Puget Sound study area. These incidents are generally very small, and few occurred in the Cherry Point-Ferndale vicinity. For example, in 1993, only nine incidents were recorded, ranging from one to four gallons of petroleum spilled, in the Cherry Point-Ferndale vicinity. It should be noted that between 1993 and 1995 there were no spills between 1,500 gallons and 25,000 gallons. The one pollution incident larger than 25,000 gallons reported for 1994 was a spill of 26,000 gallons (619 barrels) of diesel oil from a vessel grounding in the waters of the San Juan Islands. Because data are not available to calculate the probability of vessel incidents prior to 1992, USCG data were examined to gain an understanding of frequency and character of past incidents in northern Puget Sound. USCG data retrieved from 1986 documented only three other petroleum-related incidents larger than 1,500 gallons. A spill of 67,357 gallons (1,603 barrels) of cracked gas oil resulted from a vessel capsizing near Anacortes on January 31, 1988; a spill of 84,000 gallons (2,000 barrels) of crude oil occurred on February 22, 1991 near Anacortes; and a spill of 2,685 gallons (64 barrels) of lube oil occurred on April 22, 1992 in waters of the San Juan Islands.

A mixture of sizes and types of marine vessels would transport bulk goods to and from the proposed project site, averaging 60,000 metric tons of capacity per vessel. According to the Transportation Analysis for this EIS, the proposed project is expected to generate 140 entering transits (round trips) annually. This

would result in an average of a 33% increase at Cherry Point, and approximately 2% for the study area as a whole. The increase in shipping activity is not expected to have any impact on existing monitoring of vessel traffic control by the USCG.

As discussed above, the rate in pollution incidents from 1993 to 1995 decreased significantly. This could be the result of increased prevention activities, awareness of vessel crews and cooperation between tug companies and oil companies for cleanup and response plans. Emergency oil spill equipment is now located in many places in Puget Sound. Tugs available to assist now are powered by 8,000 horsepower. Three years ago, only 4,000 horsepower was required for large tanker assistance. The probability of a pollution event occurring would not be expected to increase and could continue to decrease, however, the actual number of events could increase slightly. Assuming the average actual incident rate remains stable, the 140 entering transits per year generated by the proposed project would be expected to result in an additional 2.5 small pollution incidents per year in northern Puget Sound, a very small percentage of which would be in the Cherry Point vicinity. If the rate of pollution incidents continues to decrease, or remains stable, it would partially offset any increase in incidents that would result from the proposed project.

The proposed Gateway Pacific Terminal Project would result in an insignificant increase in the number of pollution incidents per year, assuming historical rates of occurrence for marine pollution incidents.

However, there is a small but unquantified probability that a catastrophic petroleum or chemical spill could occur near shore adjacent to the proposed project. In a worst case scenario, a large oil tanker carrying a full load of petroleum (1 million barrels) destined for the Arco pier could collide with a cargo vessel full of chemicals that could be just arriving or debarking from the proposed terminal. Effects would depend on the rate of leaking from the oil tanker, the amount of chemical entering the water from the cargo vessel, the proximity and readiness of spill response staff and equipment, the wind velocity and tides, and the time of year. There likely would be an acute mortality of most living organisms in the vicinity that were unable to swim away. The size of area impacted would depend upon the above conditions. Damage would be more localized and lethal during calm weather, and more widespread but diluted in poor weather with strong tides. Mortality would include all macroalgae and eelgrass, epibenthic organisms, non-mobile shellfish and other invertebrates, fish eggs and larvae, some fish, and near-surface planktonic organisms. Chronic effects would depend on how soon and effective spill response efforts would be to contain the pollution, and the effectiveness of clean-up efforts. Recolonization of organisms and recovery of some habitats could take several months to several years.

Benthic invertebrates. Benthic invertebrate populations in the intertidal and shallow subtidal portion of the beach would not be noticeably affected. During trestle construction, the majority of benthic invertebrates in the immediate piling locations would be destroyed in the "footprint" of the piles. At tidal elevations below 5 feet MLLW, there would be approximately 65 36-inch diameter steel piles for the trestle that would displace an estimated 459 square feet of benthic habitat. However, if it is assumed that an average length of 20 feet on each pile in this zone would support attachment of marine organisms, an area of 12,246 square feet of potential marine organism habitat would result from the project. The wharf would be supported by approximately 576 48-inch diameter steel piles (94 around the perimeter and 482 under the interior of the wharf). These would displace a benthic area of 7,235 square feet. If it is assumed that an average length of 20 feet on each pile on the perimeter and an average length of 5 feet on each interior pile the would support attachment of marine organisms, an area of 54,000 square feet would be created by the project. The total existing benthic displacement would be about 7,700 square feet (0.18 acre), and the estimated new surface area, resulting from project implementation, likely to support attachment of marine organisms would be 66,000 square feet (1.51 acres).

The generation of excess turbidity during construction could cause additional minor impacts in adjacent areas through smothering and contamination of gill structures. The limited extent of the proposed pile driving and its temporary nature, however, probably would preclude extensive impacts.

Concern has been expressed regarding potential increased turbidity caused by turning propellers of tugs or cargo vessels approaching and leaving the facility. The depth of water is much greater than the drafts of the vessels, and propellers are unlikely to stir up bottom sediments. Strong currents in the area also would dissipate downward currents caused by propellers. Because of the depth and distance from shore, any impacts from propellers of vessels using the facility would be less than those caused by the herring seine fishery where the vessels may operate closer to shore.

Based on available data, an oil or toxic material spill resulting from marine activities associated with the proposed project has a low probability of occurring. Based on the analysis of vessel traffic issues (Appendix E-4), a spill of any size would be a very rare event (less than one tenth of one percent). In the event of a spill, damage to benthic organisms would depend on the size of the spill, the proximity to benthic biota, the substance spilled, and weather conditions. Small spills of a few gallons have a much higher probability to occur than catastrophic spills. A small spill would be unlikely to affect benthic organisms because it would be dissipated by currents before making contact with the benthic environment. A rare catastrophic spill could kill nearly all benthic organisms if toxic material was allowed to come in contact with them. Depending on the concentration and toxicity of the spilled material, impacts could range from stressing of the animals to inhibition of reproduction, chronic weakening, or acute mortality.

Dungeness crab. The generation of excess turbidity during pier construction could cause minor impacts in adjacent areas through smothering and contamination of gill structures. The limited extent of the proposed pile driving and its temporary nature, however, probably would preclude extensive impacts. Juvenile and adult Dungeness crab are mobile and probably would avoid the immediate area of construction. Marine sediments stirred up during pile driving likely would have effects similar to increased turbidity during winter storms, but more localized. It probably would not affect crabs, which are known to burrow into the sandy mud substrate.

Normal operation of the facility would not have a noticeable effect on Dungeness crab. Approximately 1,800 acres of crab nearshore habitat occur within the -25 ft. MLLW contour between Sandy Point and Point Whitehorn (Whatcom County, 1981). Only the "footprint" of the piles supporting the proposed project would be removed from the habitat. A possibility exists that vegetative habitat used by crabs in the shade zone of the proposed project could be affected. This change would be very small in comparison to the available habitat. Stormwater runoff, if not controlled, could affect larval and other life stages of Dungeness crab.

As with benthic organisms, the probability of impact on Dungeness crab from toxic spills due to increased vessel traffic is extremely low. A small spill would be unlikely to affect crabs because it would be quickly dissipated by currents. Adult crabs also could move away from toxic substances they could detect. There is a chance that localized concentrations of crab larvae could be affected by a petroleum sheen, if exposure was long enough. Depending on the concentration and toxicity of the spilled material, a rare catastrophic spill could result in impacts ranging from stressing of the crab to inhibition of reproduction, chronic weakening, or acute mortality. Materials upon which crab feed could also be contaminated and could poison the crab, if eaten in quantity.

Use by Dungeness crab and red rock crab could be enhanced by the presence of the pilings and the encrusting community that would grow on them. Welch, et al., (1969) found that the bottom under the Intalco pier was heavily used by these crabs, apparently supported by the pier's encrusting community.

Herring. During construction, there would be a temporary decrease in water quality, primarily due to increased turbidity from pile driving. A potential exists for some shallow sediment deposition on substrate and aquatic vegetation on the site; if this occurred when herring spawn were present, some minor covering of eggs by sediment would occur (Whatcom County, 1984). This is not expected to have a significant impact on hatching success. Impacts on herring could occur during construction and operation from oil or fuel pollution as a result of accidental spills or vessel collision.

As with benthic organisms, the probability of impacts to herring because of toxic spills from increased vessel traffic is extremely low. A small spill would be unlikely to affect post-larval herring because it would be dissipated by currents, and herring could move away from toxic substances they could detect. There is a chance that localized concentrations of herring eggs or larvae could be affected by a petroleum sheen, if exposure was long enough. Depending on the concentration and toxicity of the spilled material, a rare catastrophic spill could result in impacts ranging from stressing of eggs and larval herring to inhibition of development, chronic weakening, or acute mortality, especially if a spill occurred during nearshore spawning. While herring older than post-larval forms could move away from the spill, prey organisms could be affected that could poison the herring, or a reduction in abundance of forage could result.

After the facility has been constructed and is operational, marine water quality would be a major concern. During heavy rain storms, if surface water runoff is not treated and properly diffused or retained, water quality could decrease, affecting herring egg and larvae survival. Behavior of adult herring also could be affected to some unknown degree.

A small amount of herring spawning habitat (macroalgae) under the new trestle could be affected by shading. Within the "footprint" of the proposed trestle, dense macroalgae communities occur between about MLLW and -13 feet MLLW (Appendix E-2, E-3). Based on the results of that study, the GPT trestle "footprint" would cover about 23,500 square feet (about 0.54 acre) of the primary (>5% macroalgae cover) vegetative zone. Macroalgae coverage in this zone was about 20,000 square feet (averaging 85% coverage) and represents about 0.46 acre of vegetated area.

As discussed in the *Aquatic Plants Section* above, the effects of shading on macroalgae from the proposed trestle has been modeled (Appendix E-2). Results of the model suggest that given the orientation, width, and height of the proposed trestle, very little macroalgae cover under the trestle "footprint" would be lost, and thus there would be an insignificant effect on herring spawning habitat. The level of risk to which areas of macroalgae under or near the proposed trestle will be determined during discussions with agencies of jurisdiction.

No eelgrass was found in the footprint of the proposed trestle. The nearest eelgrass is a sparse patch that begins 25 feet west of the footprint of the proposed trestle, located approximately 205 to 260 feet offshore at depths of about -3 to -5 feet MLLW.

Based on several assumptions, Whatcom County (1992) suggested that if both proposed projects (this project and CPIP) were built, and the areas of potential impact of existing structures were added, the total impact would be 524,755 square feet (12.12 acres). The total area of potential impact represents about 1.77 percent of the total vegetated area from Sandy Point to Point Whitehorn, or about 0.65 percent of the total intertidal and subtidal habitat that is less than -25 feet MLLW in the same area.

Some of the assumptions used in this analysis are not longer valid. First, it is highly unlikely that state or federal agencies would permit more than one new pier, so if the CPIP project is not constructed, there would be 33,600 less square feet of potential impact. Second, Whatcom County indicated the shade zone would be considered the

same as the width of the structures. While this may be true for eelgrass, it not true for macroalgae, at least for the Arco and Intalco piers. Photographic evidence demonstrates that macroalgae grows on hard substrates in the intertidal shade zones of the Arco and Intalco trestles. Third, the areas calculated were based on the length of trestles from the Ordinary High Water Mark to -25 MLLW. Recent studies suggest that macroalgae was dense enough to attract spawning herring existing primarily between +3 and -20 MLLW at the GPT site. Fourth, the width of the GPT trestle was increased from 30 to 50 feet; however, the orientation was changed so the length of the trestle over the intertidal zone was reduced. Fifth, a worst-case scenario was developed for the loss of eelgrass/macroalgae based on published baseline information (i.e., percent cover).

It is not possible to determine the precise importance of specific habitat for herring spawn. No studies have been conducted to determine the effects of existing pier structures in this area on the macroalgae/eelgrass communities, and the percent cover of vegetation is not known for all existing structures. It is known, however, that herring populations have declined from 1973 to 1987, although the population has stabilized over the past eight years. To what extent, if any, these piers have affected the Cherry Point herring population is unknown. With less than 0.2 percent of the spawning habitat potentially impacted, it would be difficult to conclude that this is a significant limiting factor in determination of the abundance of the Cherry Point herring stock. The biomass of macroalgae and eelgrass likely fluctuates much more than 0.2 percent annually naturally, and herring use only a small percentage of all available vegetation from Point Whitehorn to Sandy Point during spawning.

Salmon. The potential impact of pier construction on juvenile salmon, primarily, and adults, secondarily, would be effects on their migration patterns. Fish within the immediate project site during construction which did not leave the area could be subject to increased turbidity from pile driving. Salmon could be affected during construction and operation by oil or fuel pollution as a result of accidental spills or vessel collision.

As with benthic organisms, the probability of impact on salmon because of toxic spills resulting from increased vessel traffic is extremely low. A small spill would be unlikely to directly affect juvenile or adult salmon because it would be dissipated by currents, and the fish could move away from toxic substances they could detect. Depending on the concentration and toxicity of the spilled material, a rare catastrophic spill could result in impacts ranging from stressing of juveniles and adults to inhibition of development, or chronic weakening. While juvenile and adult salmon could move away from the spill, prey organisms could be affected that could poison the salmon or reduce abundance of their food.

Salmonid migration patterns could be altered by barge traffic to and from the project site during construction. Lights operated during night construction could attract juvenile salmon to the area.

A report by Whatcom County (1981) suggests that the most significant potential effect of the proposed project on salmonids would be alteration of their normal migration patterns, both as juveniles and adults. Local salmon fishers believe that the Arco pier has changed adult migration patterns, and fishers have altered their fishing strategy to take advantage of this change. It is not known to what extent, if any, the presence of the piers has affected juvenile salmon migration.

Salmon are attracted to white, yellow, and amber lights, based on studies conducted at the Trident Submarine Base in Hood Canal (Salo, et al., 1977). Night lighting for the GPT facility, which would be necessary if work is to proceed continuously, may attract fingerling or adult salmon and herring. It is unlikely a progressive buildup of fish would occur, however, because of their daily movements that would draw them away from the site (Whatcom County, 1981).

A possibility exists that shading could reduce intertidal and subtidal vegetation, which provides food sources and protection from predation for juvenile salmon (Whatcom County, 1984). The potential impacts to this

vegetative habitat are discussed in the Marine Plants Section. Even in a worst case situation, it is unlikely that such a small reduction (0.5 acre) in foraging substrate would result in a measurable impact on migrating salmonids (Whatcom County, 1981).

Because herring is an important component in the diet of salmon, any reduction in herring could affect salmonid production. The project has a small potential to affect the abundance of herring.

Mitigation Measures

If a catastrophic spill occurred, private, local, state and federal response action plans would be implemented to minimize any damage. There are also specific laws, regulations and protocols that would be implemented for damage assessment and compensation. The Washington Department of Ecology is the lead agency for response to spills by the state of Washington. A summary of state laws and regulations pertaining to release of petroleum products and hazardous substances in Washington is available in the booklet *Emergency Spill Response Laws and Regulation* (DOE, 1994). This booklet has a section dealing with resource damage assessment that describes a compensation schedule, assessment of compensation, pre-assessment screening, and damage assessment studies. The National Resource Damage Assessment Team (NRDA) as creased by the State Legislature to oversee the protection and restoration of natural resources when damaged by oil or hazardous substance spills. Washington state agency representatives from DOE, Fish and Wildlife, Natural Resources, Health, Parks and Recreation Commission, the Office of Archaeology and Historical Preservation serve on the team as well as representatives from the federal and tribal governments. The proponent would develop a spill prevention and response action plan, and maintain equipment and trained staff to implement the plan. The plan would involve local private resources, as well as public agency coordination. If a spill should occur, the proponent would immediately implement the action plan. The proponent would follow all protocols of local, state, and federal agencies, as well as the National Resource Damage Assessment (NRDA) Team, to minimize damage to the environment, and provide adequate mitigation and compensation.

Benthic Invertebrates. During construction and operation of the facility Best Management Practices (BMPs) would be implemented for handling any toxic substances; stormwater would be managed to meet state and federal requirements for stormwater discharge; and all required protocols would be followed to avoid vessel traffic collisions, interactions, and marine spills.

Upon completion of the trestle and wharf, submerged surfaces of the piles would be colonized by a succession of barnacles, mussels, and a large variety of other species that form an encrusting community. While not a direct mitigative measure, piles could provide an estimated 1.51 acres of surface habitat to affect the 0.18 acres of displaced habitat. No coatings will be put on the piles to discourage marine growth. The establishment of normal communities within two to four years would more than replace invertebrate biomass lost due to construction. Assuming hard substrate algae also would grow on the pilings, habitat for benthic invertebrates would be enhanced.

Dungeness Crab. The submerged pilings of the piers would be colonized by encrusting organisms, enhancing the area for use by Dungeness crabs (Whatcom County, 1992). During construction and operation of the facility Best Management Practices (BMPs) would be implemented for handling any toxic substances; stormwater would be managed to meet state and federal requirements for stormwater discharge; and all required protocols would be followed to avoid vessel traffic collisions and marine spills.

Use by Dungeness crab and red rock crab (*Cancer productus*) could be enhanced by the presence of the piles and the encrusting community that would grow on them. Welch, et al., (1969) found that the bottom under the Intalco pier was heavily used by these crabs, apparently supported by the pier's encrusting community.

Herring. Construction and maintenance of the piers would be scheduled during times of minimal biological activity in the area. Periods when spawning herring may use the site would be specifically avoided. No eelgrass was found directly beneath the proposed trestle nor would any likely be affected.

Based on extensive baseline studies and several meetings with natural resource agency personnel, the applicant has made several modifications to the proposed project to avoid operational impacts on the environment and lessen the potential need to create replacement marine habitat. These include the following:

- Relocation and reorientation of the trestle to a north-south aspect to create less shade on any one spot under the trestle; and

- Raising the trestle to create less shade (for example: from 22.0' MLLW to 37.3' MLLW at the 0.0' MLLW contour, and from 22.0' to 26.3' MLLW at the -20' MLLW contour).

The applicant shall discuss with agencies of jurisdiction, research that predicts potential shade effects of the proposed project on attached macroalgae species. If it is determined that there is a high risk that attached macroalgae would be significantly affected, then the applicant would collaborate with agencies to design appropriate additional mitigation. Such mitigation could include maximization of grating or other translucent elements in the trestle, installation of sunlight-reflection devices or daytime artificial lighting under the pier, and other facilities that would not impact existing beach habitats. Macroalgae growth on the piles also could contribute to the mitigation goal.

If it is desirable to initiate efforts to enhance the Cherry Point herring resource, several proposed methods have merit, and would be considered in collaboration with WDFW. These include provision of SOK-like net pens containing vegetative substrate upon which herring could naturally spawn. The spawn would be protected from birds and other predators to increase hatching probability.

During construction and operation of the facility Best Management Practices (BMPs) would be implemented for handling any toxic substances. Stormwater would be managed to meet state and federal requirements for stormwater discharge. During months when herring spawn or larvae are present (April through August), stormwater from the facility would not be discharged into marine waters, but would be retained on site. All required protocols would be followed to avoid vessel traffic collisions and marine spills.

Marine piles may provide additional substrate upon which herring spawn. O'Toole (1996b) reports WDFW has observed herring spawn on vegetation attached to piles of the Arco pier. Such observations are uncommon, occur only every second or third season, and only during the largest spawning event of the year.

Salmon. Construction impacts on salmonids could be minimized by coordinating with the Washington Department of Fish and Wildlife (WDFW) to set seasonal restrictions on construction activities to protect migrating fish.

In addition, on-site light sources could incorporate shields to avoid spillage of light off-site. The location of lighting could be designed to preclude or reduce attracting salmonids in the area.

During construction and operation of the facility Best Management Practices (BMPs) would be implemented for handling any toxic substances. Stormwater would be managed to meet state and federal requirements for stormwater discharge. During months when herring spawn or larvae are present (April through August), stormwater from the facility would not be discharged into marine waters, but would be retained on site. All required protocols would be followed to avoid vessel traffic collisions and marine spills.

Wetted portions of the pilings would provide new substrate (see *Benthic* subsection above) for encrusting organisms and macroalgae that, in turn, would produce additional food organisms for juvenile salmonids.

Significant Unavoidable Adverse Impacts

Benthic Invertebrates. Benthic invertebrates in the 0.18 acre covered by the "footprint" of the piles would be eliminated.

Dungeness Crab. Dungeness crab would be displaced during construction. Silts and fine sediments suspended during construction would decrease water quality and could temporarily affect crab gills. Neither of these impacts is considered serious or long-term.

Herring. A small portion of prime herring spawning beach could be affected; it is not possible at this time to determine how this could affect stock size, if at all.

Salmon. Migration routes of adult and juvenile salmon likely would be altered by some unknown amount. A potential exists for a small loss of the intertidal and subtidal habitat that provides food sources and protection for juvenile salmon.

Impacts of the Alternatives

No-Action Alternative

Benthic Invertebrates. Benthic invertebrates would continue to exist in the proposed project area. There would be no additional habitat provided (the submerged surfaces of the pilings) to enhance use by shrimp and other mobile crustaceans, and there would be no substrate for macroalgae to provide food and cover for these invertebrates.

Dungeness Crab. With the No Action Alternative, Dungeness crab habitat would continue to exist in the proposed footprints of the pilings. There would be no additional habitat provided (the submerged surfaces of the pier structures) to enhance use by Dungeness crab.

Herring. The No Action Alternative would not impact herring.

Salmon. The No Action Alternative would not affect current juvenile and adult salmon migration patterns. Food sources would be unaltered.

Industrial development could occur in the future, with unknown impacts on benthic invertebrates, Dungeness crab, herring and salmon.

CPIP Alternative

Benthic Invertebrates. The CPIP Alternative would have similar impacts as described above for the proposed project. In addition, it also would impact approximately 25,000 square feet of sandy habitat where the proponent proposes to place 1,000 cubic yards of cobble between the +1 and -10 feet MLLW in an attempt to increase substrate for attached macroalgae. This would reduce the amount of sandy or mud flat habitat, and reduce the abundance of those benthic invertebrates that require such environments or eelgrass as substrate. It also could increase those invertebrate species that inhabit cobble environments and use macroalgae as substrate.

Dungeness Crab. The CPIP Alternative would result in impacts and mitigation similar to those for the proposed project. In addition, it also would impact approximately 25,000 square feet of sand and mud flat habitat where the proponent proposes to place 1,000 cubic yards of cobble between the +1 and -10 feet MLLW in an attempt to increase substrate for attached macroalgae. This would reduce the amount of sand or mud flat habitat where juvenile crab may burrow and where eelgrass would have opportunity to colonize and provide crab habitat. There could be an increase in habitat for red rock crab.

Herring. The CPIP Alternative would have similar types of impacts as the proposed project, but on a larger area. For mitigation, the proponent proposes to transplant impacted eelgrass and to spread 1,000 cubic yards of cobble between the +1 and -10 feet MLLW spread over 25,000 square feet of sandy habitat. The objective is to increase substrate for attached macroalgae. This would reduce the amount of sand or mud flat habitat for the colonization of eelgrass, but it also could replace macroalgae that may be impacted by shading.

Salmon. The CPIP Alternative would result in the same types of impacts as the proposed project, but on a larger area. The proponent proposes to transplant impacted eelgrass and spread 1,000 cubic yards of cobble over 25,000 square feet of sandy habitat between the +1 and -10 feet MLLW. The objective is to increase substrate for attached macroalgae. This would reduce the amount of sandy or mud flat habitat for the colonization of eelgrass, but it also could replace macroalgae that could be impacted by shading. The cobble substrate, if it was not silted-in, also would increase production by an unknown amount of benthic invertebrates that would be food organisms for juvenile salmonids.

2. *Commercial Fisheries*

Affected Environment

Blaine and Bellingham are important commercial fishing ports in Whatcom County. The diverse fishing industry includes harvesting, seafood processing, and supporting sales and services (e.g., boatbuilding and repair, gear supply, fuel docks). Major seafood landings are composed of salmon, groundfish, Dungeness crab, and herring. Granger (1979) completed an inventory characterizing the fishing industry in Whatcom County. The study estimated approximately 1,200 jobs were related to commercial fishing in Whatcom County. In the mid-1970s, Whatcom County residents held about 10% of all salmon licenses in the state (but a higher percentage in purse seine, gill net, and reef net fisheries than in trollers), about 17% of the groundfish licenses, and about 30% of crab licenses (Granger, 1979; Whatcom County, 1981). The herring fishery in Georgia Strait has historically been fished by Whatcom County fishers. Granger (1979) estimated at least 2,500 persons were directly involved in harvesting, processing, and support/sales services. Because of the decline in commercial fishing in other areas of Puget Sound as a result of legislative closures and decreased abundance of some species, the relative importance of commercial fishing in Whatcom County compared to other Puget Sound counties has likely increased.

These resources are also of critical importance and are in the Usual and Accustomed Fishing Areas for tribal fishers, primarily members of the Lummi and Nooksack Tribes. The Suquamish, Swinomish, and Tulalip tribes also fish in these waters (MacWilliams, 1992).

Large vessel traffic varies in the Gulf of Georgia Region and has changed over the last few years. Cargo vessel sizes range up to 900-feet in length, 125-foot beam (width), 60-foot draft, and 125,000 dead weight tons (KJS, 1996). Vessel traffic landings, hold capacity and cargo handling turn around time for the Port of Bellingham was analyzed by Pacific International Terminals (PIT) (Kaspar, 1996). Among other findings, the study revealed:

- In 1972, the Port handled 61 ships averaging 91,800 mt/vessel, 34 hrs to unload
- In 1982, the Port handled 49 ships averaging 135,000 mt/vessel
- In 1992, the Port handled 52 ships averaging 161,000 mt/vessel, 16 hrs to unload

This analysis suggests that there is a trend for cargo vessels bound for Cherry Point to be larger while cargo handling has also become more efficient.

Commercial shipping movements within the immediate Cherry Point vicinity average two large commercial vessel movements per day to the three existing piers (Collins, 1993). Recent historical marine movements of large commercial vessels in the Georgia Strait Waterway have averaged 15 per day (KJS, 1996).

Historically there have been interactions between commercial fishing operations and cargo vessel/tug-and-barge traffic in the study area. Losses to commercial fishers of fishing time and gear attributable to vessel interactions can be categorized into several types of traffic: tugs towing cargo barges, tugs towing log booms, cargo vessels, and commercial fishing vessels. Loss of fishing time or space is easily identified because the commercial fishers experience it directly on the grounds. Loss of fishing gear is more difficult to define and document, especially for unattended set gear. The difficulty in estimating current risk is the trend in reductions in fishing seasons and areas for the last several years. Anecdotal information suggests there is less interaction due to less fishing.

There is no interagency system in place to quantify instances of gear loss or fishery interruption due to commercial vessel traffic. To gather this type of information, a comprehensive survey of fishers in each gear group would be necessary, and such a study is beyond the scope of this report.

Crab Fishery. The southeast Strait of Georgia (Marine Fish/Shellfish Catch Area 20A) is the most important area in Puget Sound for the production of Dungeness crab for commercial fishers (Whatcom County, 1981, 1984; Kyte, 1984). Landings increased steadily from 264,000 lb. in 1970 to a peak of 1,764,000 lb. in 1978, followed by a decline to 642,000 lb. in 1985. The harvest ranged from 776,000 lb. to 1,349,00 lb. from 1986 through 1994. 1995 was a record harvest at 2.2 million lb. Tribal harvest was not significant (less than 2% of the catch) until 1983 when it represented 19%. The percentage of tribal harvest has grown steadily from 13% to 53% between 1990 and 1995. The number of nontribal vessels has steadily decreased since 1990, while the reverse is true for the tribal fisheries.

The nontribal commercial fishing season generally begins October 1 and continues until mid-April (Stanley, 1996). The tribal fishery has been operating all year in recent years. The percentage of the catch attributable to the Cherry Point subarea (which extends from the BP pier north to Point Whitehorn) is unknown. Total crabbing effort for the Cherry Point subarea comprised 3% of the total commercial effort in Marine Fish/Shellfish Management and Catch Reporting Area 20A during the WDFW buoy count survey in November 1991, and 21% in February 1992 (Armetta, 1992).

Commercial crab pot loss attributable to vessel interactions can be categorized into several types of traffic: tugs towing cargo barges, tugs towing log booms, cargo vessels, and commercial fishing vessels (primarily otter trawl and gillnet).

Representatives of the Puget Sound Crabbers Association (Knutson, 1996), report losses ranging from 15 to 30 pots per year (7 to 15%) of their 200 pot limit. Tugs towing log booms account for the majority of the loss in the Anacortes area. Commercial otter trawl and tugs towing cargo barges may cause the greatest loss in the Strait of Juan de Fuca and the Gulf of Georgia Regions. Cargo vessels are not usually a problem.

Herring Fishery. Major commercial fishing for herring has occurred in the project vicinity since 1973. The herring sac-roe fishery has been managed jointly by the WDFW and the four northern Puget Sound herring fishing tribes (Lummi, Nooksack, Swinomish, and Suquamish) since 1975. WDFW and the tribes meet annually to set harvest quotas and other regulations.

The herring sac-roe fishery, which began in 1973, historically was the largest and most lucrative of the state's herring fisheries, and rivaled several salmon fisheries in economic value to the state. The project site is located within one of the most heavily fished areas (Point Whitehorn to Neptune Beach) when the herring fisheries are operating (Whatcom County, 1981).

Historically, the purse seine fleet consisted of treaty purse seiners fishing under tribal authority and non-treaty purse seines. Non-treaty seine fishers were limited to 31 vessels that qualified for limited entry. In the latter years of the sac-roe fishery, vessels were chosen by lottery to control the rate of harvest. The vessels were generally 50-70 feet in length and operated seines about 1,600 feet long and 170 feet deep. The seine fleet attempted to fish sac-roe herring as close to shore as possible where nearshore bottoms were free of obstructions. Fishing generally occurred between 36 and 150 feet deep. Skiffs are also used in shallow waters.

In 1979, the gill net fleet consisted of six non-treaty fishermen validated under the state's limited-entry, and approximately 200 vessels operated by treaty fishers. This fishery occurred during April and May along the

shores of the Strait of Georgia. The gill nets used were generally constructed of nylon monofilament of about 2-1/4 inch mesh, and were about 8 feet wide and 700 feet long. Fishing occurred quite close to the beach. The herring-laden nets were drummed aboard the vessels by hand or power, and the fish were removed.

In 1982, the sac-roe fishery was reduced to a single day, and no fishing was allowed in 1981 and 1983-86.

From 1987 to the present, the only herring fisheries occurring on the Cherry Point stock are the tribal and nontribal spawn-on-kelp (SOK) fisheries and a small sac-roe gillnet fishery conducted by the Nooksack Tribe. The nontribal fishery is limited by legislation to a small number of SOK permits per year. In the SOK fisheries, most herring are caught in purse seines that are carefully towed to anchored net pens (closed ponds) where fish are impounded until spawning. An experimental line (open pond) SOK fishery also has been permitted.

To minimize handling stress, both tribal and nontribal fishers anchor their closed ponds near the fish catching areas. On May 2, 1994, seven ponds were observed anchored southwest of the abandoned gravel trestle near Gulf Road. On May 13, 1994, four ponds were anchored in the same place and one was observed just south and inshore of the south tip of the Arco pier.

The area between Point Whitehorn and Sandy Point, especially the area between the Arco and Intalco piers, has been the primary fishing grounds for the herring fishing fleet (Whatcom County, 1992). WDFW estimated that an average of about 56% of the 1974-1979 annual total roe fishery landings was taken in the Point Whitehorn to Sandy Point vicinity. That percentage is probably greater during the 1990s because of reduced fishing opportunity and fishers concentrating in areas of highest herring abundance. Few catches are made south of the Tosco (formerly BP) dock.

Prior to construction of the Arco, Intalco, and BP piers, the shoreline from Point Whitehorn to Sandy Point offered 8 miles of unobstructed access to the fishing area. As a result of construction, gillnet and purse seine fishers had to modify their fishing to avoid these piers. Despite the presence of these piers, the fisheries have not been prevented from achieving their seasonal quotas. These fisheries occur from mid-April through the first week of June, with the bulk of the fishing occurring during May.

Salmon Fishery. The Strait of Georgia is an important fishing region in Puget Sound. Five species of Pacific salmon are harvested in waters adjacent to the project area. Commercial nontribal salmon fishers primarily use purse seine, gill net, and reef net gears. Tribal fishers use purse seine, gill net, setnet, salmon troll, lampara, and beach seines.

Gill-netters typically fish waters deeper than 20 fathoms (MacWilliams, 1992). In relation to the project site, salmon are primarily caught north of Point Whitehorn or south toward Lummi Bay.

Fishing seasons are set depending on the size of salmon returns. Typically, commercial salmon fishing begins in mid-June and extends through December. No steelhead fishing occurs in marine waters adjacent to Cherry Point; however, steelhead fishing does occur south (Bellingham Bay and Nooksack River) and north (Fraser River) of the project site.

There is no specific data for catches in the immediate project vicinity. The proposed GPT project area is heavily fished when fish are present (McWilliams, 1992).

Lanny Pillatos (1996), President of the Puget Sound Gillnetters Association, reported that he has lost about four gillnets due to cargo vessel interactions in the past 10 years. He used to report such incidents to the U.S. Coast Guard. He believes the number of gillnets lost has decreased in recent years as a result of

decreased fishing time allowed. He estimates that currently about 10 to 15 nets per year are damaged or lost due to cargo vessel interaction in the study area. He had not been compensated for any net loss, nor was he aware of gillnetters that had received compensation from operators of cargo vessels for damaged nets.

Fishing open periods are very short, depending on a fishery. They have been changing from year to year. Recently, a period may last from 10 to 12 hours. When a net is run over by a cargo vessel, it means the fisher looses that fishing period, and perhaps the season for that species of salmon in that management area (Kelly, 1996).

Significant Impacts of the Proposed Action

Without the ability to estimate current probability of fishing interference and gear loss, projections of changes in the probability of gear loss due to changes in vessel traffic to Cherry Point cannot be made. Anecdotal information does provide some insights and general trends on the characteristics of the issue, however. The following summarizes personal experiences and perceptions of persons contacted regarding the incidence and nature of past incidents of cargo vessels interfering with fishing operations and loss of gear. The proposed project is not likely to affect commercial fisheries for benthic invertebrates (sea urchins, sea cucumbers, or clams) or groundfishes. The tribal fisheries of shrimp are just developing and it is unknown what impacts, if any, the proposed project would have. The fisheries discussed below could be impacted.

Crab fishery. The commercial crab fishery in the vicinity has been affected by existing industrial developments. The impact is primarily caused by vessel traffic, which results in lost gear, lost catches, and lost fishing time. The expanding fishing fleet has increased pressure on existing fishing grounds; expansion into shipping lanes has further increased gear losses (Whatcom County, 1981).

Although specific data are not available to quantify the change in vessel traffic that would result from implementation of the proposed project, there would likely be an increases in vessel traffic to the Cherry Point area. Shipping activity associated with the proposed project would result in an increase of about 280 ship trips per year, representing a 5% daily increase in shipping movements in the Georgia Strait Waterway. Shipping movements within the immediate Cherry Point vicinity would increase from an average of two large commercial vessel movements per day to nearly three per day. This increase in shipping would not affect existing monitoring of vessel traffic by the U.S. Coast Guard, navigation of the waterway, or commercial vessel conflicts (KJS, 1996). The amount of traffic, including barges towed to the site and cargo ships, will be an important factor. Anecdotal information suggests crab buoy lines are most affected by the tow lines of barge traffic rather than cargo ships where the buoy lines are passed beside or underneath the hulls without getting snagged (see Appendix E-4). It has been reported that commercial and tribal fishers may lose approximately 20% of their crab gear each season in the southeast Strait of Georgia (Humphries, 1983; Ingram, 1983; Thatcher, 1983). Some of this loss is attributed to marine traffic tangling buoy lines. Increased loss of gear could result should additional barge traffic result from project implementation.

Herring Fishery. The proposed project also would be located within the primary herring fishing grounds. It likely would interfere with some existing herring fishing activities. If construction were allowed during the fishing season, the herring fisheries would be disrupted in the vicinity of the construction. It still would be possible to seine between the construction activity and the Intalco pier, but it would likely be difficult to seine between the Arco pier and the construction activity of the northern arm of the GPT wharf. Pile driving and other disturbances in the water could drive herring from the vicinity, thus displacing the fisheries.

After construction, the geographic proximity of the Arco and GPT structures could restrict seining. With approximately 2,400 feet between the Arco south dolphin and the northern tip of the GPT pierhead, and assuming a circled purse seine would be about 510 feet in diameter, it is possible a set could be made between the two facilities if there were little wind and current. With wind and current, risk of contacting a pier would increase. The position of the GPT wharf is closer to shore than the Arco pierhead, and fishers may be able to drift by the GPT wharf. Any fishing near the proposed project site would have to occur far enough from the facility so that drifting nets would not become entangled in the piers.

It is unknown how much room is necessary for purse seiners or gill netters to effectively drift while fishing an area. Fishers currently fish the area between the Intalco and Tosco (formerly BP) piers, a distance of approximately 1 mile. If it is assumed that a minimum unobstructed area of 1 mile does not preclude a fishery, it would appear that fisheries could still operate with low risk between the GPT wharf, if constructed, and the Intalco pier.

Risk to Nooksack Tribe herring gill net fishers would not be as high as it would be for seine vessels; they would still be precluded from access, however, at least within the footprint of the marine facility. SOK line fishers are not likely to be significantly affected because their gear is smaller and easier to maneuver.

The proposed project site is northwest of the area commonly used to anchor the SOK fishery closed ponds, and could interfere with towing the catches to the ponds if fish were caught near the Arco and GPT piers.

The potential cumulative effects of the additional pier probably would affect the herring fishery more than the commercial salmon or crab fisheries. The primary place where the herring are caught commercially is in the Point Whitehorn to Sandy Point area. Because of the small total annual herring quotas, it is likely that fishers would still be able to attain their respective shares. They may have to spend an unknown additional amount of time to attain those quotas, however, depending on annual variations in the distribution of the spawning run between Point Whitehorn and Sandy Point.

Shipping associated with the proposed project would result in an increase of about 280 ship trips per year, representing a 5% daily increase in shipping movements in the Georgia Strait Waterway. Shipping movements within the immediate Cherry Point vicinity would increase from an average of two large commercial vessel movements per day to nearly three per day. Herring fishers would spend a small amount of time avoiding these additional vessel movements.

Salmon Fishery. Construction activities occurring during the salmon fisheries could restrict fishing in the immediate vicinity of the project site. Throughout the year, adult salmon of all species migrate along waters adjacent to the project site. Peak migration and associated fishing occur during summer and fall. The area also is the sockeye and pink salmon migration route to the Fraser River. According to Lummi Indian Fisheries (1979), during summer, pink, sockeye, and other salmon species migrate along this beach (Sandy Point to Point Whitehorn). Adult salmon may alter their migration to avoid underwater work. Any activity that disrupts this migration route could make it more difficult for local fishers to make their expected catches. It may not be possible to shift to another area and expect the same success as occurs along this shoreline. These construction operations would interfere with purse seine, gill net, and setnet fisheries in shallow waters (0 to 90 feet deep) of the project area.

After the proposed project is constructed, cargo ship and barge traffic into and out of the facility could interrupt salmon fishing. Shipping activity associated with the proposed project would result in an increase of about 280 ship trips per year, representing a 5% daily increase in shipping movements in the Georgia Strait Waterway. Shipping movements within the immediate Cherry Point vicinity would increase from an average of two large

commercial vessel movements per day to nearly three per day. Fishing practices would be interrupted by increased vessel traffic if it occurred when fish presence was high.

The proposed project also might interfere with gill nets set in shallow water along the beach, but only when drifts enter very shallow water. The salmon gill net fishery would likely be required to change fishing practices occasionally.

The proposed facility could interfere with drift gill net and seining practices in the area. Drifts would need to be shortened to avoid the wharf. This area has been a prime area for both gill-netters and purse-seiners. Through years of experience, fishers have gained an understanding of salmon migration routes and know when to expect good fishing. At least on a local scale, this facility could alter this migration route, causing fish to school in a less predictable manner. Coupled with increased vessel traffic, this could make fishing more unpredictable and could cause economic impacts if the fishers could not adjust to the different fish-migration patterns (Whatcom County, 1992).

Mitigation Measures

Crab Fishery. Investigate scheduling marine and commercial traffic to minimize conflict with the commercial crab fishery. New notification procedures could be developed to inform fishers of vessel movements.

Herring Fishery. Construction could be timed to avoid the herring fisheries. Because the pre-spawning schools of herring begin to assemble in late March, construction activities would be limited during the spring months.

Fishers would be offered practical opportunities to use the proposed marine facility to help their fishing operations. These could include anchoring closed ponds to trestle pilings; tying off gill nets and line gear to prevent drifting; and gear transfers.

Commercial marine traffic could be assigned approach and departure corridors to minimize conflict with commercial and tribal herring fisheries.

Herring resource enhancement activities discussed in the Marine Resources section also could provide mitigation for interference with fisheries.

Salmon Fishery. Fishers would be offered all practical opportunities to use the proposed marine facility to help their fishing operations. These could include tying off gill nets and line gear or modifications of the trestle pilings to prevent drifting; and gear transfers.

Commercial marine traffic may be able to be assigned approach and departure corridors to minimize conflict with commercial and tribal salmon fisheries. Because fishing does not occur seven days a weeks, marine traffic could be coordinated to minimize conflicts. The proponent will meet with tribal fish commissions, commercial fishers, and appropriate agencies to address vessel traffic-fishing interactions.

Significant Unavoidable Adverse Impacts

Crab Fishery. Crab pot gear loss could increase if there is an increase in barge traffic. Crabbers could be displaced from areas near the pier.

Herring Fishery. Construction of the proposed facility would permanently remove a fishable section of water from use because of the presence of the trestle and wharf. The project would alter fishing patterns of the nearshore herring fishing fleet.

Salmon Fishery. The proposed facility would affect the use of the area by commercial and tribal salmon fishers. Fishing practices and patterns would change as a result of the proposed project. Nets would not be able to be set in the footprint of the proposed facility.

Impacts of the Alternatives

No-Action Alternative

Crab Fishery. The No Action Alternative would not result in an increase in marine traffic, and fishers would not be displaced near the project site. Marine traffic would likely continue to increase to existing industrial facilities in the area. With no mitigation measures (e.g., scheduled traffic or better communications), the rate of gear loss would continue.

Herring Fishery. The No Action Alternative would not impact fishing activities.

Salmon Fishery. The No Action Alternative would not impact current salmon fishing activities.

Industrial development could occur in the future, with unknown impacts on crab, herring and salmon fisheries.

CPIP Alternative

Crab Fishery. The CPIP Alternative would result in impacts similar to the Proposed Action. There could be a higher proportion of barge traffic associated with the CPIP project, however.

Herring Fishery. The CPIP Alternative would reduce fishing access and create different fishing patterns. The CPIP site is located in the center of the area where herring SOK closed ponds have customarily been anchored. This would cause additional risk to seine fishers who tow seines full of herring to ponds.

Salmon Fishery. The CPIP Alternative would have impacts similar to the Proposed Action, however, the amount of impact would be greater proportionally to the larger footprint of the CPIP facility.

3. Recreational and Subsistence Fisheries

Affected Environment

The primary recreational and subsistence fisheries are clam digging and personal use (sport) crab fisheries. Clam species include cockles (*Clinocardium nuttallii*), native littleneck (*Protothaca staminea*), eastern softshell (*Mya arenaria*), horse (*Tresus nuttallii*), and butter (*Saxidomus giganteus*). WDFW estimated the 1995 recreational catch at 10,173 lbs. and effort at 1,689 user days for the beaches between Point Whitehorn and Sandy Point. The Cherry Point beaches represent a small percentage of the harvest (2%) and effort (4%).

Sport catch data for Dungeness crab are collected every two years by WDFW. Sport catch is estimated by counting individual crabs in pots and converted to pounds by multiplying the number of crabs by a mean weight of 1.8 pounds each (Armetta, 1992). Catch has ranged from 81,000 lb. to 257,000 lb. and represents 12% to 33% of the Puget Sound sport harvest. Sport crabbing effort in the Cherry Point subarea represented less than 2% of the buoy surveys in 1991 (Armetta, 1992).

Significant Impacts of the Proposed Action

Because Dungeness crab might avoid the vicinity during construction, there could be a temporary displacement of shore-based fisheries. Operation of the project is not expected to permanently impact sport or subsistence fisheries. The exception would occur in the rare event of a catastrophic toxic spill related to the project. In this case, mortality to clams and crabs caused by these organisms coming in contact with the toxin could reduce resources such that no recreational or subsistence fisheries could occur for one or more years.

Mitigation Measures

The height of the trestle and the spacing of the pilings have been increased to allow continuous movement of small vessels under the trestle.

Measures to mitigate effects to Dungeness crabs and benthic organisms discussed in the Marine Resources section would contribute to the maintenance of these resources that support current recreational and subsistence fisheries.

Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are anticipated.

Impacts of the Alternatives

No-Action Alternative

Under the No Action Alternative, the clam and Dungeness crab fisheries would continue to develop as they are now. Industrial development could occur in the future, with unknown impacts on clam and Dungeness crab fisheries.

CPIP Alternative

The CPIP Alternative would result in impacts and mitigation similar to the Proposed Action. In addition, it also would impact approximately 25,000 square feet of sand and mud flat habitat where the proponent proposes to place 1,000 cubic yards of cobble between the +1 and -10 feet MLLW in an attempt to increase substrate for attached macroalgae. This action would reduce the amount of sand or mud flat habitat where juvenile crab may burrow and where eelgrass would have the opportunity to colonize and provide crab habitat. It also may impact cockle and habitat for other clams, reducing the resource available to sport and tribal subsistence fishers. There could be an increase in habitat for red rock crab.

4. Shore Birds, Marine Birds and Threatened and Endangered Species

Affected Environment

Marine Birds and Shore Birds

Whatcom County has published a *Map Folio of Fish and Wildlife Habitat*, which describes wildlife habitation areas in the Cherry Point vicinity; information applicable to the proposal site is incorporated by reference into this EIS and summarized below. The site is just south of a concentration area of harlequin duck, which extends northward around Point Whitehorn to Blaine. Another small concentration area for harlequin ducks is located approximately one mile south of the site. A harbor seal haulout area is located approximately two miles north of the site. Great blue heron foraging area is also identified north of Point Whitehorn. Offshore areas near the site are mapped as part of a diving bird concentration area and black brant concentration area. The shoreline area is mapped as part of a "rocky substrate shorebird" concentration area.

Another source of wildlife information is the report "*Significant Wildlife Areas, Whatcom County, Washington,*" prepared by Ann M. Eissinger, published in December, 1994 as part of the Whatcom County Environmental Resources Report Series. Information in this report applicable to the proposal site is hereby incorporated by reference into this EIS and summarized below. This report identifies the high wildlife value of Cherry Point "due to its large numbers and seasonal concentrations of marine birds and their high vulnerability to oil spills." Species of Special Concern noted in this report include: the common loon, horned grebe, western grebe, red-necked grebe, Brandt's cormorant, great blue heron, harlequin duck, bald eagle, peregrine falcon, Caspian tern, marbled murrelet, California sea lion, harbor seal and Pacific harbor porpoise. Other bird species noted as present in the area include: arctic loon, pigeon guillemot, common murre, surf scoter, black scoter, white-winged scoter, dunlin, killdeer, yellow-billed loon, pied-billed grebe, belted kingfisher, oldsquaw, Bonaparte's gull, mew gull and Thayer's gull.

Threatened and Endangered Species

A review of Washington Department of Fish and Wildlife's Priority Habitats and Species Data System and Nongame Data System and previous studies of the area resulted in the identification of the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), marbled murrelet (*Brachramphus marmoratus marmoratus*), and stellar sealion (*Eumetopias jubatus*) as the only federal or state-listed endangered or threatened wildlife species potentially occurring in the vicinity of the project area. A detailed baseline bird study of the project area was prepared by Shapiro and Associates, Inc. (1994). Portions of the baseline report are summarized below.

Bald Eagle. The bald eagle (a federally listed endangered species) is a common winter resident in western Washington including the inland waters of Puget Sound and the Strait of Georgia. Large numbers (100's) of eagles occur in the Skagit and Nooksack River drainages along the west slopes of the Cascade crest. Many additional eagles are winter and year-round residents of nearby coastal areas along the Olympic Peninsula and the Strait of Georgia. The 1992-1993 survey of the project site indicated that a few bald eagles were usually in the area (Shapiro, 1994). The eagles frequently flew over the site and along the shoreline traveling north and south. On one occasion five different birds were seen but most of the time only one or two birds were seen during the survey period on any given day.

Two bald eagle nests occur near the project area: one approximately 2 miles north (near Pt. White Horn Road) and the other approximately 2 miles south of the proposed project (near the Intalco plant). The nests were occupied in 1993 as reported in the baseline study. The limited shorebird habitat in the project area suggests that potential prey for the bald eagle are primarily fish and wintering waterfowl. Several trees along the shoreline provide perch sites for eagles and other species moving through the area. The upland portion of the site does not contain trees large enough to provide nesting platforms for eagles.

Although eagles show a strong preference for fish about 50% of the time, they prey on mammals (voles and rabbits) and birds (waterfowl, seabirds, and shorebirds) in equal proportion for the remaining 50% of their diet.

American Peregrine Falcon. The American peregrine falcon (a federally listed endangered species) occurs in Puget Sound and the Strait of Georgia. The Skagit flats, located approximately 40 miles south of the project site, provide some of the most important wintering habitat for peregrines in North America. The Washington Department of Fish and Wildlife Priority Habitat Map for the peregrine falcon includes the shoreline within the project boundary as part of the falcon's winter feeding area.

No peregrine falcon nests have been found on or near the project site primarily due to a lack of ledges on high cliffs that are preferred nesting sites. Peregrines are not known to nest in trees. However, trees along the shoreline provide perch sites for the falcons.

Peregrine falcons forage almost exclusively on small- to medium-sized birds. Studies in the Skagit Flats area show that peregrines prey most often on ducks, shorebirds, and rock doves. Seabirds and waterfowl in the project area spend most of their time on or under the water and are not readily available as prey for the peregrines.

Marbled Murrelet. The marbled murrelet (a federally listed endangered species) is a marine bird that could be breeding in Douglas fir forests away from the shoreline in the Puget Sound region of western Washington. The U.S. Dept. of Interior 1989 report, *Catalog of Washington Seabird Colonies* estimates that as many as 20 individual murrelets may use the near shore habitat in the vicinity of the project site for feeding. The 1992-93 survey lists observations of five marbled murrelets in December of 1992, twenty seven in January, and three in February of 1993 from on-site observation stations (Shapiro and Associates, Inc. 1994). However, surveys as recent as May 1995 have turned up no evidence of nesting in the site vicinity. Two murrelets were sighted one mile south of the project site during May, 1995 (ENSR, 1995).

Stellar Sea lion. The stellar sea lion (a federally listed endangered species) is a marine mammal that is a rare visitor to the Strait of Georgia. The habitat of the stellar sea lion is primarily the Gulf of Alaska. They have been known to frequent the outer coast of Washington, only rarely spotted in the inland waters.

Significant Impacts of the Proposed Action

The threatened/endangered species of birds and mammals (bald eagle, peregrine falcon, marbled murrelet, stellar sea lion) could be indirectly impacted by construction activities that could cause them to move away and use other areas for feeding and resting. The value of the water area covered by the facility for feeding and resting habitat will be diminished for the life of the project. Accidental toxic material spills during construction could, if big enough, taint prey organisms and thus potentially impact some predators feeding on the tainted organisms. During operation of the facility, the noise and increased human presence in and

near feeding and resting areas could cause an incremental increase in the disturbance of the birds and mammals in the vicinity.

Impacts on marine birds and shore birds would be similar to those described above for threatened/endangered species of birds and mammals.

Mitigation Measures

During construction and operation of the facility, BMPs would be used for handling any toxic materials. Coordination with resource agencies will identify critical periods for any threatened or endangered species in the project area so that potential impacts can be minimized.

Significant Unavoidable Adverse Impacts

No direct significant unavoidable adverse impacts on threatened/endangered species have been identified. These species could be indirectly impacted by: construction activities disturbing area that could be used for feeding and resting; potential toxic spills; and increased noise and disturbance from proposed activities.

Impacts of the Alternatives

No-Action Alternative

The No Action Alternative would allow the project site to continue to support resting and feeding activities of any individuals of a threatened or endangered species with no change. Industrial development could occur in the future, with unknown impacts on threatened and endangered species.

CPIP Alternative

The CPIP Alternative would result in impacts and mitigation as described above for utilization of the shoreline and water area for resting and feeding.

ENVIRONMENTAL HEALTH

Upland Risk Assessment

Affected Environment

Methodology and Scope of Analysis

This section of the EIS provides information pertaining to risks associated with spills, explosions, collisions, and transport of materials stored and handled at the upland portion of the proposed marine terminal facility. This analysis inventories proposed conditions which affect levels of risk associated with the project, and estimates risks based on these conditions. Much of the information required to quantify levels of risk is not available; risk modeling and forecasting was not conducted. This assessment is qualitative in nature, concentrating on identifying the wide range of potential risks which can be minimized or eliminated by adopting best management practices when the proposed project is finalized. .

Information from other sections of this Draft EIS, similar project proposals in the area, and personal correspondence provide the basis for this analysis. Specifically, proposed rail and road facilities, expected operating procedures, and proposed types of commodities stored and handled on the site are examined for their potential effects on humans and the natural environment. Risks identified in this report are not constrained by available information.

The study area used in this analysis includes areas likely to be affected by the proposed facilities operation within Whatcom County. This includes the immediate proposed upland facilities and areas on site where transfer and transport activities occur, the entire PIT property, and adjacent properties. These areas include storage and transfer areas, administrative and maintenance buildings, roads most likely to be traveled by employees and trucks, the proposed rail loop and connecting railways, and areas adjoining these locations. Marine and beach areas are addressed in Gateway Pacific Terminals' analysis of Vessel Traffic Issues (Shapiro & Associates, 1996).

Significant Impacts of the Proposed Action

There are two major categories of risk generated by the proposed project:

- Direct risks to human health (such as a train or auto accident), and indirect risks to human welfare originating from environmental degradation (i.e. increased risk of sickness from air or water pollution); and
- Direct risks to the natural environment.

Additionally, there are varying levels of risk during the construction, operation, and future construction and operation.

Risk From Explosion

As currently proposed, the Gateway Pacific Terminal will be transporting and handling commodities which pose a low potential for producing an explosion during normal operations. Materials included in the proposal which are more likely to cause an explosion include the dusts of grain, green coke, and calcined coke. Small quantities of stored flammable liquids such as fuels and solvents are also explosive.

Explosions could also occur due to an automobile or train collision, during ship fueling operations, or as a result of equipment malfunction. Locations with a higher probability to experience an explosion include grain storage areas, fuel tanks, train crossings, intersections, and areas with higher traffic concentrations and higher rates of travel.

Additional risks to human welfare due to explosion stem from exposure to commodities which are released due to an explosion. Sulfur and potash are corrosive, not containable and degradable, and may pose a threat to human welfare after an explosion depending on levels of exposure to the commodity. If an explosion involving calcined coke and potash occurred, these commodities may pose additional adverse effects because they are capable of being wind swept to areas adjoining the location of an explosion.

Risk of explosion during construction may be higher than during normal facility operations due to the use of welding equipment and heavy machinery near fuel storage.

The majority of risk caused by explosion would be to workers and employees who work near grain and coke storage units, and to vehicle operators. The potential risk of these materials exploding for reasons other than collision will be borne almost entirely by workers. Explosions during transport would extend risk to the general public near roadways and railways used during shipment. In this case, local residents are burdened with the majority of risk, but it also extends to individuals living or interacting within commonly used transportation corridors. With the understanding that employees stand a higher chance of being adversely affected by explosion, best management practices enacted during future operations will address issues relating to worker safety.

Risk of Traffic Accidents

Existing and projected road and railway conditions are addressed within the Transportation section of this Draft EIS. The following information summarizes these findings and addresses additional safety issues.

The traffic analysis conducted by KJS Associates Inc. characterized the current roadway conditions as rural in nature and having lower than average daily traffic volumes. Local roadways serving the proposed site are generally two lane, in good condition, post speed limits up to 45 mph, and operate at Level Of Service A. The highest estimate of daily trips generated by the project is 1,500, and peak traffic periods occurring during a typical p.m. shift change is estimated at 75. Lower than average traffic volumes for the area, and the incremental increase in trips due to the project will have little or no adverse effects on the vicinity roadways.

The proposed facility will use rail lines within the Pacific Northwest Rail Corridor. This corridor currently services freight and Amtrak passenger rail. The local line near Interstate 5 serves six freight and two passenger rail movements each day. The existing rail spur at Cherry Point carries between 38 and 47 rail cars/day. Rail transport will account for 75% of total through-put at the proposed terminal, converting to 860 unit-train movements per year under proposed operating conditions. Adequate capacity is expected on the mainline to meet the anticipated increase of train movements.

Any increase in train or vehicle trips will increase the probability for a transportation related accident. However, given the rural and industrial nature of the proposed site, low population density, and generally underutilized transportation systems in the area, the proposed project would not dramatically increase the risk of an accident occurring in the area. The proposed GPT site provides ample space for transport and transfer activities which would reduce the potential for on-site collisions and accidents. Any additional risk

will be experienced primarily by workers, though residents near or on road and rail systems also may be affected.

Public Beach Access

Individuals using beach resources will not be subject to a significant risk of injury stemming from the proposed development. During the construction phase, beach access will be restricted in order to eliminate risks to the public associated with pier and facility construction. Normal facility operations should not pose additional risk of injury. An increased risk of traffic accidents arising from people attempting to obtain beach access near the site may occur. The proposed development is in a location currently used for recreation activities such as camping, fishing, walking, crabbing, and gathering. In these cases the public absorbs the risks associated with accidents occurring on or near the beach. These risks may be reduced by posting signs indicating "No Beach Access" on appropriate roadways and areas previously providing site or beach access to the public.

Spills

During standard operations the potential for a spill occurring is greater than the likelihood of an explosion. Small spills related to loading and unloading may occur at this type of facility. All spills will be cleaned manually, or with appropriate equipment as they occur. Nearly all commodities passing through GPT pose little threat to humans or the environment in the event a spill occurs. No commodities proposed to be transferred or processed at the proposed GPT are hazardous or radioactive, and thus are not likely to affect areas bordering spill sites. Spills on site involving fuels and solvents pose a greater risk to workers than the general public. Spills of these substances in areas with open flame or sparks, poorly ventilated areas, and highly populated work areas pose additional risks. This is especially true during the construction phase of the project. Utilizing proper spill response procedures will reduce risks to workers and the public. Adverse effects stemming from spills in the marine environment are addressed in the Marine Risk Assessment.

Impacts on Humans

The effects the proposed GPT project on air, soil, water, and levels of noise are addressed in the appropriate sections within the Draft EIS. The emissions from ships, equipment operations, and vehicles will increase the potential for air, water, soil, and noise pollution in the area. Local residents, residents near railways and roadways, and workers are anticipated to incur the majority of any adverse effects. Also, because this project is in its initial planning phase it is difficult to precisely state all of the effects environmental changes will have on human health.

Catastrophic environmental effects result in permanent, irreversible effects on humans or the environment. Due to the nature of commodities transported at GPT, there is little potential for a catastrophic event causing massive environmental degradation leading to a loss of human life. Acute effects occurring and reacting in a short period of time include events such as explosions and spills. The effects of acute events have been discussed previously in this report. Chronic effects are observed over the course of years and include adverse effects on human health as a result of long term exposure to contaminants. At the conceptual level, the chronic risks associated with the GPT facility are difficult to estimate.

Impacts on Natural Resources and Environment

The primary risk to plants, animals, and other organisms would occur during a spill or explosion releasing materials into natural environments. Commodities such as sulfur and potash can have adverse effect on terrestrial and aquatic organisms including plants, algae, wildlife, and the animals depending on these organisms for food. An explosion or spill releasing a large quantity of these materials could adversely affect organisms, wetlands, surface and ground water, vegetation, plants and animals in the immediate area, as well as areas adjoining roads and train tracks. Wetlands and a seasonal stream located in the southwest corner of Aldergrove and Gulf Roads are adjacent to the train tracks, increasing the risk of contamination and negative effects on plants and animals on the site or in the area.

Surface Waters

Construction may cause additional pollutants, such as solvents and oil, to be released into the wetlands and the seasonal stream. During normal operation small spills during loading and unloading of commodities may occur. There is also a potential for commodities to be released into surface waters during a large spill or explosion. The adverse effects of small spills during normal operations will be minimized with the implementation of a spill recovery plan. A comprehensive spill recovery plan will also reduce the adverse effects of an unexpected release of commodities into surface waters.

Vegetation

Vegetation affected by potential spills or explosions would vary depending on the scale of a potential event. Spills affecting surface waters or soils may also affect vegetation. In the case of a spill or explosion, vegetation in the immediate area would be adversely impacted. Negative impacts extending beyond the site of a spill or explosion are unlikely. Additional air pollution resulting from ship, truck, train, and auto use may also adversely affect plant communities in the area.

Wildlife

Spills and explosions may affect wildlife directly, through exposure to spilled commodities, or indirectly, through ingestion of vegetation, water, or prey which has been exposed to spilled commodities. Direct effects may be more harmful to a smaller number of species, while indirect effects may be less harmful to a larger number of species. The degree of negative effects stemming from spills is related to the quantity of commodity released into the environment. Given that the commodities transported are not hazardous, most adverse effects of spills are likely to affect species in the immediate area of the spill.

Wetlands

The greatest risks to wetlands generated by normal site operations stem from rail spills or explosions near wetland or riparian areas. The adverse effects associated with spills are dependent on the size and location of a spill.

Mitigation Measures

Risk From Explosion

- Measures which may reduce negative effects to humans include locating administrative and maintenance facilities, and areas with high worker concentration away from grain and fuel storage

areas. Additionally, limiting the number of train crossings and intersections encountered during product transport may reduce the risk of explosion. Adhering to proper traffic safety and transport regulations within the site and county will reduce the risk of an explosion caused by collision.

Risk of Traffic Accidents

- Separate timing of shift changes and train movements, adding larger shoulders to affected roadways, and improving the road paving and signalized railroad crossing at Henry Road west of Kickerville Road are measures that could be implemented to reduce the chance of an accident occurring.

Surface Waters

Measures reducing the effects on surface waters during construction, and during a spill include:

- using BMPs during construction and normal operations, including the use of hay bales, silt fences and siltation ponds;
- operating and maintaining an effective storm water drainage and recovery system;
- storing water soluble commodities in areas with runoff retention, and containing these commodities in enclosed storage facilities; and implementing a storm water drainage and recovery system, and spill prevention and recovery plan.

Vegetation

Measures reducing adverse effects on vegetation during construction and operation include:

- developing and implementing a spill response and recovery plan.

Wildlife

Measures reducing adverse effects of construction activities, spills, and explosions, include:

- maintaining buffer areas around the site, wetlands, and stream;
- maintaining a 100 foot vegetated buffer along the stream to maximize the buffer between the road and railroad; and
- implementing a spill recovery plan on and off site.

Wetlands

Measures reducing the effects of construction, and spills on wetlands and riparian areas include:

- maintaining vegetated buffer zones between rail and road ways which are between riparian and transport areas; and
- adopting and implementing a spill recovery plan which addresses spills into surface waters and wetland areas.

Significant Unavoidable Adverse Impacts

There is an unquantified risk to human health and the environment from explosion and spills.

Impacts of the Alternatives

No Action Alternative

The potential for adverse effects impacting humans and the environment would be lower under this alternative because no development is assumed. Future development of industrial uses are possible and could involve activities that create risks to environmental health. These future uses, and associated risks, cannot be identified at this time.

CPIP Alternative

The CPIP would not have tenants that manufacture explosive, toxic or hazardous materials. Materials which are potentially explosive, such as grain dust, flammable liquids and gases, fuels, paint and solvents would be properly stored to minimize risks of explosion.

NOISE

Affected Environment

Noise Regulations, Standards & Guidelines

Noise Descriptors and Characteristics

When addressing the effects of noise on people, it is necessary to consider the frequency response of the human ear. Instruments are therefore designed to respond to or ignore certain frequencies. The frequency-weighting most often used is A-weighting, and measurements from instruments using this system are reported in "A-weighted decibels" or dBA. All sound levels in this evaluation are reported in A-weighted decibels.

The human ear responds to a very wide range of sound intensities. The decibel scale used to describe sound is a logarithmic rating system that accounts for the large differences in audible sound intensities. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dBA. Therefore, a 70 dBA sound level will sound twice as loud as a 60 dBA sound level. People generally can not detect differences of 1 dBA in a given noise source; under ideal laboratory situations, differences of 2 or 3 dBA can be detected. A five decibel change in a given noise source would be expected to be perceived under normal listening conditions. However, when a new noise source is introduced the different frequency range can make the new source audible, even if it does not increase the sound level itself.

For a given noise source, factors affecting the noise impact include distance from a source, frequency of the sound, the absorbency of the ground, obstructions, and duration. The degree of impact also depends on who is listening and on existing sound levels. For example, if background noise levels are high, introducing a new noise source would tend to have less impact than in an environment where background noise levels are low.

Typical sound levels of familiar noise sources and activities are presented in Table 3-8.

Regulatory Overview

Relevant noise criteria for this evaluation include the Washington Administrative Code, Chapter 173-60. Federal Highway Administration (FHWA)/Washington State Department of Transportation (WSDOT) criteria are used as guidelines to help evaluate the relative impact of truck traffic noise.

Washington State Regulations

The State of Washington has a noise regulation that is the framework for numerous county and municipal noise ordinances. These regulations are all very similar in format, and specify sound level limits depending on the land use or zoning of the noise source and noise receiver. The law limits noise from individual vehicles (Chapter 173-62 WAC), but traffic noise in general is exempt. Whatcom County has adopted the State regulation (Chapter 173-60 WAC).

Washington State noise regulations are based on the environmental designation for noise abatement (EDNA) of both the noise source and the receiving property. Whatcom County has **not** specified zoning as the basis for these EDNAs, therefore the County uses land use as the basis for the environmental noise

Table 3-8
Sound Levels Produced by Common Noise Sources

Thresholds/Noise Sources	Sound Level (dBA)	Subjective Evaluations	Possible Effects on Humans
Human Threshold of Pain Carrier jet takeoff (50 ft)	140	Deafening	Continuous exposure can cause hearing loss
Siren (100 ft) Loud rock band	130		
Jet takeoff (200 ft) Auto horn (3 ft)	120		
Chain saw Noisy snowmobile	110		
Lawn mower (3 ft) Noisy motorcycle (50 ft)	100	Very Loud	
Heavy truck (50 ft)	90		
Pneumatic drill (50 ft) Busy urban street, daytime	80	Loud	
Normal automobile at 50 mph Vacuum cleaner (3 ft)	70		Speech Interference
Large air conditioning unit (20 ft) Conversation (3 ft)	60	Moderate	
Quiet residential area Light auto traffic (100 ft)	50		Sleep Interference
Library Quiet home	40	Faint	
Soft whisper (15 ft)	30		
Slight Rustling of Leaves	20	Very Faint	
Broadcasting Studio	10		
Threshold of Human Hearing	0		

Note that both the subjective evaluations and the physiological responses are continuums without true threshold boundaries. Consequently, there are overlaps among categories of response that depend on the sensitivity of the noise receivers.

regulations (Roland Middleton, personal communication, 1996). The Class A, B, and C EDNAs loosely refer to residential, commercial, and industrial land uses, respectively. Table 3-9 summarizes allowable noise levels.

Table 3-9
Washington State Maximum Permissible Environmental Noise Levels (dBA)

EDNA of Noise Source	EDNA of Receiving Property		
	Class A Day / Night	Class B	Class C
Class A	55 / 45	57	60
Class B	57 / 47	60	65
Class C	60 / 50	65	70

Based on current land use, the proposed marine terminal would be classified as a Class C noise source; this category includes "(i) storage, warehouse, and distribution facilities." For Class C (industrial) sources affecting Class A (residential) receivers, the allowable noise levels are 60 dBA from 7 a.m. to 10 p.m. and 50 dBA from 10 p.m. to 7 a.m. For Class C (industrial) sources affecting Class C sources, allowable levels are 70 dBA.

It is important to note that some noise sources such as traffic on public roads, aircraft, and railroad traffic are exempt from the applicable environmental noise limits. Also, temporary construction sites are exempt from these limits during daytime hours. However, construction activity noise levels would have to meet the allowable levels between 10 p.m. and 7 a.m. at nearby residential locations.

Federal Highway Administration/Washington State Department of Transportation

For vehicles traveling on public roadways, the U.S. Federal Highway Administration (FHWA) identified noise criteria and established procedures for evaluating road improvement projects in its Federal-Aid Highway Manual (U.S. DOT, 1982). However, these criteria only apply to projects involving state or federal funding. Since no state or federal funds would be used for the road improvements associated with the marine terminal project, the following criteria are being used for evaluation purposes only.

FHWA defines a traffic noise impact as a traffic noise level approaching or exceeding 67 dBA for residential or recreational locations. The Washington State Department of Transportation (WSDOT) defines "approaching" the FHWA criteria as within 1 dBA of the criterion level. The FHWA also defines a traffic noise impact as a predicted traffic noise level substantially exceeding an existing noise level. WSDOT defines "substantially exceeding" an existing noise level for receivers in residential or recreational locations as an increase of 10 dBA if the predicted sound level in the design year is greater than 55 dBA or an increase of 5 dBA if the design year sound level is above 62 dBA.

Zoning and Land Use

The area surrounding the proposed Gateway Pacific Marine Terminal is predominantly undeveloped land used for pasture and hay, with some developed industrial sites interspersed throughout the area. Most of the area is zoned for Heavy Industrial use.

Residential structures nearest to the marine terminal facility are on the east side of Gulf Road where the road turns to follow the shoreline, approximately 2,400 feet away from the Gateway Pacific Terminal site. According to anecdotal information, one of the two existing residential structures is used for commercial purposes (by Intalco) while the other is being rented on a short-term, month-to-month basis (PIT, 1996). These residences will be eliminated prior to operation of the terminal facility. The nearest permanent residences other than these Gulf Road residences are located on Kickerville Road, approximately 1.5 miles east of the project site.

The adjacent property east of the proposed facility is undeveloped, but is currently being used along the shoreline as a semi-permanent "camp." Current residents of this camp are trespassing on private property and are occasionally removed from the site only to return shortly (Middleton, personal communication, 1996). Once the property is developed, the residents will be permanently removed. These occupants are not considered in this noise analysis.

Existing Noise Conditions

A site visit was conducted in September, 1996. The site was relatively quiet; the loudest sounds observed were those associated with marine waters. No noise associated with the adjacent industrial activities was discernible. Existing noise levels were not measured as part of the analysis.

Significant Impacts of the Proposed Action

The following analysis is qualitative in nature and is based on typical noise sources encountered in similar industrial operations; no modeling of project noise was performed for this analysis.

Construction Impacts

During construction there would be temporary increases in sound levels near the terminal site, near roadway alignments being improved, and near the new rail line alignment due to the use of heavy equipment and the hauling of construction materials. The increase in noise levels would depend on the type of equipment being used and the amount of time it is in use. Pile driving, excavation, grading, and construction would generate sounds audible on surrounding properties. Construction noise would be exempt from regulations, except for nighttime noise limits between 10 p.m. and 7 a.m.

Table 3-10 shows the typical range of noise levels for construction equipment which could be used during the construction of this project. Sounds from construction equipment (a point source) decrease about 6 dBA for each doubling in distance from the source. Depending on distance and other factors, construction noise could have an adverse impact on residences near the site. However, one of the residential structures along Gulf Road is currently used for commercial purposes and the other residential structure is inhabited on a short-term lease will be removed. Therefore, there will be no residential sources within approximately 1.5 miles of the site. Construction-related noise impacts would not be likely at residential uses adjacent to Kickerville Road, approximately 1.5 miles from the site. Existing industrial and agricultural activities are not considered noise-sensitive and would experience significant noise impacts.

Table 3-10
Typical Construction Equipment Noise (dBA)

Types of Activities	Types of Equipment	Range of Noise Levels at 15 meters (50 feet)
Pile Driving[1]	Pile Driver	69-103
Materials Handling	Concrete mixers Concrete pumps Cranes (movable) Cranes (derrick)	75-87 81-83 76-87 86-88
Stationary Equipment	Pumps Generators Compressors	69-71 71-82 74-87
Land Clearing	Bulldozer Dump truck	77-96 82-94
Grading	Scraper Bulldozer	80-93 77-96
Paving	Paver Dump truck	86-88 82-94

Source: U.S. Environmental Protection Agency, 1971 [1] Measurement taken by McCulley, Frick & Gilman, Inc.

Operational Impacts

Terminal Activity

Potential noise sources from the marine terminal facility include:

- trucks traveling on the site and along the trestle/pier;
- ships entering and exiting the facility and docking at the pier;
- conveyors transporting material;
- loading of material;
- other material handling equipment; and
- occasional bangs, clanks and other impulsive noises.

Potential Impacts to Gulf Road Residences. Terminal operations could cause sound levels up to or exceeding 50 dBA at a distance of 2,400 feet. Intervening distance, terrain and vegetation would provide some noise attenuation. Assuming that the nearest residential structures on Gulf Road will not be used for residential occupation, no significant noise impacts would occur at this location.

Potential Impacts to Kickerville Road Residences. Residences along Kickerville Road would be more than 1.5 miles from the terminal facility. At this distance, it is unlikely that terminal operations would be audible at residences along Kickerville Road. There would be no direct line of sight to the facility. No significant noise impacts would occur at these locations.

Railroad Activity

Part of the proposal for the Gateway Pacific Marine Terminal project includes construction of a loop rail track and a rail spur connecting the terminal facilities to existing rail transportation systems. Burlington Northern has a main track running north/south approximately 1,300 feet west of Kickerville Road. There is an east/west rail line on the north side of Aldergrove Road that connects the main rail line to the Arco Refinery. The Gateway Pacific Marine Terminal proposes constructing a new rail line that would connect with the Arco Refinery track just west of the existing main line and would travel on the south side of Aldergrove Road before continuing southward toward the terminal facility.

Equipment or facilities of surface carriers engaged in commerce by railroad are currently exempt from the maximum permissible noise levels specified in WAC 173-60. The following discussion of potential railroad noise impacts is used to identify potential impacts, regardless of compliance with the state noise regulations.

Gulf Road Residences. No probable noise impacts would occur from railroad traffic or loading/unloading. The proposed new rail lines would be at least a mile from the Gulf Road residential locations and noise from the rail lines would be attenuated by the intervening distances and terrain.

Kickerville Road Residences. The proposed new rail line would be further from residential locations along Kickerville Road than the existing Burlington Northern rail line. Therefore, noise levels due to the new rail line would be lower than noise levels from trains on the existing tracks. However, the proposed facility would increase the train activity on the existing main line and would increase the frequency of train noise events in the vicinity.

Traffic Activity

According to current project plans and the transportation analysis in the Draft EIS, no significant increase in truck traffic on local roadways is anticipated. Trucks transporting petroleum coke between the Gateway Pacific Marine Terminal and the neighboring Arco Refinery would not pass any residential or other sensitive receptors. Therefore, truck trips are not anticipated to not cause significant noise impacts.

Employees traveling to and from the terminal facility would cause increases in traffic volumes on local roadways. The increase in afternoon peak hour traffic volumes along Grandview, Kickerville and Mountain View Roads due to the facility employees would cause traffic noise increases of 1 dBA or less. According to WSDOT interpretation of FHWA criteria, a traffic noise level increase of less than 5 dBA is not considered significant. Therefore, the facility would not likely cause significant traffic noise impacts.

Mitigation Measures

Construction

Construction noise could be minimized with properly sized and maintained mufflers, engine intake silencers, engine enclosures, and turning off equipment when not in use. Stationary construction equipment should be located away from sensitive receiving properties where possible. Where this is unfeasible, or where noise impacts are still significant, portable noise barriers should be placed around the equipment with the opening directed away from the sensitive receiving property. These measures are especially

effective for engines used in pumps, compressors, welding machines, etc., that operate continuously and contribute to high, steady background noise levels.

Although back-up alarms are exempt from Washington's noise ordinance, they are among the most annoying sounds from a construction site. Where feasible, equipment operators should drive forward rather than backward to minimize this noise. Noise from material handling can also be minimized by requiring operators to lift rather than drag materials wherever feasible.

Operational

No significant impacts have been identified and no mitigation measures are required.

Significant Unavoidable Adverse Impacts

No significant unavoidable adverse noise impacts are expected to occur.

Impacts of the Alternatives

No Action Alternative

Under the No Action Alternative, the proposed marine terminal facility would not be constructed and the site would remain in its currently undeveloped state for the foreseeable future. No noise would be generated by the site. Industrial development could occur in the future, with unknown impacts on noise.

CPIP Alternative

The CPIP EIS did not evaluate noise impacts, so there is no basis for comparing noise impacts with the proposed action.

LAND AND SHORELINE USE

1. Land Use Patterns

Affected Environment

The project site of 1,092 acres is located within unincorporated Whatcom County, approximately 7 miles east of the City of Ferndale and approximately 12 miles northwest of the City of Bellingham. The site is characterized by a mix of forest, abandoned shrub-dominated fields, and agricultural fields, some of which are still in use. The terrain ranges from flat to gently rolling, except for a ravine on the southwest portion of the site with moderate slopes, and moderate to steep bluffs along the shoreline. An unnamed seasonal stream is associated with the ravine. The site occupies approximately 5,460 linear feet of shoreline on the Strait of Georgia.

There are two residential structures located near the proposed marine terminal facility on the east side of Gulf Road where the road turns to follow the shoreline, approximately 2,400 feet away from the Gateway Pacific Terminal site. According to anecdotal information, one of the two existing residential structures is used for commercial purposes (by Intalco) while the other is being rented on a short-term, month-to-month basis (PIT, 1996). These residences may be eliminated prior to operation of the terminal facility. The nearest permanent residences other than these Gulf Road residences are located on Kickerville Road, approximately 1.5 miles east of the project site.

The site is bordered on the north and west by the Arco oil refinery, to the east by the Intalco Aluminum Corporation, wooded acreage and Lake Terrell Wildgame Refuge, and to the south by the Strait of Georgia. The northwestern area of the County in which the site is located is generally known as Cherry Point. Cherry Point is located on the Strait of Georgia south of Birch Bay. Adjacent land uses include: the Arco and Tosco oil refineries, Intalco's aluminum plant, rural residential, agricultural, and wooded tracts. Access to the site is provided by a system of local county roads including: Aldergrove Road to the north, Gulf (Powder Plant Road) to the east, and Henry Road. Lonseth Road also passes east-west through the center of the site. Several decaying sheds, old foundations from farm houses and outbuildings are located south of Henry Road and near the intersection of Aldergrove and Gulf Roads.

The site has been under various ownerships and was actively farmed up until the late 1960's. Farming activities included commodity crops, hay, dairy, chickens, as well as use of some woodlots for firewood, and frequent logging. The present conditions of open fields and wood lots has been stable for approximately 50 years as documented by a 1950 aerial photo and indicated by discussions with retired neighbors that have lived and worked in the Cherry Point area for most of their lives.

When the Cherry Point area was rezoned in the early 1970's to Heavy Industrial, various entities began to aggregate farmlands into larger blocks of land. Many of the farms have not been actively producing commodity crops since that time, but some agricultural uses such as pasture lands, hay, and limited commodity crops continue. The site is identified in the Whatcom County Comprehensive Plan as containing prime agricultural soils (based on Soil Conservation Service soil types). However, a large portion of Whatcom County falls in this category. The site has not been designated as Resource Lands in the Comprehensive Plan, and continues to be zoned for industrial uses.

Although privately owned, the beach has been used by the public for walking, fishing, clamming, picnicking, and overnight camping. Access to the beach is via Gulf Road. In past years, reef net boats

used the beach to the southeast of the project site where a café was located (one-story wooden building that is presently deteriorating). There is a gravel off-loading structure (also deteriorating) east of the proposed project site.

Both Blaine and Bellingham are important fishing ports in Whatcom County. The site is located in an area of the Strait of Georgia that contains important fisheries resources including crab, herring, and salmon. These resources are also of critical importance and are in the Usual and Accustomed Areas for tribal fishers, primarily members of the Lummi and Nooksack Tribes. The Suquamish, Swinomish, and Tulalip tribes also fish in these waters. Recreational fishing also occurs along the shoreline of the site.

Significant Impacts of the Proposed Action

Changes in land use can generate different types and magnitudes of impacts. For analytic purposes, these effects may be categorized as direct, indirect, or cumulative. These terms generally relate to different cause-and-effect relationships between a proposal and its impacts, ranging from effects that are closely and directly related; those that are more tenuous or remote, but nevertheless related; and/or impacts that generally involve the intervention of other factors or agents to generate the effect. Effects may be closely related in time and place or may be widely dispersed.

Direct impacts are directly caused by a proposal and are relatively close in time and place. These can include conversion of land to a different or more intensive use; displacement of existing activities, incompatibilities and conflicts between land uses and activities; foreclosure of future land use opportunities; and the conduct of clearing, grading and similar construction activities with their associated short-term effects on adjacent properties.

Indirect land use impacts are those caused by or related to a proposal to some degree. Compared to direct impacts, they are generally more tenuous or remote in terms of causation and often involve actions of other parties. In general, effects may be more widely dispersed in time and place than direct impacts. They may include an increase in the attractiveness of certain parcels of land for development as a result of a proposed action, due to improved access, for example; the tendency of certain uses to generate a demand for other uses in close proximity (i.e., spin-off or secondary uses, such as tourist or highway-commercial activities); one use or activity serving as a precedent for another use; and the pressure for other changes in land use due to real or anticipated increases in property values, population growth or economic opportunities.

Cumulative impacts are those that are generated by an action in conjunction or combination with the actions of other parties. These types of potential impacts can include changes to the general character of an area from the combined effects of numerous (possibly unrelated) development projects. These impacts may be extensive (i.e., regional) in scope due to the convergence of multiple activities over time or because of the nature of the potential change.

Direct Impacts

Land use impacts of the proposed action would involve development of approximately 180 acres of the total 1,092-acre site, which consists of mostly agricultural and shrub lands, to industrial uses. Development of the pier and associated uses would permanently alter the physical character of the site and would foreclose other potential uses for the foreseeable future. People who currently use the beaches for walking, fishing, clamming, picnicking, and overnight camping would experience significant changes in the character of the beach. The beach and adjacent areas would change as a result of construction and

operation of a deep water marine terminal including the pier, trestle, shoreline storage facilities, and the increased marine shipping activity. Upland areas that are currently used for informal recreation may be closed to users during construction and subsequent operation of the new facility. Beach areas near the proposed facility would be available for use during operation of the new facility, but may be closed during construction.

Land uses on the portion of the site used for the loop railroad track system and the terminal storage facility would be permanently converted to industrial uses. The terminal storage facility would occupy approximately 80 acres and be developed with both covered and open storage for a variety of different cargoes, pavement, and buildings. The rail loop would use approximately 100 acres. These proposed uses would involve development of approximately 16 percent of the total 1,092-acre site. Establishment of new industrial uses including a deep water pier and railroad access would alter the rural, agricultural character of the site. There would be an increase in the general level of activity in the vicinity and changes to the visual character of the beaches and uplands.

In the short-term, the proposed development would contrast with the open, undeveloped character of surrounding lands. However, existing industrial development associated with the Arco and Intalco facilities is also surrounded by rural or agricultural lands. All adjacent lands have been zoned Heavy Industrial and, over time, as vacant properties are developed in accordance with the zoning designation, the land use pattern in the Cherry Point area will change from open land with a rural, agricultural character to industrial activities of various types. The proposed action would be consistent with the future land use pattern that is planned for within the general area.

The Gateway Pacific Terminal would be compatible with the existing industrial/terminal developments associated with the Arco, Intalco, and Tosco facilities in the area. The site design is generally similar in function and purpose (i.e., a marine terminal facility that serves an international import and export market)

Indirect and Cumulative Impacts

The proposed action is not expected to indirectly affect land uses adjacent to the site or in the general vicinity. Uses of the type and scale proposed do not typically generate spin-off uses; the proposal would not be expected to create a significant demand for commercial uses to support and service planned operations or residential uses to house employees. Similarly, the proposed development is not expected to generate cumulative adverse land use impacts. Industrial development is assumed to be included in the projected growth planned for by county.

Mitigation Measures

No mitigation measures are required. Industrial development of the site and the general area is anticipated by the comprehensive plans and zoning regulations adopted by Whatcom County. Changes in land use patterns and character of development are consistent with adopted policies and regulations.

Significant Unavoidable Adverse Impacts

No significant unavoidable adverse land use impacts are expected to occur.

Impacts of the Alternatives

No Action Alternative

Under the No Action Alternative, no changes in the current use of the site would occur at this time. Industrial development of other properties in the area would occur over time consistent with adopted plans and regulations.

CPIP Alternative

Land use impacts of this alternative would be generally similar to those of the Proposed Action.

2. Recreational Uses

Affected Environment

The site has no existing developed recreational uses and is not designated as public park or open space. However, the Whatcom County Open Space and Recreation Plan (1991) identifies a public access to the water on the eastern portion of the site. This area, located at the foot of Gulf Road (or Powder Plant Road), is currently used intensively for unauthorized camping and is also used for access for crabbing and beach walking. The waters offshore from the site support some recreational fishing and crabbing. The site proposed for development of the terminal storage facility is sometimes used for unauthorized camping or evening gatherings of young people.

Significant Impacts of the Proposed Action

Project development would preclude the informal recreational activities that now occur on the area of the site proposed for development of the terminal storage facility. The pier would cross the beach area at an elevation allowing continued unobstructed access on the beach except during construction when access may be restricted for public safety. Small water craft would be able to pass under the trestle, but would be precluded from the area occupied by the pier, and the area adjacent to the pier when vessels were berthed at the terminal.

Recreational experiences could be altered for some people by the presence of an industrial facility and pier on the shoreline; however, it would be located between two similar facilities.

Mitigation Measures

To assure continued public use of the low beach area at the foot of Gulf Road, permanent public access could be provided through donation, acquisition, easement or other means.

Significant Unavoidable Adverse Impacts

Any current unauthorized recreational uses of the development area (uplands or shoreline) would be precluded. This is not considered a significant unavoidable adverse impact.

Impacts of the Alternatives

No Action Alternative

The No Action Alternative would not directly impact recreational activities at the site. Industrial development could occur on the site in the future, with unknown impacts on recreation.

CPIP Alternative

Industrial development of the CPIP pier and upland industrial development would result in greater loss of public access due to the more intensive public use of the beach and shoreline at the CPIP site. The section of public road along the shoreline on the CPIP site had recently been vacated to CPIP and is now closed to the public. The CPIP pier would create some conflict with recreational fishers and crabbers; the CPIP Trestle is 950 feet longer than in the proposed action, and could create a greater obstruction to fishing.

RELATIONSHIP TO PLANS AND POLICIES

A. Federal Policies

1. Clean Water Act (33 USC 1330)

Summary: The primary goal of the Clean Water Act is to restore and maintain the chemical, physical and biological integrity of the nations waters. In general, the Act (first passed in 1948 as the Federal Water Pollution Control act) provides for technical and financial cooperation by the federal government and state an municipalities in the formulation and implementation of programs for the abatement of water pollution; sets water quality standards (through EPA); and mandates implementation of point and non-point source water pollution controls. In general, industries are required to employ the best available technology for treatment of sources of pollutant discharges. All requirements of the Act are enforced through a national pollutant discharge permit system based on effluent guidelines established by the EPA.

Section 404 of the Act requires a permit for discharge of dredged or fill material into waters of the U.S. or onto their adjacent wetlands. The Corps of Engineers has been assigned responsibility for the administration of the Section 404 permitting process. The Washington Department of Ecology also has responsibility for issuing water quality certification pursuant to the Act.

Discussion: The proposed project could result in direct and indirect water quality impacts to the waters of the Strait of Georgia due to proposed pier and trestle construction and operations, marine shipping traffic, discharges of fresh water, and potential spills from vessels or materials stored on or transported from the site. See the Water section of this Draft EIS for a complete analysis of impacts and mitigation measures.

Proposed construction of the trestle and pier includes installation of approximately 1,533 pilings. During trestle construction, the majority of benthic invertebrates in the immediate piling locations would be eliminated in the "footprint" of the piles. The limited extent of the proposed pile driving and its temporary nature, however, would probably preclude extensive impacts. According to the Corps of Engineers guidelines (Regulatory Guidance Letter 90-8), when pilings are placed for structures that have traditionally been constructed on pilings, such as wharves and piers, a Section 404 permit is not required. Such a permit is required in connection with pile driving when the piles are used in a manner essentially equivalent to a discharge of fill material in physical effect or functional use and effect. An application for a Section 404 permit has been filed with the Corps of Engineers.

No dredging is proposed for the project. The water depth at the pierhead is sufficient to accommodate vessels of up to 250,000 dwt.

A storm water management system would be prepared for the site that would include treatment facilities designed to remove contaminants from materials handled on site. Best Management Practices (BMPs) for treatment of storm water would be used in the design of storm water facilities including separation of potentially contaminated water by grading and curbing throughout the terminal; curbing the trestle and pier; and pumping storm water to the treatment area. Storage tanks would be lined and bermed. Contaminated storm water would be treated by an on-site collection and treatment system that would provide screening, gravity sedimentation, oil/water separators, physicochemical treatment, sludge removal and dewatering.

2. Rivers and Harbors Act (33 USC 407)

Summary: Section 10 of the Rivers and Harbors Act requires a permit for any structures or work in navigable waters of the U.S. Permits are required for such activities as the placing of piers, pilings and dolphins. The Corps of Engineers has been assigned responsibility for the administration of the Section 10 permitting process.

Discussion: The project would include construction of a pier and trestle. No dredging is proposed as part of the project. An application for a Section 10 permit has been filed with the Corps of Engineers.

3. Endangered Species Act (16 USC 1531)

Summary: The basic premise of the Endangered Species Act and subsequent amendments is that endangered plant and animal species are of aesthetic, ecological, education, historical, recreational, and scientific value to the nation and its people. The Act directs all federal departments and agencies to conserve endangered species and to pursue all methods and procedures necessary to bring any endangered or threatened species to the point at which measures provided by the Act are no longer necessary. An important part of protecting such species is conserving the ecosystems they depend on. The Act involves designation and protection of critical habitat, or those parts of the species' range which are sensitive and require special consideration, and generally prohibits the taking of endangered species on both public and private lands. Amendments passed in 1978 require that a species' status and its critical habitat be listed concurrently, if possible, and that determination of critical habitat include the economic impacts of such designation. Amendments passed 1982 and 1988 strengthened protection afforded to endangered and threatened plant species. Responsibility for implementation of the Act is directed to the United States Fish and Wildlife Service.

Discussion: Species/habitat subject to the Act that are potentially found on the site include bald eagle, American peregrine falcon, marbled murrelet, and the stellar sea lion. Two bald eagle nests occur near the site; several trees along the shoreline provide perch sites. No peregrine falcon nests have been found on or near the site, although trees along the shoreline provide perch sites for falcons. Marbled murrelets have been observed on the site in the past; however, recent surveys showed no evidence of nesting in the vicinity of the project. The stellar sea lion is a marine mammal that is a rare visitor to the Strait of Georgia. The primary habitat of the stellar sea lion is the Gulf of Alaska. Although they have been known to frequent the outer coast of Washington, they have been spotted only on rare occasions in the inland waters.

4. Executive Order 11990 - Protection of Wetlands

Summary: Executive Order 11990 requires that all Federal actions, or Federally permitted actions, employ all feasible and prudent options to avoid impacts to wetlands. Where wetland impacts can not be avoided, mitigation must be provided that will result in no net loss in the functions and values of wetlands. Any filling of wetland areas that would require a permit under Section 404 of the Clean Water Act, administered by the Corps of Engineers, is required to meet the requirements of Executive Order 11990.

Discussion: The proposed project would require filling of approximately 5.85 acres of wetlands for the construction of the loop railroad track system. Of the 5.85 acres proposed to filled, 4.30 acres are classified as farmed seasonally saturated palustrine emergent wetlands; 1.45 acres are seasonally saturated palustrine scrub-shrub wetlands; and 0.1 acre are seasonally saturated palustrine forested wetlands. The Wetlands section of this Draft EIS contains a detailed discussion of the wetlands on the site and a wetland mitigation plan.

B. Whatcom County Plans and Policies

1. Adopted Whatcom County Comprehensive Plan

Summary: Whatcom County's existing Comprehensive Plan was adopted under the authority of the Planning Enabling Act (RCW 36.70). The plan is organized according to subarea plans which address particular areas of the county. The subarea plans apply the goals and policies of the Comprehensive Plan to properties within these defined geographic areas. The site of the Proposed Action is within the Cherry Point-Ferndale Subarea Plan.

The subarea plan is comprehensive, general and long-range in nature. It is intended to address current issues along with current issues and anticipated problems and possibilities. The Cherry Point Subarea Plan sets forth goals and polices for regional design, growth management, land use, cultural and natural resources, and citizen involvement. The plan also identifies characteristics of properties with particular zoning designations, such as Heavy Impact Industrial.

Goals & Policies

The applicable regional *design* goal calls for location of urban development within or immediately adjacent to existing urban areas, the elimination of sprawl, assurance that an adequate range of urban services are available, optimization of investments in public services, and conservation of energy resources (Sec. IV A(1)). The *growth management* goal encourages predictable patterns of urban and rural development that utilize previously committed land areas and existing facility investments before committing new areas for development (B(3)).

Land use goals relevant to the proposal include the following:

- conserving agricultural and forest lands for continued production of food, forage and timber crops (C(1)).

- a balanced and diversified economy in order to assure desirable local employment opportunities, and to strengthen and stabilize the tax base. To accommodate anticipated economic development in an environmentally responsible manner with due consideration for public cost, energy availability, land use compatibility and transportation accessibility (C(4)).

- promote a functional, coordinated, and multi-mode transportation system which provides for safe and efficient movement of people and goods, avoids undesirable environmental impacts and optimizes public investments and the conservation of energy resources (C(6)),

Cultural and natural resource goals seek to identify and manage environmentally sensitive areas so as to prevent destruction of the resource base and reduce potential losses to property and human life. The subarea plan also calls for continued identification of cultural and natural resources and formulation of viable methods to preserve and conserve such resources in recognition of their irreplaceable character (D(2)).

Zoning Criteria

In addition to goals and policies, the Cherry Point Subarea Plan identifies general locational criteria and policies and goals for various county zoning classifications. For a Heavy Impact Industrial zoning designation, which is applicable to the site of the proposal, sites should be sufficiently large to accommodate industrial activities, flat and well drained, and have good land bearing qualities. Other site criteria include the availability of industrial rail service, an adequate supply of labor and utilities, and good access for truck transportation. Industrial sites should also be relatively isolated from less intensive land uses. Unique features, such as deep water access for ocean going shipping, should also be considered in site selection.

The Subarea Plan recognizes that the Cherry Point area meets relevant locational criteria for Heavy Impact Industrial sites. The designation of a large industrial land area at Cherry Point is intended to acknowledge the County's commitment to provide adequate vacant developable land to meet anticipated demand for manufacturing uses. It also intends to promote a diversified economy to assure local employment opportunities and strengthen the tax base.

The underlying purpose of the Heavy Impact Industrial zone is to provide vacant land to meet the demand for heavy industrial/manufacturing uses, to encourage diversification of the economic base, and at the same time, to maintain an acceptable balance between the interests of the private sector and the impact of cultural aspects of Whatcom County. The Subarea Plan also specifically states Whatcom County policy to emphasize development of public and private multi-purpose ocean cargo transfer terminal facilities in the Heavy Impact Industrial area; such facilities are intended to be consistent with Shoreline Master Program policies and regulations (Sec. 1.06).

Other relevant policy statements call for monitoring vacant industrial land; financial participation of industrial users when impacts exceed capital improvement programs; use of adequate buffering to non-industrial uses; and use of pollution and nuisance control measures (Sec. 1.02-1.05).

Discussion: The proposed action is generally consistent with applicable Comprehensive Plan policies. The site of the proposal is within an area designated for heavy industrial uses by the adopted Comprehensive Plan and Subarea Plan. Applicable plan policies recognize the site as appropriate for heavy industrial uses and marine pier facilities. The proposal would occupy property previously designated for industrial development; would use existing infrastructure; and would be located away from population centers. It would implement policies encouraging multi-purpose ocean cargo transfer terminal facilities, and take advantage of deep water access for ocean going shipping. The site has previously been designated for industrial use and meets the Plan's criteria for location of such uses. The proposal would generate additional jobs and tax revenues, which would be consistent with Plan policies that encourage diversification of the economic base.

2. Proposed Whatcom County Comprehensive Plan (1996)

Summary: Whatcom County is in the process of preparing an updated Comprehensive to meet the requirements of the Washington State Growth Management Act (GMA). A draft of the proposed plan was published in June, 1996. Due in part to appeals filed with the Western Growth Management Hearings Board, the Plan has not yet been adopted by the County as of this writing. The following discussion summarizes the content of the proposed Plan as it applies to the proposed project.

The proposed Comprehensive Plan designates future land uses for the unincorporated areas of the County. The goals and policies of the Plan, together with the land use map, are intended to be used by the County to direct growth and development in the County over the next 20 years. The draft designates the Cherry Point area as within an Urban Growth Area; it is one of three industrial areas within the County so designated because of their unique locations or characteristics and contribution to industrial land supply. The site of the proposal would also retains its Heavy Impact Industrial designation and is . Note that a recent decision of the Growth Hearings Board invalidated the industrial urban growth areas designated by the proposed Plan. Whatcom County maintains that the industrial zoning classification of the Cherry Point area is still in effect and still includes Cheery Point and the site of the proposal within its proposed UGA.

The proposed Comprehensive Plan identifies the Cherry Point area as an area appropriate for industrial development and designates it as the Cherry Point Heavy Impact Industrial Zone. Proposed policies include the following:

- maintain Cherry Point as a heavy industrial area to accommodate major uses that need to be located away from concentrated urban areas (2CC-1);
- work in conjunction with industrial owners to locate additional docks, as necessary, at Cherry Point. Facilitate the permitting process for these docks (2CC-2); and
- resist inclusion of Cherry Point as part of any future incorporation of Birch Bay in order to protect interests of property owners, preclude urban growth near "smokestack" industries, and to preserve county government tax base (2CC-3).

The proposed Plan also contains economic goals and policies that recognize the need for a healthy economy that offer a variety of employment opportunities, emphasize coordination and cooperation among jurisdictions and coordination with environmental quality; and express the desire to maintain the resource-based industries in the County.

Proposed environmental goals recognize the wide variety of natural habitats that exist within the County including marine habitats that contain kelp and eelgrass beds. Goals and policies are directed to protecting, retaining and enhancing natural systems including those that support native fish and wildlife populations, and wetlands. Recommended implementation measures include goals to adopt an Environmental Management Program that would include both regulatory and non-regulatory elements.

Discussion: The proposed action is located within the area of the County that is designated for heavy industrial uses by the proposed Comprehensive Plan and within an identified Urban Growth Area. Appropriate heavy industrial uses include an additional marine pier facility that would support upland industrial uses. The proposed marine terminal facility would be consistent with draft Plan policies by creating additional employment, generating tax revenues and contributing to the economic base of the county. The facility would be designed and operated to minimize impacts on sensitive environmental resources through locating in an area that can provide deep water berths without dredging; reducing the length and width of the pier and trestle to the minimum consistent with the transportation needs of the facility; and designing storm water treatment facilities to avoid or minimize adverse impacts on marine resources.

3. Zoning Code

Summary: The proposed marine terminal facility is located in the Heavy Impact Industrial zone. This zoning classification permits activities primarily relating to producing, distributing and processing raw

materials (WCC 20.68). Bulk commodity storage facilities, truck, rail, and vessel transshipment terminals and facilities, and a wide range of manufacturing and processing uses are permitted outright.

Development regulations for Heavy Impact Industrial uses address minimum lot size, building setbacks, height limitations and lot coverage. Maximum lot coverage is limited to 60 percent of the lot. At least 15 percent of the site must be left in open space. Buffer areas are also required for sites that are located on the boundary of the Heavy Impact Industrial District, including provisions affecting the northern and western boundaries of the Cherry Point Heavy Industrial area that are not contiguous to another industrial zone. These are intended to optimize visual appearance by obscuring industrial activity from motor traffic.
The zoning ordinance also contains development standards for landscaping, drainage, off-street parking, access and maintenance. Performance standards for pollution control and nuisance abatement require that each industry must continuously employ the best pollution control and nuisance abatement technology when reasonably and practicably available. Facilities that produce heat, light or glare are to be constructed and screened to limit impacts on adjacent properties; ground vibrations except for those produced by highway vehicles, trains or construction activity are not to be discernible beyond the boundaries of the site; and odors from activities on the site may not create a public nuisance, threaten health or safety, or unreasonably affect the use and enjoyment of properties beyond the boundaries of the district.

Major Development Permits are required for projects for which an Environmental Impact Statement (EIS) has been prepared, and which are valued at 5 million dollars exclusive of land value. A Major Development Permit requires a public hearing before the County Hearing Examiner and a recommendation by the Examiner to the County Council which is authorized to make the final decision whether to approve or deny a proposed development. Standards of review for a Major Development Permit include compliance with the standards of the zoning district in which the property is located; consistency with applicable laws and regulations; non-interference with the operation of existing uses; access to essential facilities, utilities and services necessary for its operation such as roads, drainage, electricity, water supply and sewage disposal facilities, and police and fire protection; and a finding that the proposed development will not impose uncompensated requirements for public expenditures or costs on other properties.

The zoning code requires property owners to obtain a Major Development Permit for projects requiring an environmental impact statement and having a development/construction cost of greater than $2 million. Review procedures include a public hearing before the Hearing Examiner, who makes a recommendation to the County Council. The County Council makes a final decision to approve or deny the application or to require additional review. Standards for review include compliance with the standards of the underlying zoning designation; consistency with applicable laws and regulations; non interference with existing uses; service by essential utilities and facilities; no uncompensated requirements for public expenditure for infrastructure; no uncompensated costs to other property; and responsiveness to the EIS prepared for the proposal.

Discussion: The site of the proposal is zoned Heavy Impact Industrial and the proposal is permitted outright in this zoning classification. Based on the conceptual site plan, the proposal would comply with regulations for site coverage, open space and buffering. Detailed design of proposed facilities will be required to comply with applicable zoning standards relating to pollution control, light and glare, and vibration.

The proposed facility (including the rail loop) would occupy only approximately 180 acres of the total site of 1,092 acres; it would have not affect non-industrial uses or other districts. Adjacent land uses include heavy industrial activities; buffering would be provided between the site and these facilities.

"Vesting" is determined by submittal of a complete application and determines which regulations apply to a proposal. In general, regulations in effect at the time of submittal of a complete application will be applied to a proposal. The subject Major Development Permit and Shoreline Substantial Development permit applications were submitted on June 18, 1992. Whatcom County's Critical Areas Ordinance was adopted after these applications were submitted. The County has determined that the proposal is vested for purposes of the critical areas regulations.

4. Shoreline Master Program

Summary: Whatcom County's Shoreline Master Program was prepared in accordance with the Washington State Shoreline Management Act (RCW 90.58). Section 23.100.210 of the Shoreline Master Program addresses the Cherry Point Management Unit (CPMU), in which the proposal is located. This section of the SMP contains policies, regulations and development standards for shoreline development.

The purpose of the CPMU is to provide a regulatory environment that recognizes and balances the special port, industrial and natural resource needs associated with development of the marine resources along a Shoreline of Statewide Significance. It also identifies preferred development components of port and shore-dependent industrial activities, and sets forth development standards.

General policies of the CPMU encourage development of pier on piling and floating public and private marine cargo transfer terminal facilities as a preferred use in the CPMU. Dredge and fill operations are prohibited unless it can be demonstrated that impacts to sensitive marine resources can be avoided. The CPMU encourages and gives preference to shore-dependent and shore-related industrial facilities, as are facilities that require access to the shoreline. Facilities that allow for multiple use of piers, cargo handling, storage, parking and other accessory facilities are also encouraged. Opportunities for public access is also emphasized, provided that it can be accomplished without causing interference with industrial operations or hazards to life and property. Natural resources such as fish and wildlife habitats; marine and upland interactions in the shore-process corridor including littoral drift, natural wetlands, feeder bluffs and accretion shorelands. Aesthetic vistas of land, water and the San Juan archipelago are to be protected from adverse impacts of development.

Permitted uses in the CPMU include port development and shore-dependent or shore-related industrial development, as well as components of such development including pile supported or floating piers or expansion of existing piers, and road and railway systems.

Regulations and standards of the CPMU are directed toward implementation of the general policies. Piers are to be designed to minimize interference in the intertidal zone, impacts to fish and wildlife habitats, and impacts on steep shoreline bluffs. In addition, piers are to be designed to accommodate only activities that are necessary and intrinsic to activities associated with movement of cargo to and from water and land; the length of piers are to be limited only to that length needed to accommodate the draft of vessels that are expected to use the facility.

Standards for wastewater treatment, surface drainage, oil and hazardous material are directed toward protection of water quality in the Strait of Georgia. Other standards address lighting, roads and railroads, utilities, and public access.

Discussion: The proposed project is located within the Cherry Point Management Unit. The proposed marine terminal facility would be consistent with the general policy intent of the CPMU to provide shoreline locations for marine industrial development. The pier and trestle, which would be constructed on

piles, would be consistent with the policies and regulations of the CPMU. Development of the facilities would be accomplished in accordance with the requirements and conditions of a shoreline substantial development permit.

AESTHETICS, LIGHT AND GLARE

1. *Aesthetics*

Affected Environment

From the project site, views include the San Juan Islands (Orcas Island, Sucia Island, Patos and Matia Island), Lummi Island, the Intalco, Arco, and Tosco dock structures and some limited views of the associated upland industrial development. The beach area is currently used by recreational campers, clammers, and beach walkers. The upland storage area is only visible from Henry Road; vegetation visually shields the upland site area from the beach.

The project site is visible from the surrounding industrial properties, and possibly visible with binoculars from portions of the islands within visual range. Other public views of the site are available from the beach on Gulf Road, from passing watercraft and from Henry Road north of the storage area. Campers using the beach area (not an authorized recreational use) may also view the pier and pier activity. There are no nearby residences with views of the site.

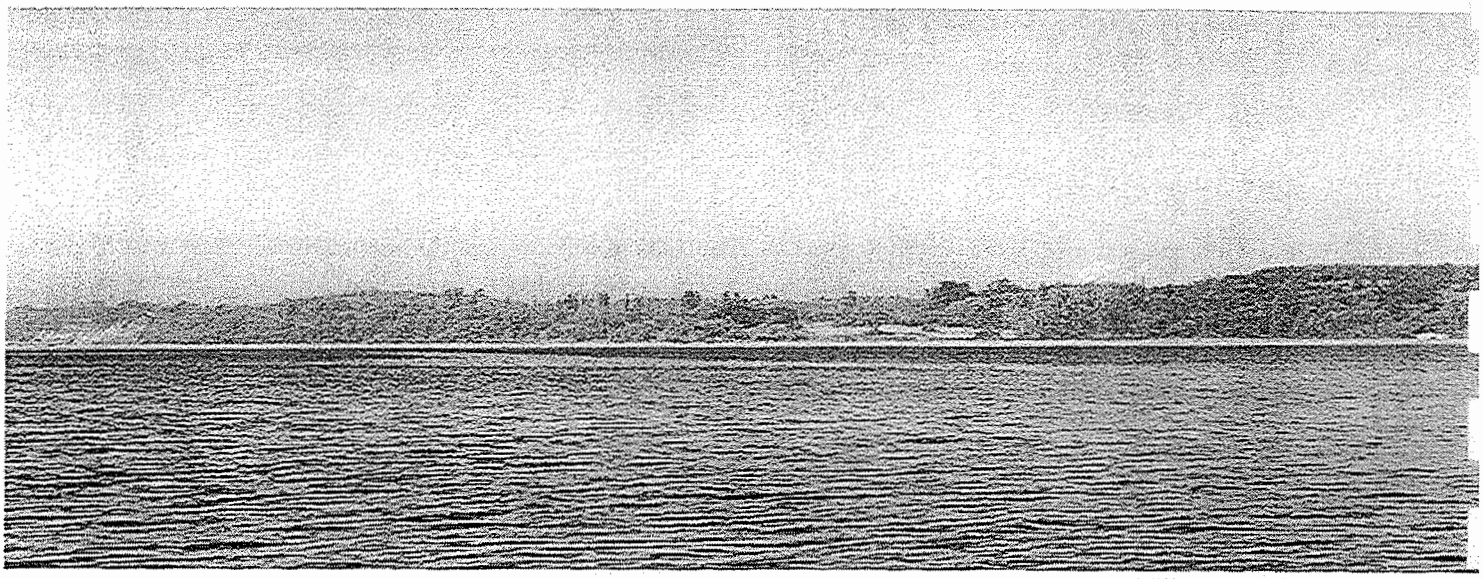
Significant Impacts of the Proposed Action

The proposed action would alter the visual character of the upland development site from farmed land to industrial in nature. The industrial character would consist of large storage buildings and covered conveyors servicing the terminal. Rail access would pass through existing fields to the rail service area. Existing vegetation would be largely maintained on the bluff along the shoreline, and east of the site along the existing seasonal stream and ravine. This vegetation would provide at least partial screening of the upland structures from the beach. Construction of the pier access and conveyor system would require some clearing at the bluff, which could potentially allow some view of upland structures from the beach. Some structures would be visible from Henry Road, and might be visible from the beach due to their height (80 to 90 feet). However, due to the screening provided by existing vegetation on the bluff, views from the beach would primarily consist of the marine structures described below.

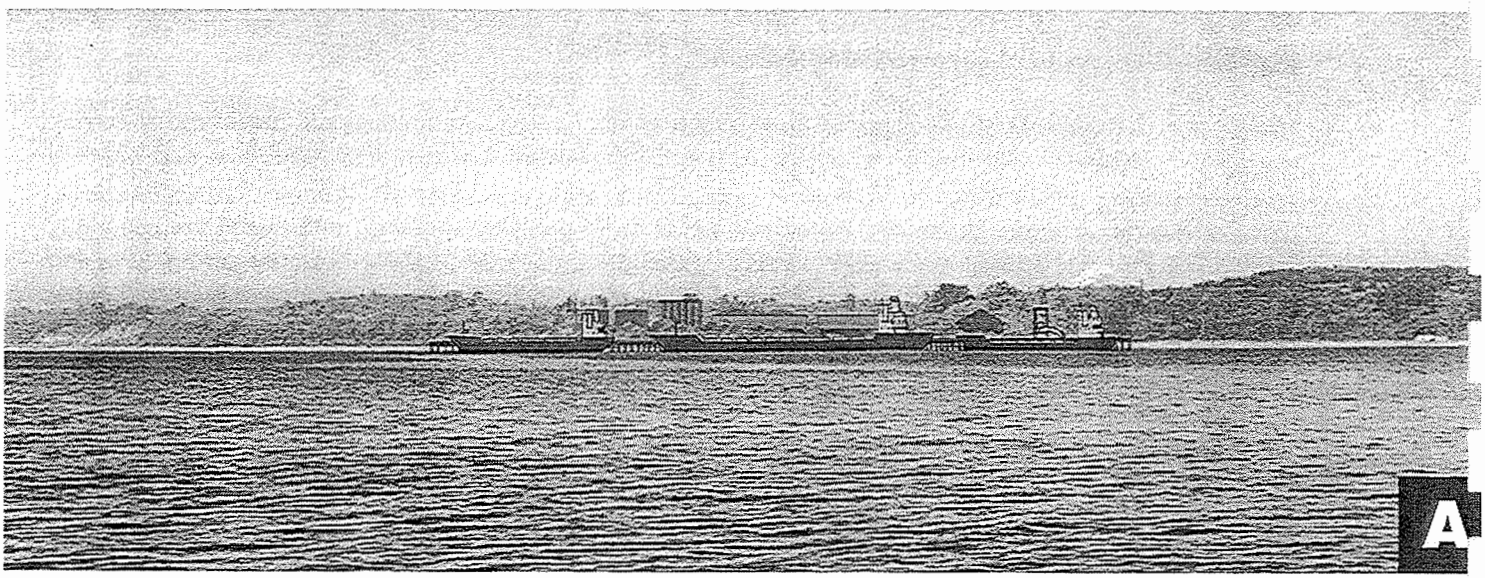
The pier structure would be visible from the water to a distance of approximately one mile (see Figure 11). Ships at the pier would be a primary component of the change in views from the water. The upland terminal facilities would be partially visible from the water. At night, lighting on the pier and the ships would be present in views from the water or islands within visual range (see discussion later in this section).

Views toward the water from the nearby beach would be significantly altered by the proposed marine structures (see Figure 12). The pier and conveyors would extend from the shore approximately 1,000 feet out into the water, with an approximately 3,000-foot section parallel to the beach. The structure and the ships that would use the pier would dominate the view from the beach in the immediate site vicinity. This would increase the industrial visual character of the marine area that is already represented by marine structures at the Arco, Intalco and Tosco sites. Correspondingly, it would diminish the aesthetic value of the beach for beach users. However, the beach would still be publicly accessible and physically unaltered along most of its length, and therefore would retain some of its aesthetic value.

FIGURE 11 - VISUAL IMPACT COMPARISON FROM WATE



VIEW: NORTH UNDEVELOPEI



VIEW: NORTH OF COMPLETED PROJEC

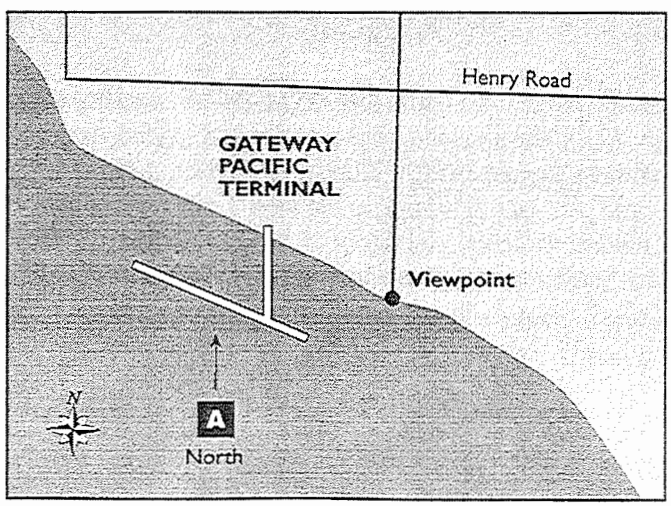
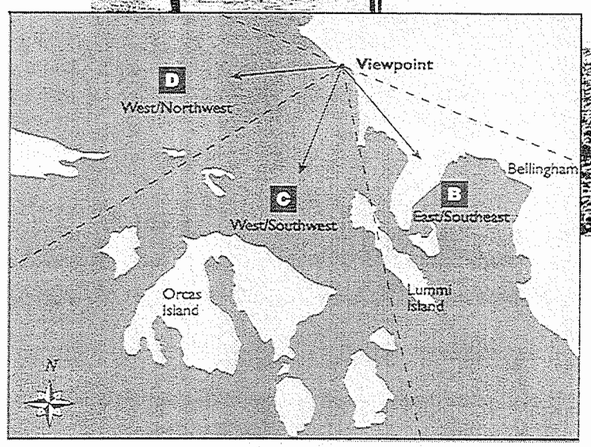
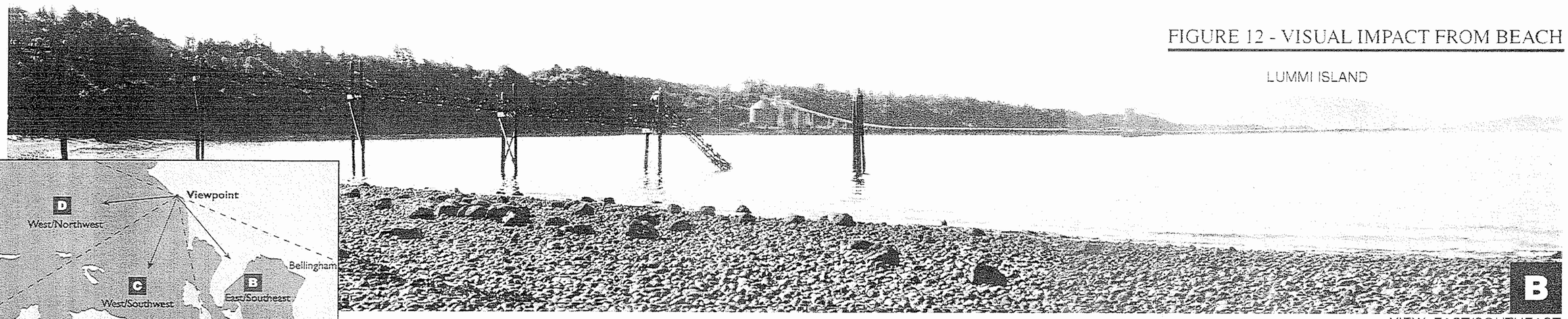


FIGURE 12 - VISUAL IMPACT FROM BEACH

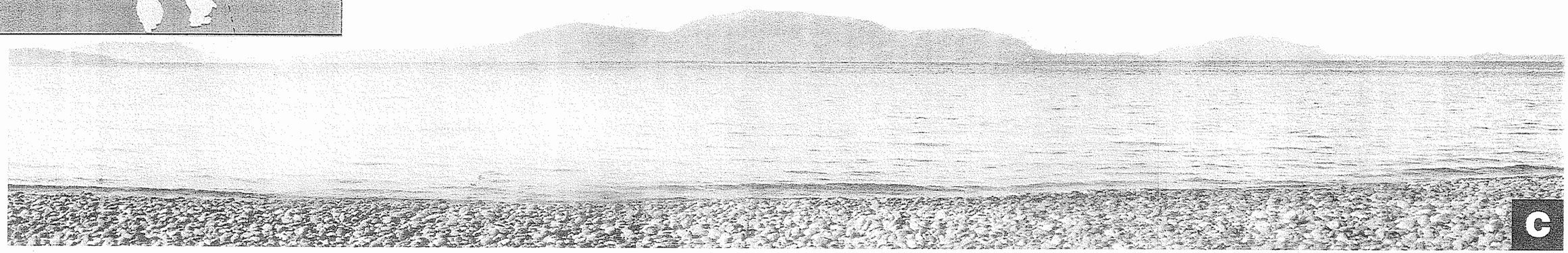


LUMMI ISLAND

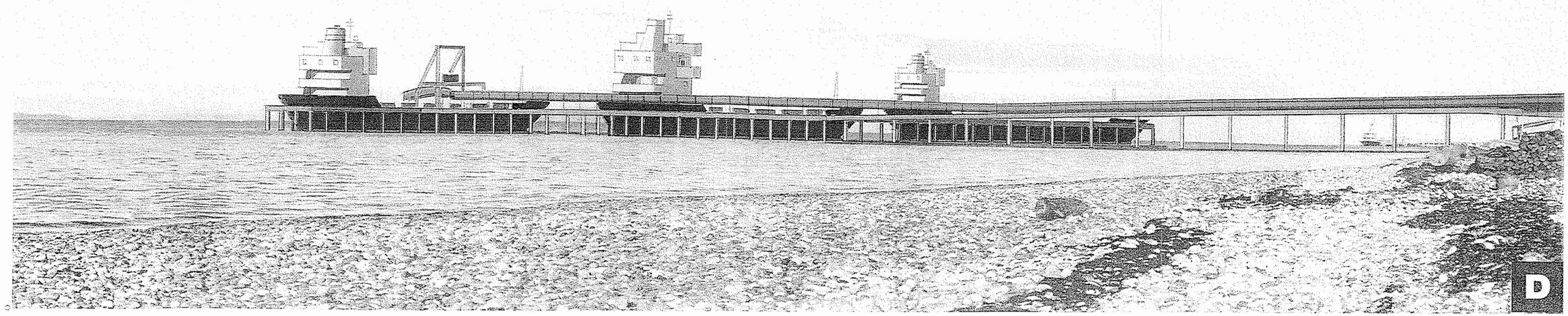


VIEW: EAST/SOUTHEAST

ORCAS ISLAND



VIEW: WEST/SOUTHWEST



VIEW: WEST/NORTHWEST

Mitigation Measures

Trees screening the site from the bluff and along the ravine would be maintained, reducing visual impacts from both the water and the beach.

Neutral colors and materials not prone to reflection would be utilized in construction of the larger structures.

Significant Unavoidable Adverse Impacts

Industrial development of the site would alter the visual character of the uplands and the shoreline. The marine structure and berthed ships would be visible from the beach and from passing watercraft. The upland storage area would be partially visible from the water, and from Henry Road near the site.

Impacts of the Alternatives

No-Action Alternative

Under the No-Action alternative, no development or aesthetic impacts would occur at this time. However, industrial development could occur in the future, which could result in unknown changes to the site's visual character. The type of future development would determine the nature and extent of impacts.

CPIP Alternative

The CPIP Alternative would be more visible from the Gulf Road access because a longer trestle accessing the pier would be provided (1,900 feet versus 980 feet). Other view and aesthetic impacts would be similar to the proposed action.

2. Light and Glare

Affected Environment

Industrial development southeast (Intalco) and north (Arco) of the project site are existing sources of light and glare. The marine structures of these uses produce light visible from off-shore and some shoreline areas. Other sources of light include industrial rail traffic, and road traffic as it passes through the Cherry Point Industrial Area. There are no existing sources of light or glare on the project site.

Significant Impacts of the Proposed Action

The proposed action would generate light/glare from dock structures, upland storage facilities, and ships at berth. Since the terminal facility would operate both day and night for ship loading and unloading, the terminal and pier lighting would be visible primarily from the water and from portions of islands within visual range of the site. Certain types of lighting are required by the U.S. Coast Guard; on-site lighting would conform to the safety requirements for structures in navigable waters used by commercial vessels. The Plants and Animals section in this chapter notes that lighting may attract fingerling or adult salmon and herring, but that a progressive buildup of fish is unlikely because of their daily movements that would draw them away from the site.

Mitigation Measures

Other than lighting necessary for safe operation of the facility, lights would be provided with directional shielding to lessen the amount of light viewed from off-site sources.

Reflective surfaces on structures or the pier would be avoided or painted to reduce glare or light reflection.

The vegetation on the bank between the proposed storage areas and the water would be preserved to provide a natural screen for the upland impacts.

The vegetation immediately north of the beach area most often used for recreation would be protected to reduce impacts to users of the beach. In addition, as part of mitigation to the Lummi Nation, cedar trees would be reintroduced to appropriate areas to assist in vegetation screening.

Significant Unavoidable Adverse Impacts

Lights from the pier and the storage areas would be visible from passing watercraft and from some portions of islands within visual range of the site.

Impacts of the Alternatives

No-Action Alternative

Under the No Action alternative, no change in on-site lighting would occur at this time. However, industrial development could occur in the future, which could result in unknown changes to the site's light/glare characteristics.

CPIP Alternative

The CPIP Alternative would result in the same general impacts to surrounding uses as the proposed action. The CPIP alternative could be more visible due to a longer pier, differences in topography and less vegetation between upland uses and the water.

HISTORIC AND CULTURAL RESOURCES

Affected Environment

The project area includes ancient marine terraces formed by fluctuating relative sea levels. The land surface has been available for human occupation for at least the last 10,000 years with little subsequent deposition of geologic materials to deeply bury cultural remains. More recent sea-level variation may have affected where and when people used the shoreline. For more detailed information about the geologic history of the project area, please see the **EARTH** section of this document.

Prehistory. Prehistoric occupation of northwestern Washington could have begun any time after the Vashon glaciation. Excavations in the region, primarily on the Canadian Strait of Georgia, the lower Fraser River, and to a limited extent, northern Puget Sound, have outlined a culture history extending back 9,000 years. Briefly, the prehistory of the region began with early, post-glacial settlement by small groups of people who were mobile hunters following game. Their prey was primarily large ungulates, possibly including extinct fauna. Lithic assemblages attributed to this stage represent opportunistic manufacture from local cobbles and include large lanceolate and stemmed points, scrapers and other flake-derived tools. In northwestern Washington, these assemblages and sites are termed "Olcott," after a type of site in Snohomish County (Kidd 1964), and regionally they are called "Old Cordilleran" (Matson and Coupland 1995). Olcott sites are often found on late Pleistocene landforms, commonly at the edges of terraces overlooking river valleys or the sea. Dates, features and faunal assemblages from these inland sites are virtually unknown. The few coastal sites represent use of diverse littoral and terrestrial resources during brief occupations. This pattern may have persisted over 6,000 years with gradual increase in the prey spectrum and, near the end of the time period, increasing reliance on marine and riverine resources (see Figure 13).

The archaeological record after about 5,000 B.P. suggests exploitation of the region's abundant marine resources, including shellfish, salmon and sea mammals, supported greater human populations organized in more complex ways. Shell middens and village sites are found along with special purpose resource processing and procurement sites by the Locarno Beach Phase. The subsistence and settlement pattern eventually developed into that known from ethnographic accounts in the Marpole Phase. There is evidence for development of complex and diversified fishing and sea mammal hunting technology, woodworking, population aggregates, large plank houses, wealth-status objects, status differentiation in burials, art objects, ornaments, importation of exotic goods, and diversity of ground and chipped stone and bone artifacts (Fladmark 1982).

Ethnography. Geographically, the Cherry Point vicinity is near the boundaries of tribal territories and claimed by several Straits Salish groups. Part of the difficulty arises from imposing geographic boundaries on people with concepts of social organization and ownership very different than those of Euroamericans. Ownership and use of areas was often determined by kinship and marriage ties that cross-cut tribal boundaries.

Ethnographic data shows the residential pattern of the native people changed through the year in response to the availability of resources. Permanent villages were maintained and occupied for the winter. In the spring, early shoots of sprouting plants, such as cow parsnip, horsetail, salmonberry, blackcap, and thimbleberry were eagerly sought (Underhill 1953:62). Spring runs of smelt, eulachon, herring, and chinook salmon were also important. Spring and summer hunting for deer and elk was undertaken and root digging for camas, tiger lily, brake fern, and "wild carrot" at special locations was critical. The most

FIGURE 13 - REGIONAL CHRONOLOGY

YEARS BEFORE PRESENT	SOUTHERN BRITISH COLUMBIA[1]		GULF OF GEORGIA[2]	PUGET SOUND REGION[3]
	STAGE	Period	Phase	Period
150	DEVELOPMENTAL	Late	Gulf of Georgia	Cultural Conflict-Euroamerican Contact
250				
1,000				Specialized Resource Management Established Coast Salish
2,000		Middle	Marpole	
3,000			Locarno	Specialized Resource Development Developmental Coast Salish
4,000		Early	St. Mungo	
5,000			Old Cordilleran	
6,000	LITHIC	Late		
7,000				Generalized Resource Development Post-Glacial Settlement
8,000				
9,000			Proto-Western	
10,000				
11,000		Early	Clovis	
12,000				

1 Fladmark (1982)

2 Matson and Coupland 1995

3 Blukis Onat 1987

important resource gathering was during the summer, when winter villages were abandoned and people lived in more temporary camps near resources such as reef net fisheries. Salmon were prepared, dried and smoked on racks lining the beach. Other marine fish were also caught such as bass, halibut, sole, perch, lingcod, sturgeon and dogfish. Shellfish including sea urchins, crabs, and barnacles were gathered while butter clams, horse clams, littleneck clams, cockles, and bay mussels were preserved by steaming and drying. In fall and winter, over 30 species of waterfowl migrated through the area and were netted in large numbers. Uplands were the year round source of important plants for food, fuel, fiber, medicine, construction wood and tools, as well as terrestrial game for hides, meat, horn, and bone.

History. The first Europeans to enter the region were the Spanish explorers Eliza and Pantoja who sailed off the coast of present day Whatcom County in 1791. The British James Vancouver followed the next year, but actual settlement was much later. In 1827, Hudson's Bay Company established Fort Langley and parties traveled along the coast between this post and Fort Nisqually and Fort Vancouver. Sporadic settlement began in the 1850s with the arrival of entrepreneurs in Bellingham Bay intent upon establishing either a sawmill or a cannery. A sawmill was established at the mouth of Whatcom Creek in 1852, however the first influx of large numbers of Euroamericans came when thousands of gold seekers traveled through the area in 1858 on their way to the Fraser gold fields. This burst of activity was short-lived and settlement continued at a less hectic rate through the 1870s. In the 1880s, land speculation was rampant as western Washington awaited the transcontinental railroad and the population grew after its arrival, increasing six-fold (3,095 to 18,591) in Whatcom County from 1885 to 1890. In 1893, the Great Northern Railroad linked Bellingham to Vancouver, B.C. via Ferndale and Blaine. Railroads spurred the development of the lumber and salmon packing industries by creating new national and international markets. Settlement proceeded as forests were felled and the land turned to agriculture.

Archaeology. Evidence of prehistoric use of the marine shoreline between the project area and the Fraser River is extensive. Archaeological surveys and excavations have been completed on the lower Fraser, on Point Roberts, Semiahmoo Bay and Semiahmoo Spit, and around Birch Bay and in the adjacent highlands. The sites excavated reflect the rich prehistory of the region with its marine adaptation and complex social evolution. Closer to the project area is the work conducted on parcels adjacent on the east and most importantly, at the Cherry Point Site, 45-WH-1, located within the project area along the shoreline south of Henry Johnson Road Other surveys have also been conducted in the vicinity to relocate a site on the Arco refinery property north of the site for pipelines serving the Intalco Aluminum Plant.

The Cherry Point site is a shell midden which has suffered three other modern disturbances in addition to archaeological excavation. The shoreline has continued to erode naturally; midden from the east end of the site was used to pave an access road; and a portion of the site was leveled with a bulldozer in the 1960s.

Excavations at the site were first conducted in 1954 by individuals from Western Washington State College. Additional excavations were completed in 1956, 1969, 1970, 1971, 1975, 1976, and 1986. Currently, the collections are housed at Western Washington University and consist of 148 archive boxes, of which 94 are unsorted level bags, soil samples and carbon samples collected for radiocarbon dating.

Reportedly, remnants of a plank house, fish drying racks, fish trap, smoking pits, artifact manufacturing areas, domestic hearths, fire modified rock pavements, human burials, and more than 2,500 artifacts were found. Four uncorrected radiocarbon dates rage from 960 ± 200 B.P. to 2630 ± 240 B.P. This area represents occupation before about 2100 B.P. and contains artifacts characteristic of the Locarno Beach Phase. The shell midden yielded dates ranging from 1640 ± 200 to 960 ± 200 and contained Marpole and Gulf of Georgia Phase artifacts. While the archaeological evidence suggests relatively intense, long-term

prehistoric use of the Cherry Point site for salmon fishing and processing and collecting shellfish, Suttles (1951:35) documents historic uses of the area as collecting herring and capturing ducks along the shoreline, and hunting for deer and elk inland near Lake Terrell.

Significant Impacts of the Proposed Action

Analysis Methods. Survey and shovel testing were conducted over the project area on March 14th through 17th, 1996 by four archaeologists. Transects north of Henry Johnson Road were 30 meters apart with shovel probes excavated at 30 meter intervals along each transect. South of Henry Johnson Road, the transect and shovel probes sampled sediments covered by dense vegetation. Standing water in densely forested areas north of Henry Johnson Road prevented systematic transects and shovel probes in the forested areas. In these areas, reconnaissance transects were completed which were dictated by depth of water and passability of the vegetation.

Expectations. The geologic history of the area combined with knowledge of the ethnographic record and the previously located archaeological sites structured expectations for the new survey. Sites representing hunting and gathering activities were expected away from the marine shoreline. Small dispersed lithic scatters composed of debitage associated with tool maintenance. Gathering of plants and fibers was unlikely to leave many long-lasting traces. Potential for finding trees scarred by removal of bark for its fiber or for finding tree burials was considered low because of the logging and agricultural history of the area. Archaeological sites associated with higher elevations and old shorelines are also likely to be found.

Historic remains were expected at the locations within the project area where abandoned structures were marked. In addition, archival review of maps and ownership records suggested other buildings or structural remains might be found. For example, a church was shown at the west end of Lonseth Road on the south side of a map from 1946 (Metzger, 1946).

Results. Five historic locations were found which correspond to abandoned structures shown on the USGS 7.5' quad map for the area. All had structural remains and appeared to date to the twentieth century; none had standing buildings and two are within the buffer zone established for 45-WH-1. Eight prehistoric cobble-derived artifacts were found in the pasture south of Henry Johnson Road and west of the Johnson driveway. Distances among the artifacts ranged from 20 meters to 187 meters. Two other isolated cobble artifacts were found east of this dispersed scatter. At the locations of Artifacts 1 through 5, four additional shovel probes were dug 2.5 meters from each artifact in the cardinal directions. Additional possible flakes and fire modified rock (FMR) were found at each location, although not in every probe. The results of this procedure are tentative because none of the matrix was screened and identification of small-sized, mud-covered artifacts was difficult.

Discussion. To determine if the identified locations require additional treatment requires determination of significance followed by a consideration of effects of the planned project on them. Sufficient information must be available to allow site evaluation and potential impacts must be well defined. The initial task is two-fold: first, to determine if a location qualifies as a site and if adequate information exists to begin evaluation; second, to determine if the integrity of a location is intact. Once this information is available, the significance of the locations can be assessed.

Archaeological Remains. The Cherry Point archaeological site, 45-WH-1, has already met these conditions and is fully entered in the state archaeological site files. Integrity of remaining site deposits is

very likely intact in many areas, despite the extensive disturbance. Documented discussions of the extent of the site, however make its actual dimensions unclear.

Historic Structures. The historic structural remains are locations which may qualify for recording in the state historic site listing. Although deed strings on the project area are incomplete, review of the first plats by the General Land Office, completed in 1860 and 1874, show that most of the parcels remained in the ownership of a few individuals. Edward Brown, Henry Johnson and the Lonseths are among these. Brown settled in the Mountain View area in 1877 and eventually acquired 700 acres. He served in the state legislature in 1989-1908, as a state senator from 1908 to 1920 and as president of the board of County Commissioners beginning in 1920. Brown apparently never lived on the project are property; his original homestead is located in Kickerville. Henry Johnson immigrated to the United States from Norway in 1892 and eventually worked his way to the Northwest. He purchased 32 acres in the project area in 1912 and used the land for dairy farming and raising chickens. Foundations and other structural remains associated with Johnson are on the edge of the terrace at the end of the western drive extending south from Henry Johnson Road. Information on the Lonseths has yet to be found. Most of the remaining structures are probably associated with use of the area by renters.

Artifact Scatter. Artifacts #1 through #7 are more widely dispersed than is usual for designation of a single prehistoric site. The preliminary results of additional shovel probes near Artifacts #1 through #5 suggest test excavation with screening of sediments is necessary to determine if other associated material is to be found and to determine if horizontal and vertical integrity are intact. Upper portions of the deposits are obviously disturbed by plowing, yet information may still be derived from horizontal distributions and feature remnants, like hearths, could be more deeply buried than the agricultural disturbance.

Significance of Archaeological Resources. Federal criteria established by the Advisory Council on Historic Preservation (36 CFR 60.4) provide measures for evaluation of the significance of historic properties. Properties are significant which retain integrity of location, design, setting, materials, workmanship, feeling, and association, and:

a) That are associated with events that have made significant contribution to the broad patterns of our history; or
b) That are associated with the lives of persons significant to our past; or
c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
d) That have yielded, or may be likely to yield information important in prehistory or history.

Archaeological Remains. Criterion d), involving scientific significance is most applicable to the Cherry Point site. Scientific significance involves the potential to establish reliable facts and generalizations about the past. The extent to which a particular site may contribute to regional historical and scientific research issues is a measure of its significance (Moratto and Goldberg 1986). As has been demonstrated by the previous excavations, the intact deposits at the site contain data categories (bone, shell, lithics, botanical remains, stratigraphic information) to address a variety of questions related to regional prehistory making the site significant under criterion d).

Historic Structures. The historic structural remains lack architectural integrity and fail to meet any of the significance criteria.

Artifact Scatter. More information is needed to complete the evaluation of the cobble derived artifacts to determine if they retain integrity and if the locations can satisfy criterion d). Potentially, they can be regarded as potentially significant.

Assessment of Effects. Specific design plans are not currently available, however, general categories of impact are discussed, the most obvious of which are: any disturbance of native sediments by blading, excavation, or other means; and placement of fill.

Archaeological Remains. Disturbance of the native sediments will destroy the integrity and information potential of 45-WH-1. Placing fill, for example for the construction of the pier, may compact 45-WH-1 crushing shell and bone; change the chemistry of the midden causing unknown damage to site contents; damage the stratigraphic record, and eliminate the consideration of the site data potential in future research or mitigation. Since the extent of the site is in question, portions of it may be inadvertently damaged by either of these actions.

Artifact Scatter. Disruption of sediments may also destroy the integrity and data potential of the cobble-derived artifact scatter. Fill placed on the artifact scatter is unlikely to damage the stone artifacts or the shallow soils.

Lummi Concerns. Other undetermined impacts to traditional cultural properties or to spiritual aspects of the site must be determined by the Lummi Nation.

Mitigation Measures

Mitigation of adverse effects to archaeological data at 45-WH-1 may be accomplished by several means. The extent of the site should be verified in order to insure that undiscovered portions are not inadvertently damaged. Data recovery is a possibility, however, excavation of new portions of the site may be unnecessary when results of previous work remain largely unexamined. A plan should be developed to review the existing assemblage of artifacts, level bags, samples, and documentation to determine whether complete analysis and reporting would fulfill the scientific promise of the site. In addition, following analysis, the collection should be prepared for curations and transferred to the Lummi Nation when adequate facilities are available.

Test excavations should be completed to determine of the artifact scatter is a single site and if it is significant. Data recovery may be necessary to mitigate impacts to all or portions of the scatter, if determined significant. For the remainder of the project area, arrangements should be made to insure contingency measures to map, sample and report any site, and to collect, analyze, and curate any artifacts found during construction of the railway or other ground disturbing modifications. In the event human remains are encountered, work should halt and the County Coroner, the Office of Archaeology and Historic Preservation, and the Lummi Nation should be contacted.

The mitigation measures are designed to identify and salvage archaeological cultural resources. These archaeological measures may not address the traditional cultural properties and spiritual concerns of the Lummi Nation.

Significant Unavoidable Adverse Impacts

- Disturbance of the native sediments or placing fill on this site for construction of the pier will destroy the integrity and information potential of 45-WH-1.

- Disruption of sediments may also destroy the integrity and data potential of the cobble-derived artifact scatter.

- Other undetermined impacts to traditional cultural properties or to spiritual aspects of the site must be determined by the Lummi Nation.

Impacts of the Alternatives

No-Action Alternative

Under the No Action alternative, site development would not occur at this time. Industrial development could occur in the future, with unknown impacts on archaeological and historic remains.

CPIP Alternative

Archaeological sites 45-WH-83 and 45-WH-84 were located by a reconnaissance survey of the original CPIP property in 1978. Further testing to evaluate the sites was conducted in the same year. The sites contain similar kinds of artifacts and may be associated with early post-glacial, marine shorelines. Site 45-WH-83 is at an elevation of 110 feet and consists of a diffuse scatter of flaked cobbles and cobble spall tools. Forty-eight artifacts, including a chert core, a projectile point fragment, modified cobbles and cobble spall tools, and three historic items were recovered in testing. Site 45-WH-84 is at an elevation ranging from 25 feet to 45 feet and includes similar artifacts. Eighty-two artifacts, including cobble cores, projectile point fragments, cobble spalls and spall tools, and modified cobbles were recovered. Ages of the two sites are difficult to determine. Analogy to other sites in the Northwest suggest they may relate to the earlier, land-oriented subsistence pattern that predates 5,500 B.P. Similar artifact scatters are found on glacial outwash terraces in Puget Sound and on older terraces in the Fraser River Canyon. Another possibility is that sites with tools of these sorts represent more recent functional specialization for acquiring forest resources such as planks and logs for structures, canoes and numerous other uses. Both sites were determined eligible for the National Register of Historic Places and data recovery accepted as mitigation for the effects of construction.

Present construction and operation designs for the Cherry Point Industrial Park would destroy archaeological sites 45-WH-83 and 45-WH-84. If the Corps of Engineers issues a permit for wetlands fill and construction of the pier, the permit will have conditions related to the archaeological/cultural resources pursuant to Section 106 of the National Historic Preservation Act. A Memorandum of Agreement will be required between the Corps, County and other affected agencies, tribes and the Applicant. A mitigation plan will be part of the Agreement. Because the State Office of Archaeology and Historic Preservation will be a party to the Agreement, a State Archaeological Excavation and Removal Permit will not be required.

TRANSPORTATION

A Transportation Impact Study has been completed for this analysis by KJS Associates, Inc., and is included as Appendix B to this document.

Affected Environment

Roadway Network

The roadway network in the site vicinity is generally rural in nature and exhibits lower than average daily traffic volumes (see Figure 14). Most roadways are composed of bituminous materials and are narrow in width. Traffic control throughout the area is controlled by unsignalized treatments (i.e., stop signs or yield signs) with the exception of three mid-block at-grade railroad crossings on Grandview Road (SR 548), Aldergrove Road, and Henry Road where actuated signals are installed.

The land use in the vicinity is characterized by heavy industrial uses, including fuel and oil refineries, an aluminum smelter, and liquid-petroleum (LP) gas distribution stations. Low-density residential areas typical of rural Whatcom County surround these uses. Peak traffic volume periods in the site vicinity occur during shift changes of major employers including the Arco Refinery, Intalco Aluminum Corporation, and Tosco Refinery.

Existing Roadway Conditions

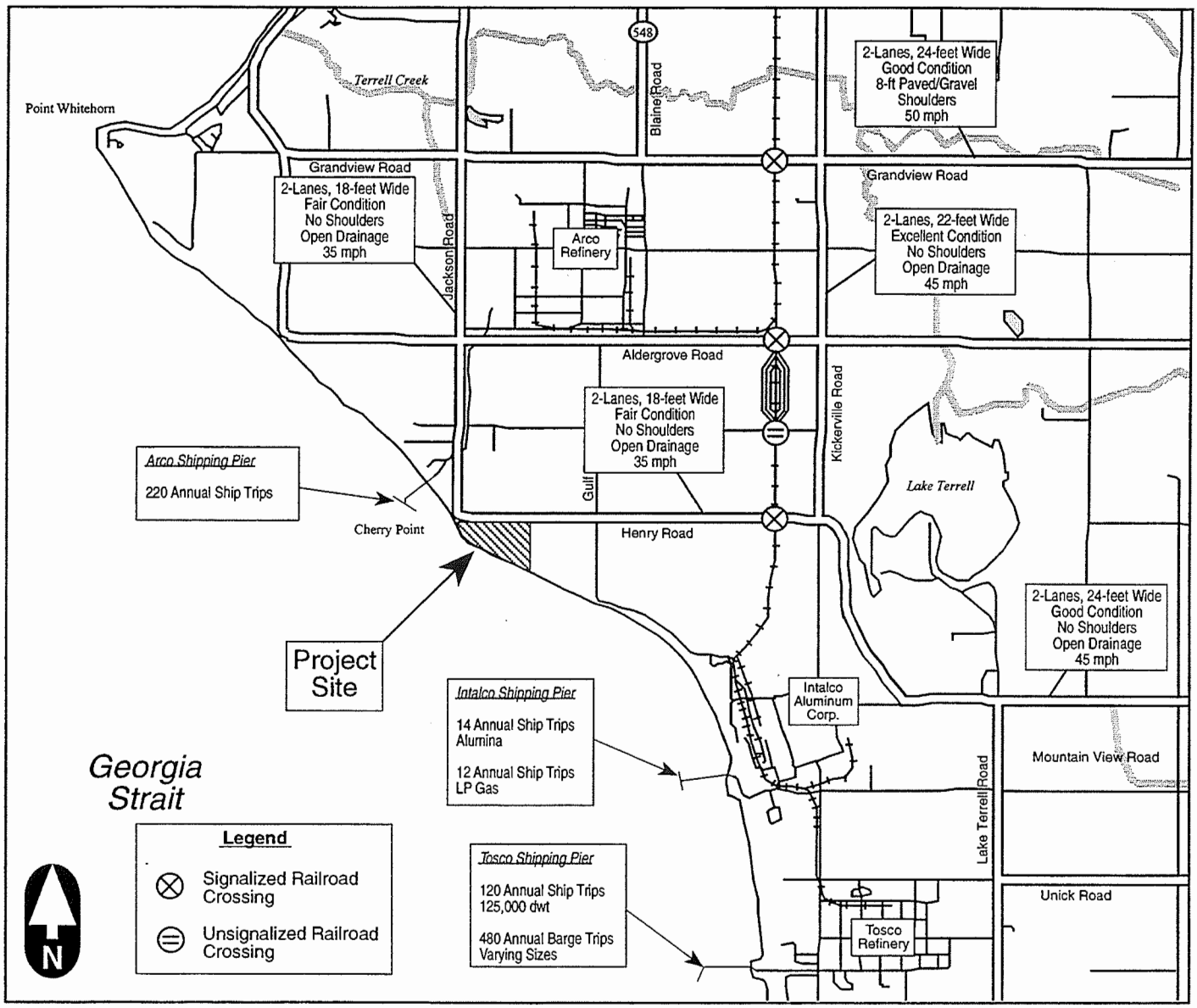
The following paragraphs describe existing arterial roadways serving the immediate site vicinity. Roadway characteristics are described in terms of facility type, number of lanes, posted speed limits, and shoulder types and widths.

Grandview Road (SR 548) is a two-lane rural major arterial running east/west in the site vicinity between Cherry Point and Interstate-5. Travel lanes vary between 11 and 12 feet, and the pavement is in excellent condition. The speed limit is posted at 50 mph. Paved or gravel shoulders are also present and are consistent with all-weather road standards. This facility carries approximately 2,600 daily vehicles in the site vicinity.

Kickerville Road is a two-lane minor arterial 22-feet in width. The posted speed limit in the site vicinity is 45 mph and pavement conditions are excellent. Average daily traffic is approximately 1,300 daily vehicles. Little or no shoulders are present with open drainage systems.

Jackson Road is a two-lane rural collector arterial with a total paved width of approximately 18-feet. The speed limit is posted at 40 mph north of Grandview Road and 35 mph south of Grandview Road. The pavement structure is a bituminous surface; no shoulders are present with open drainage systems on both sides of the roadway. General public access is restricted on this roadway south of Aldergrove Road. Existing daily traffic on Jackson Road is approximately 400 vehicles south of Grandview Road and 1,200 vehicles north of Grandview Road.

FIGURE 14 - EXISTING TRANSPORTATION SYSTEM CHARACTERISTICS



Henry Road is a local access road that will provide vehicular access to the proposed site. This roadway consists of two-lanes approximately 18-feet in total width. The roadway surface is composed of bituminous materials, with speed limits posted at 35 mph. An existing signalized railroad crossing is found west of Henry Road's intersection with Kickerville Road. Average daily traffic on Henry Road is less than 200 vehicles.

Mountain View Road is a two-lane major rural arterial running east/west that provides connections between the Cherry Point Industrial area and the City of Ferndale. Existing average daily traffic on this roadway is 2,500 daily vehicles. Pavement width is approximately 24 feet with no shoulders. The speed limit is posted at 45 mph.

Aldergrove Road is a two-lane minor rural arterial approximately 18-feet in width. The pavement surface is composed of bituminous materials. Little or no shoulders are present with open ditches providing drainage. Approximately 200 vehicles travel on Aldergrove Road daily. An at-grade railroad crossing intersects this roadway west of Kickerville Road. The speed limit is posted at 35 mph.

Existing Traffic Volumes

Daily traffic counts were collected from the Whatcom County Public Works Department. Historical counts obtained by Whatcom County indicate an average annual growth rate of 2 percent per year in the immediate site vicinity. Daily traffic volumes were collected for 1996 conditions. Figure 15 summarizes existing daily and p.m. peak period traffic volumes in the site vicinity. Peak hour traffic was estimated as a percentage of daily traffic based upon historical data. Traffic volumes are generally low throughout the area; all facilities currently operate at LOS A.

Planned Roadway Improvements

In addition to background traffic growth (described in the *Impact* section below), the transportation analysis also considered several programmed roadway improvements in the study area that were identified in Whatcom County's Six Year Transportation Improvement Program (1996-2001). It should be noted that although these projects are programmed for planning purposes, their implementation is not guaranteed. The following improvements are programmed for construction:

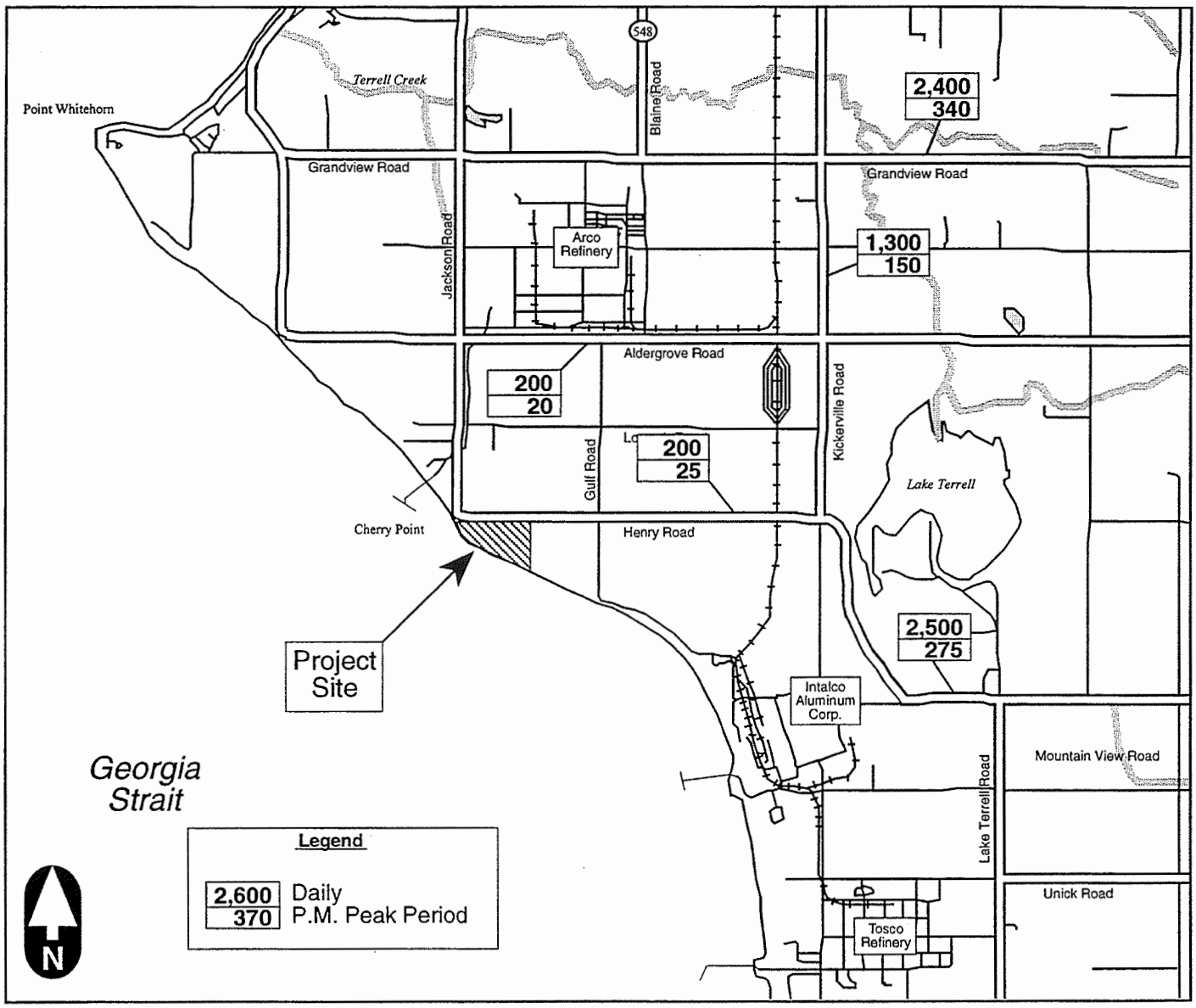
Kickerville Road: Reconstruction, widening, and paving shoulders of the street from Rainbow Road to Birch Bay-Lynden Road to all-weather road standards.

Lake Terrell Road: Reconstruction of the street from Slater Road to Mountain View Road.

Rail Transportation

Since 1970, approximately 40 percent of Washington State's active rail lines were lost to abandonment. As a result, many communities no longer have rail service and have been forced to utilize trucks that travel on state and local roadways to meet their goods movement needs. The Pacific Northwest Rail Corridor (466 miles), which extends from Eugene, Ore., to Vancouver, B.C., through Portland and Seattle, currently offers a uniquely viable transportation alternative to vehicles and serves some of the world's busiest ports including Seattle, Tacoma, Bellingham, Everett, and Kelso/Longview, Washington, as well as Portland, Ore, and Vancouver, B.C. Imports and exports include commodities such as grain, minerals, containerized materials, automobiles, and electronics.

FIGURE 15 - EXISTING DAILY AND P.M. TRAFFIC VOLUMES



In addition to freight, Amtrak provides passenger rail service in this corridor between Portland and Vancouver. More than seven million people live in the areas served by Amtrak and it is expected that more than 750,000 passengers will travel via Amtrak in this corridor during 1996.

Daily Rail Movements

In the site vicinity, six freight and two passenger rail movements occur on the mainline each day near Interstate 5. On the loop rail facility serving Cherry Point, daily shipments of materials are transported to each major industrial site via rail as follows:

- Arco: between 20 and 25 rail cars per day.
- Intalco: between 10 and 12 rail cars per day.
- Tosco: between 8 and 10 rail cars per day of LP gas and other raw materials.

Existing at-grade crossing locations consist of actuated signals and gates on Grandview Road (SR 548), Aldergrove Road, and Henry Road. An at-grade crossing controlled by stop signs is found intersecting Lonseth Road. Intermediate pavement structures between rails at these at-grade crossing consist of asphalt pavement and/or wood timbers.

Recent railway improvements in the site vicinity include the construction of a 7-track switching yard on the Cherry Point loop rail line between Lonseth Road and Aldergrove Road. This new facility was recently completed in order to provide adequate rail car storage and a switching facility off of the mainline to reduce conflicts between freight and passenger rail movements.

Marine Transportation

Marine vessels traveling to/from the Cherry Point area travel via the Georgia Strait waterway. A Waterways Analysis (WAMS-13021) was conducted on the Strait of Georgia during 1987 by the United States Coast Guard (USCGC) Mariposa, 13th Coast Guard District, to identify navigational needs and constraints within this waterway. The following paragraphs outline these findings.

The waterway extends from Sandy Point westward approximately 6 nautical miles (nm), and northward approximately 3 nm, covering 18 square miles. Alden Bank is 3 miles long in a south-east direction starting 3 miles north of Matia Island. The waterway is best charted by charts 18421 and 18431. Alden Bank Shoal is marked by buoys on three points in within the waterway. The shoal is characterized by depths of less than 60 feet and its mid-eastern third is characterized by depths of less than 30 feet. The shoal bottom is primarily sandy with rocky and muddy sections.

Tidal currents vary from 1 to 3 knots in the vicinity of Alden Bank and to the west. Currents are generally weak and variable east of Alden Bank. Winds are usually either northeast or southeast within this waterway, however, southeasterly winds are more frequent from October through March. The waterway is commonly affected by land fog from September through February. These fogs form on cool nights under clear skies and light winds and normally dissipate by early afternoon.[1]

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[1] Strait of Georgia Waterway Number 13021, USCGC Mariposa (WLB 397), Commander, 13th Coast Guard District (oan), August 1992, page 1.

Existing Navigational Aids

The following navigational hazards and associated aids are currently found within this waterway. A detailed technical description of each navigation aid is found in Appendix A of Appendix B.

- Alden Bank Lighted Gong Buoy B (LLNR 19870); located in 96 feet of water slightly east of the southern end of the shoal.
- Alden Bank Buoy 5 (LLNR 19875); located on the eastern side of the shoal just north of the most eastern point of the shoal in 44 feet of water.
- Alden Bank Lighted Gong Buoy A (LLNR 19910); located northwest of the northwest corner of the shoal in 93 feet of water.
- Sandy Point Light 2 (LLNR 1980); located slightly west of Sandy Point marking southern channel entrance to the marina in 5 feet of water.
- Sandy Point Light 3 (LLNR 19886); locates slightly west of Sandy Point marking the northern channel entrance in 2 feet of water.

Midway between Sandy Point and Alden Bank is a general anchorage governed by regulation 110.230 a(14) and b of Coast Pilot 7, Chapter 2. The waters surrounding Alden Bank vary in depth from 60 to 600 feet with shallow depths of 60 feet to 6 feet near shore. The waterway is part of the Puget Sound Traffic Lane Separation System. It serves a wide variety of U.S. and international users. The primary user groups include large U.S. and foreign flag merchant vessels, Alaskan Marine Highway ferries, Navy and Coast Guard ships, and fishing, lumber, and pleasure traffic. The nearest large shipyard repair facilities are located to the southeast in Bellingham.[2] In addition, this waterway is part of the Puget Sound Vessel Traffic Service (PSVTS) and is within radar coverage area. This system provides an excellent supplemental aid to navigation through this waterway.

The PSVTS reports no records of collisions or near-collisions in this waterway during a recent 4-year survey period. In addition, there are no known navigational problems in the Georgia Strait.

Daily Marine Vessel Movements

Large traffic varies extensively in the Georgia Strait waterway. On average, 15 large commercial vessels transit the area daily. Normally, vessel sizes range up to 900-feet in length, 125-feet beam, 60-feet draft, and 125,000 dead-weight-tons [dwt]; up to 10 small tug and lumber barges also transit this waterway daily. An Alaskan Marine Highway Ferry transits the waterway weekly between Bellingham and Alaska. During the height of the local fishing season, more than 100 fishing vessels may transit the area daily.

Between Sandy Point and Cherry Point, there are three piers that serve two large petroleum refineries and an aluminum smelter. Approximately 2.4 nm north of Sandy Point is the Tosco Refinery pier. The pier is used for the receipt of crude oil and the shipment of petroleum products. Approximately 600 annual ship trips are made to this pier comprising both large commercial vessels (125,000 dwt), and barges of varying sizes.

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[2] Strait of Georgia Waterway Number 13021, USCGC Mariposa (WLB 397), Commander, 13th Coast Guard District (oan), August 1992, page 2.

Approximately 3.2 nm north of Sandy Point is the pier of the Intalco Aluminum Corporation. The pier is used for the receipt of alumina and the shipment of refrigerated propane gas. Approximately 30 annual ship trips are made to this pier.

Four and one-half miles northwest of Sandy Point is the pier of Arco Refinery located at Cherry Point. The pier is used for the receipt of crude oil and the shipment of petroleum products. Approximately 220 annual ship trips are made to this pier.

Significant Impacts of the Proposed Action

Arterial Roadway Impacts

This discussion includes an analysis of impacts to the arterial roadway network. Specific topics include non-project related vehicular traffic forecasts, new vehicular trips generated by the proposed development, distribution and assignment of new project trips, safety issues, and the identification of circulation and access needs.

Non-Project Traffic Forecasts

As identified previously, historical traffic counts indicate an average annual growth rate of 2 percent per year in the site vicinity. Year of opening is anticipated to be 1998. Therefore, existing daily and p.m. peak period traffic counts were factored by 2 percent per year to arrive at 1998 conditions.

Vehicular Trip Generation

Trip generation equations compiled by the Institute of Transportation Engineers (ITE) were used to compute daily project-related traffic that would be generated by the proposed Gateway Pacific Terminal (see *Trip Generation, 5th Edition,* Institute of Transportation Engineers, 1991). Two published trip generation rates for ITE land use codes Waterport/Marine Terminal (010) were used to evaluate the potential number of trips that would be generated by the proposed action. Based upon trip rates per acre, an estimated 1,500 daily trips would be generated by the project. Using the trip rates based upon the number of ship berths (totaling 3), an average of 500 daily trips would be generated.

Table 3-11 summarizes these trip generation comparisons by trip end indicator. Site trip generation in this study is based on trip rate per ship berth rather than per acre. The following project characteristics support this conclusion:

- Nearly 20 percent of the project's annual commodity through-put will consist of ship-to-ship transfers. As such, the proposed project has a skewed site acreage-to-ship berth ratio (0.03 ship berths per acre) to accommodate the required storage space necessary for this type of modal transfer, much lower than the average of 0.07 ship berths per acre published by ITE;

- Intermodal transfers from marine vessels to ground transportation systems will occur approximately 90 percent via rail, and 10 percent via truck due to the type and amount of bulk commodities (i.e., large bulk materials such as grains and minerals are not economically feasible to ship via truck). In addition, the truck trips at the site will be limited to "on-site" or "local" trips such as transferring bulk coke from the Arco Refinery to marine vessels at the Gateway Pacific Terminal, and therefore, no off-site truck traffic would be generated; and

- Total commodity through-put is limited by the total number of ship berths, not by the acreage of the site.

Therefore, for daily trip generation rates per ship berth, an estimated 500 daily vehicular trips were used to analyze the project's vehicular traffic impacts.

Table 3-11
Project Vehicular Trip Generation

Land Use Type/Size/Trip Rate/Function	Trip Type	Entering	Exiting	Total
Marine Terminal/100 acres				
18.005*(acres) -287.056	Daily	750	750	1,500
Marine Terminal/3 ship berths				
298.556*(ship berths) - 417.398	Daily	250	250	500
Marine Terminal/ 50 FTE				
Maximum shift change = .75*50 FTE*2 trip ends	P.M. Peak	35	40	75

FTE: full-time employees.

Traffic impacts during the p.m. peak period were also evaluated. A maximum number of 50 employees will be on-site at any given time as estimated by the proponent. Assuming a typical staggered shift change, about 75 percent of the employees (approximately 37 employees) would be replaced by the next shift if the facility was operating at maximum capacity. Therefore, an estimated 75 trips would be generated by entering and exiting employees during a typical p.m. peak period, of which approximately 40 trips would exit the site and 35 trips enter the site (refer to Table 3-11).

The estimated 500 daily vehicle trips from the proposed project would consist of employee work trips, trips made by ship personnel at berth, other business and delivery trips associated with the operation of the facility, and local truck trips between Arco and the proposed terminal. To remain conservative, all trips generated by the site were assumed to impact external roadways.

Local truck trips generated by the project would consist of hauling coke between the Arco Refinery and the proposed Gateway Pacific Terminal. These trips, however, would remain "local" or "internal" to the refinery and project roadways. Assuming a 24-hour operation of coke hauling, up to 100 one-way daily truck trips could be expected.

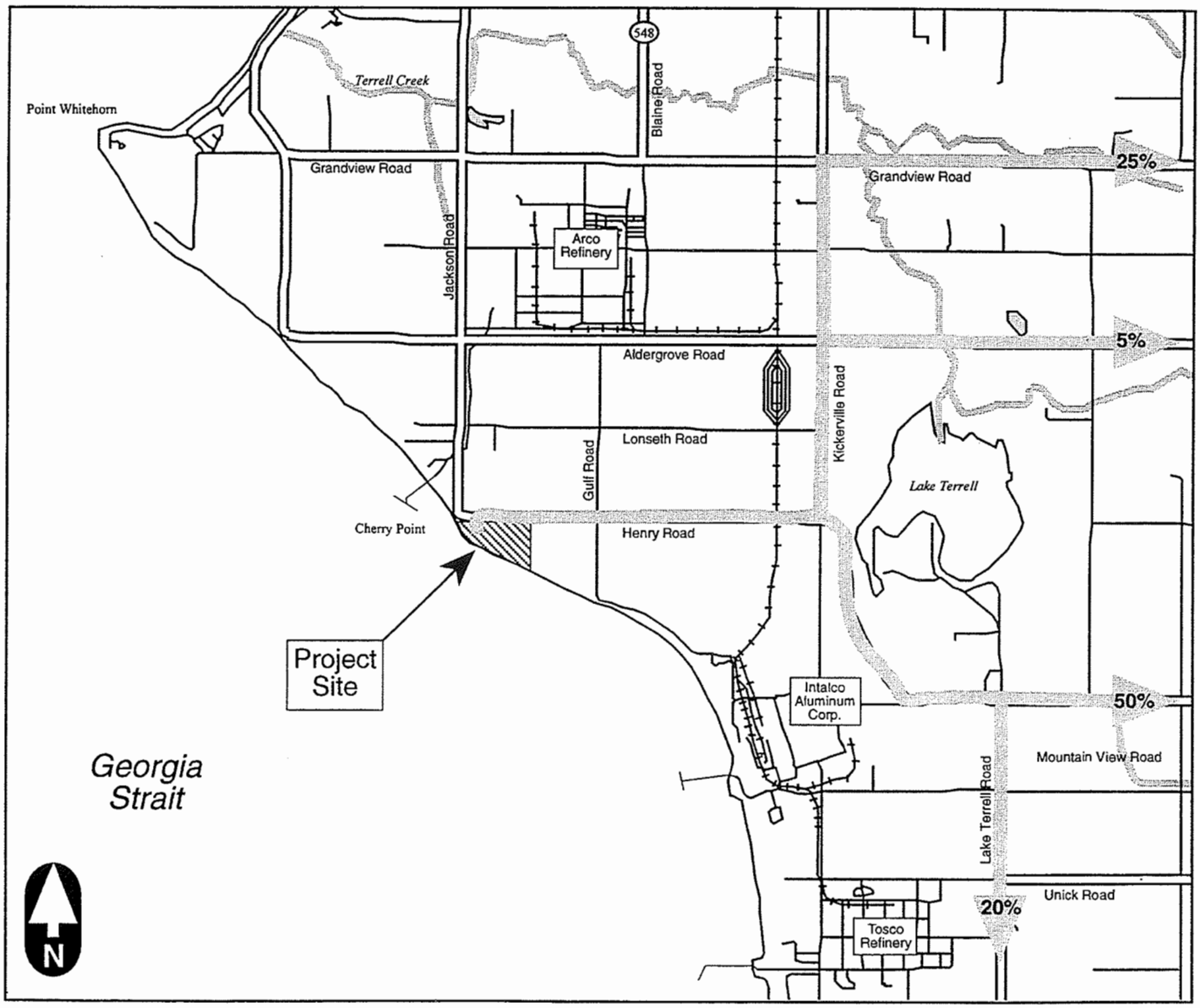
Trip Distribution

Figure 16 illustrates the estimated distribution and assignment of project-related vehicular trips from the site. Using standard engineering practices and guidelines, the project trips were distributed and assigned based on the following assumptions:

- Existing traffic patterns in the site vicinity; and
- Existing and future household distributions in Whatcom County for employee trips.

In general, the trip distribution pattern would be 30 percent north to Blaine, Lynden, and I-5, 50 percent east to Ferndale and I-5, and 20 percent southwest to Bellingham.

FIGURE 16 - PROJECT VEHICULAR TRIP DISTRIBUTION



Daily and Peak Period Traffic Impacts

Figure 17 displays the daily and p.m. peak period traffic impacts associated with the proposed development. As shown, Henry Road will experience the largest impact from project trips; it would increase from 200 daily trips without the project to 700 daily trips with the project, and from 25 to 100 trips during the p.m. peak hour. Due to lower than average traffic volumes for rural areas, the project-related increase in daily and p.m. peak hour trips would have little or no adverse impact on vicinity roadways. Also, there would not be any measurable degradation in roadway level of service or intersection operations due to the project. All intersections and roadways would continue to operate at LOS A with or without the proposed project.

Impacts to Traffic Flow due to Rail Operations

Estimated train activity to the proposed Gateway Pacific Terminal could eventually average between two and three 100-car unit-trains per day (see *Impacts to Rail Transportation* section of this report). Each train will be about 7,200 feet long. Train arrivals and departures from the site therefore, will block both Aldergrove Road and Grandview Road (SR 548) simultaneously. Assuming an average rail travel speed of 10 mph in the site vicinity, these roadways will be blocked for three 8-minute periods during each day. Both roadways will be blocked simultaneously for approximately 2.5 minutes during arrivals and departures.

If train arrivals or departures coincide with the p.m. peak period or with shift changes at the Arco Refinery plant, queues of 25 to 30 vehicles on Grandview Road (SR 548) and 1 to 3 vehicles on Aldergrove Road could occur.

Site Access and Circulation

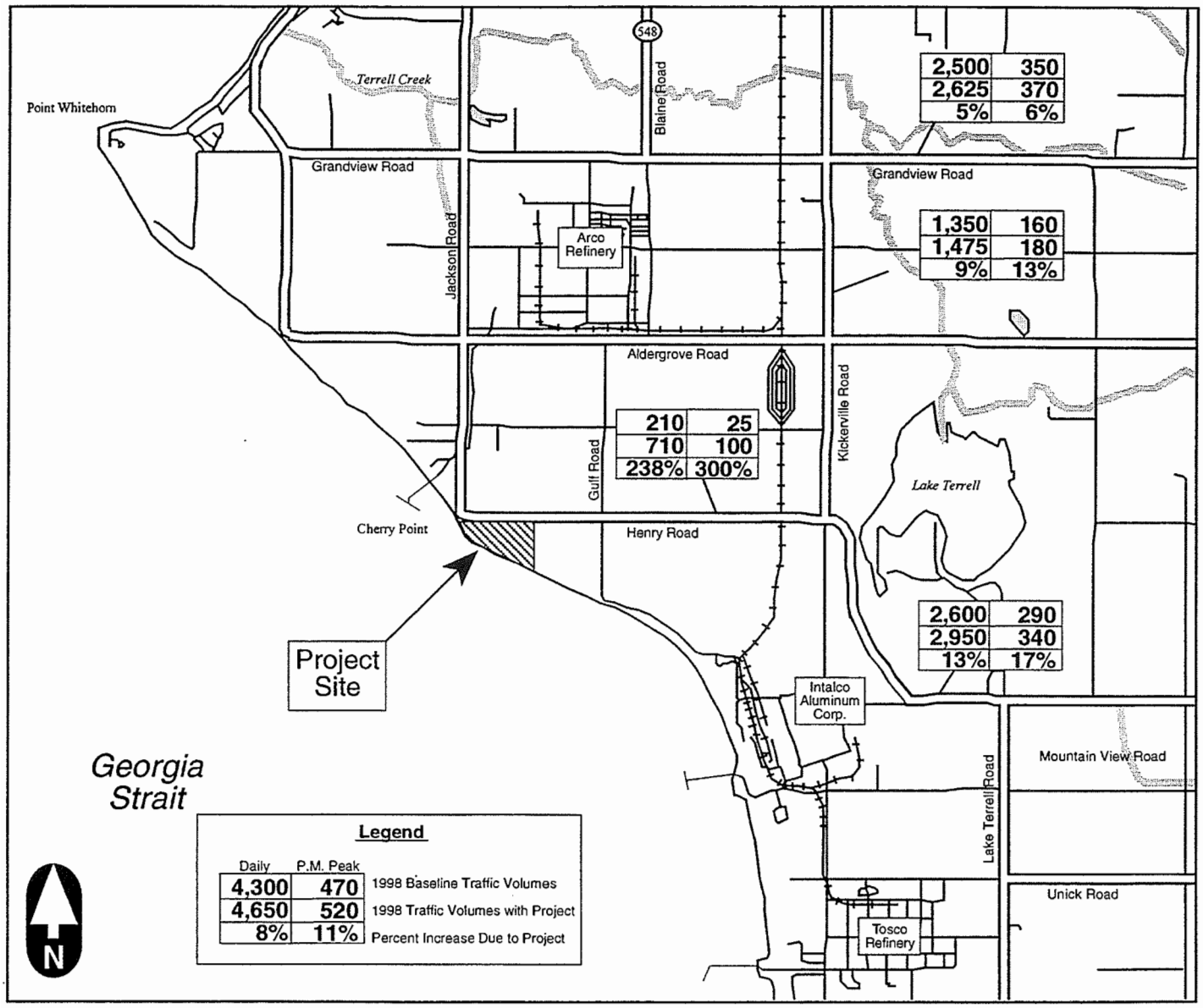
Site access will be provided via Henry Road at its intersection with Kickerville Road. Currently, no through access is allowed on Jackson Road south of Aldergrove Road due to Arco Refinery access restrictions to its pier and surrounding industrial land. Henry Road is currently a narrow 2-lane, 18-foot wide rural roadway with no shoulders. Average daily traffic with the proposed project would be approximately 700 vehicles. Whatcom County design standards for this type of access roadway require a minimum paved roadway width of 22 feet, and shoulders of at least 6 feet in width on both sides of the street.

In addition, roadway improvements on Kickerville Road between Henry Road and Grandview Road may be required to improve this roadway to all-weather standards. Turning radii improvements to accommodate large vehicles may also be required at the intersection of Henry Road and Kickerville Road.

Safety Issues

Although adequate crossing signals and vehicle gates are present at the at-grade railroad crossing on Henry Road, the roadway surface exhibits a sharp vertical curve in the immediate vicinity of the railroad crossing (approximately 10 to 15 feet on either side of the tracks) to elevate the roadway surface up to the railroad bed surface for a smooth crossing of vehicles. This condition may create difficulties for construction vehicles or long tractor-trailer combinations traversing this crossing due to long distances between axles on such vehicles. No other hazards or safety conditions were found in the vicinity, and no other conditions would be created due to the proposed project.

FIGURE 17 - PROJECT ROADWAY TRAFFIC IMPACTS



Impacts to Rail Transportation

Figure 18 summarizes the proposed rail and marine transportation systems that will be constructed as part of the project. Rail components include the connection and construction of a new 3-track railroad loop to the existing BN tracks west of the Kickerville Road. This railroad loop system would consist of nearly 30,000 lineal feet of track, and could store up to three 100-car unit trains simultaneously. An automated dumper and elevator system will be constructed along this loop system for the loading and unloading of bulk materials. A single-track railroad line from this loop system will also be constructed to directly serve the Gateway Pacific Terminal site for transfer of other bulk commodities.

Approximately 6 million annual short-tons of grain and other commodities are expected to be shipped via rail to/from the Gateway Pacific Terminal. This represents nearly 75 percent of the total annual through-put anticipated at the terminal. Assuming 100-car unit-trains, an estimated 430 unit-trains annually would be required to ship 6 million U.S.-tons of bulk commodities; this converts to 860 unit-train movements per year assuming a one-way transport, or between two to three unit-trains movements per day. In addition, the construction of this terminal is anticipated to reduce the existing rail activities at the Arco Refinery (currently between 20 and 25 rail cars per day) by shipping products related to manufacturing activities at Arco via the proposed Gateway Pacific Terminal.

Several discussions were held with representatives from BN regarding the internal operations and outside interaction with freight and passenger rail movements on the Cherry Point Industrial Loop and the BN mainline track parallel to I-5. According to Stew Gordon, Regional Freight Coordinator for the Western United States, adequate capacity on the mainline will exist to accommodate an additional three 100-car unit trains per day; a net increase in freight train movements on the mainline of 50 percent on average. Car switching and storage will be easily accommodated within the proposed 3-track railroad loop system as part of the Gateway Pacific Terminal. There is, however, some concern relating to moving unit-trains through congested rail facilities in the Seattle area. Advanced scheduling and on-time train performance may be an issue through Seattle because Auburn is the last layover area possible for unit-trains of this size.

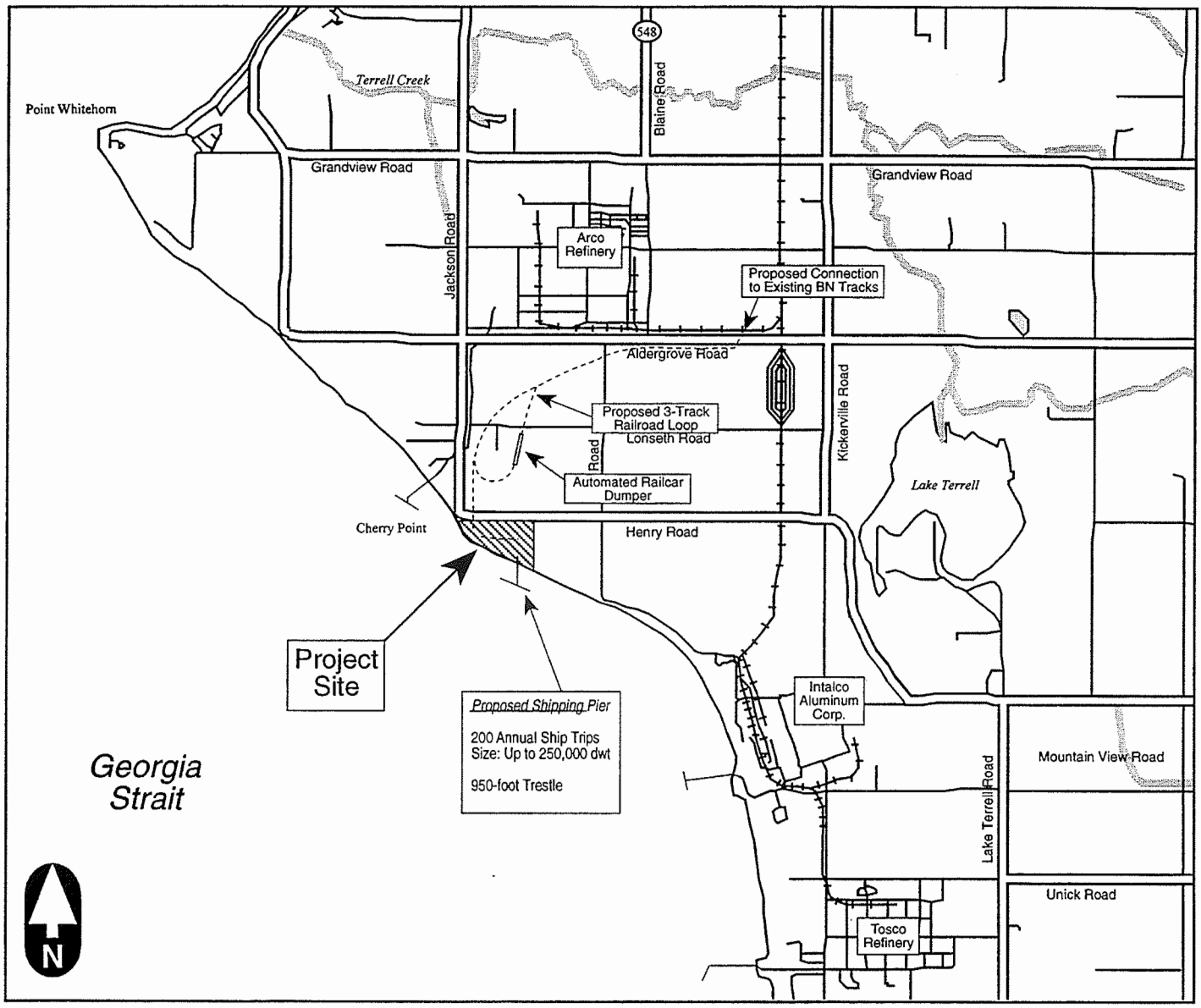
Impacts to Marine Transportation

Figure 18 shows the approximate location and facilities for the proposed pier and wharf at the Gateway Pacific Terminal. The wharf includes three ship or barge berths. Mooring dolphins extend beyond the end of the wharf allowing full utilization of the pier face. The pier is accessed by a 1,100-foot long trestle that will accommodate trucks, conveyor systems, and pipelines. The pier is located at the 80-foot depth contour, allowing vessels of up to 250,000 dwt to berth, and will be located approximately 3,600 feet southwest along the shoreline from the Arco Refinery Pier.

Total annual through-put at the proposed terminal is estimated at 8.2 million metric-tons. A mixture of sizes and types of marine vessels will transport bulk goods to/from the site, averaging approximately a 60,000 metric-ton capacity per vessel. Therefore, an estimated 140 ship trips, or 280 marine shipping movements per year, would be generated by the proposed marine terminal.

The average daily shipping activity generated by the proposed Gateway Pacific Terminal in the Georgia Strait would be approximately one vessel movement per day. Recent historical marine movements of large commercial vessels in Georgia Strait have averaged 15 shipping movements per day. New shipping activity associated with the Gateway Pacific Terminal would increase shipping activities in the Georgia Strait by only 5 percent per day. This increase in shipping activity will not have significant impacts on existing monitoring of vessel traffic by the USCGC, navigation of the waterway, or vessel conflicts.

FIGURE 18 - PROPOSED RAIL AND MARINE TRANSPORTATION SYSTEMS



Shipping movements within the immediate Cherry Point vicinity average two large commercial vessels movements per day at all of the industrial marine piers combined (including Arco, Intalco, and Tosco). The addition of daily shipping activities related to the proposed Gateway Pacific Terminal will increase this number to nearly three large commercial vessel movements per day on average.

Mitigation Measures

The following mitigation measures were identified as a result of the proposed Gateway Pacific Terminal. As discussed in the *Transportation Impacts* section of this report, no significant impacts to rail or marine transportation facilities or operations were found. However, several issues involving roadway impacts were identified; recommended mitigation measures for these impacts are identified below:

- Henry Road is currently built to substandard conditions based upon Whatcom County Roadway Design Standards for new development. Roadway improvements to Henry Road may be required to provide a minimum paved roadway width of 22-feet, and shoulders of at least 6-feet in width on both sides of the street to provide adequate travel lane width and shoulders.

- All-weather roadway standards to Kickerville Road and the intersection of Henry Road and Kickerville Road may also be required.

- Railroad crossing improvements on roadways in the site vicinity are also recommended. The existing signalized railroad crossing on Henry Road west of Kickerville Road exhibits design characteristics that may be hazardous to large vehicles with distances between axles of more than 15 feet. This is due to sharp vertical curves on Henry Road in the immediate crossing vicinity. If improvements to this crossing are not made in the context of other improvements to Henry Road, the proponent may be required to smooth the grade differential between the roadway surface and the railway surface through paving improvements to correct the roadway grade approaching this railroad crossing.

  In addition, crossing treatments at new railway beds crossing Aldergrove Road and Gulf Road will be required as part of constructing the proposed 3-track railroad loop system to the project site. Due to very low traffic volumes on these two roadways at the crossing points, vehicular traffic control may consist of stop signs only.

Significant Unavoidable Adverse Impacts

None were identified.

Impacts of the Alternatives

No-Action Alternative

Under the No Action alternative, no development would occur and no transportation impacts would be generated. Expected traffic growth on area roads would be approximately two percent per year. Transportation impacts due to future possible industrial development cannot be identified at this time.

CPIP Alternative

The proposed CPIP facility is similar in construction and operation to the proposed GPT facility. Therefore, the impacts associated with the CPIP facility would be similar to those for the proposed GPT pier. Please refer to the discussion in the CPIP EIS.

PUBLIC SERVICES

Affected Environment

Fire Service

The proposed GPT site would be within Fire District No. 7. There are five stations that could respond to calls from the site. Stations are located at Brown and Kickerville Roads, Grandview and Koene Roads, Northwest and Smith Roads, Grandview and Enterprise Roads, and at Washington Avenue and 3rd Street in Ferndale. The district currently has eight paid staff and 72 volunteers. Volunteers include employees of the local industries and residents within the county and are well-trained

District No. 7 currently has six engines capable of pumping 1,500 gallons per minute (gpm), equipped with 35-foot ladders; 3 tankers, 4 aid units, 2 staff vehicles, 2 utility vehicles and 15 pieces of fire fighting apparatus. The District is in the process of purchasing one aid unit for the Ferndale firehouse. Trucks with 35-foot ladders can reach to 29 feet. The District plans to acquire an engine equipped with a 100-foot ladder, capable of pumping 2,000 gpm to improve its capabilities in industrial areas. This engine is capable of spraying foam, useful in certain types of fires. District No. 7 does not have a fire-fighting boat for fighting ship fires. Mutual aid agreements are in effect with Bellingham, Arco and British Petroleum. Bellingham would supply aerial support as available and Arco would supply a 50-foot ladder truck as available.

The District responded to approximately 900 calls in 1995, of which 67 percent were emergency aid calls. The average response time for the District as a whole is currently 7 minutes, although approximately 80 percent of the District can be reached in 5 minutes or less. Fire code planning and inspection services are provided by the Whatcom County Fire Marshal. Project engineers have been working in conjunction with Fire District No. 7, and the District reviews plans for proposed developments as a courtesy to the Whatcom County Planning Department. The Fire District provides initial response capabilities at the scene of a hazardous materials accident to identify hazardous substances, investigate the accident, and secure the area until the State Patrol arrives. The State Patrol has jurisdictional command for a hazardous materials accident and has a HAZMAT Team for response to these situations.

An Emergency Response Plan has been completed for the proposed site. The plan includes measures to prevent fire and explosion within the storage and terminal facilities. The operational procedures to prevent fire and explosion include the following: smoking is not allowed within or nearby the grain storage or handling facilities; rigid control of "hot work" (e.g., cutting and welding); training of all personnel in the risks of dust explosions and the requirements of conduct on the site; heat sensors that automatically generate activation of fire water systems, shutdowns of equipment, and fire alarm to the local fire hall; automatic sprinkler heads which discharge at pre-set temperature levels; fire extinguishers in all locations suitable to personnel and plant safety; proper maintenance system to ensure regular lubrication and maintenance; proper setting of overload switches for all electrical equipment; rigidly enforced maintenance of all fire detection, prevention, and extinguishing equipment; on-site emergency water pump to ensure sufficient pressure and volume to all portions of the facility; a properly designed and installed fire water system, with both sufficient volume and pressure; emergency lighting system in the event of power failure; properly designed and installed emergency exits and stairwells and related lighting; and manually activated fire alarm switches which generate automatic fire alarms, equipment shut-down, and alarm to the local fire department. Other prevention measures include keeping dust levels below the minimum necessary to generate an explosion, properly designed and maintained dust control systems, facility design which

minimizes the surface collection of dust, and proper "house-keeping" which removes dust from being a fuel source in the event of a fire or explosion.

Added to the manual and automatic systems for detection of fires and the activation of sprinkler heads, sirens, and alarms at the local fire hall, are the following:

- Immediate evacuation of the facility by all personnel and gathering at distanced pre-designated gathering points for head count. If any personnel are missing, management personnel are notified, in turn notifying fire department personnel on arrival.
- A procedure to contact ambulances if necessary.

At full development, the GPT site would require a fire flow of as much as 4,000 gpm for a duration of four hours, which is approximately equal to a one million gallon emergency supply. Food grade oils and other bulk products such as sulfur pose moderate fire risk. Foam for fighting fires would be supplied on site. A variety of products are under consideration for the site, and buildings would be designed for all occupancies except "hazardous." Hazardous materials would not be processed at the site.

Fire suppression precautions on the uplands include the installation of sprinklers and fire alarms in all buildings. Several options for supplying fire suppression on the pier trestle were considered. A dry system that would be charged with water when required is expected to be used on the pier. This type of system requires safety precautions to eliminate large pressure surges. A saltwater system is expected to be utilized on the wharf. Pumps would be located at the wharf to pump the water through a network of pipes. Fires on ships are expected to be handled by ship-board systems.

Police

Police service is provided to all unincorporated areas of Whatcom County by the Whatcom County Sheriff's Office. The Sheriff's Office currently has a staff of 48 for a service population of 63,000, resulting in a ratio of one staff for every 1,300 county residents. Twenty-eight of the staff members are deputy sheriffs assigned to patrol duty.

Response times from the Sheriff's Office in downtown Bellingham to the proposed GPT site, for calls other than violent offenses, would range from approximately 20 minutes to 1 hour. Calls for violent offenses would receive a more rapid response. Industrial uses in the site vicinity have generated few calls to the Sheriff's Office in the past.

The State Patrol has jurisdictional command for hazardous materials accidents and has a HAZMAT Team to handle these situations. Generally, there has been a good response from the industries in the area in assisting with these situations.

Public Works Department

The Public Works Department has jurisdiction over County roadways and is responsible for road maintenance. Road Maintenance activities include roadside mowing and vegetation control, street sweeping and cleaning, snow and ice removal if necessary, and pothole repair. Storm drain cleaning and roadside ditch maintenance is also performed by the Maintenance Department.

Solid Waste

Currently, solid waste generated by the industrial activities in the Cherry Point area is disposed in on-site landfills or collected by Sanitary Service Company (SSC). SSC provides drop boxes and dumpsters for collection of waste at Arco and BP, and could provide the same service for the proposed Gateway facility. Although waste generated locally is to be disposed of in Whatcom County (Flow Control Ordinance of 1991), the Rabanco landfill in Klickitat County could be used.

The Mandatory Recycling and Waste Collection Ordinance and the Flow Control Ordinance strongly encourage waste reduction and recycling. Recycling pickup is available to commercial facilities in Whatcom County, and would be expected to be utilized at the proposed Gateway facility. Materials that could be recycled include cardboard, scrap paper, office paper, newspaper, glass and cans.

Environmental Impacts

Fire Service

Whatcom County Fire District No. 7 would be the agency responsible for fire suppression and initial emergency aid services to the site.

The potential exists that accidents could occur during construction of the project site. These accidents could take the form of construction equipment/personnel accidents on-site or construction vehicle accidents. There is no accurate way of estimating the number of accidents caused by construction activities given their random nature and the numerous activities that may cause them.

Construction and operation of the new pier facility would increase the annual number of response calls for the Whatcom County Fire District. However, the District does not anticipate a significant increase in the overall number of calls due to the new facility. Prior experience with the existing pier facilities/industries in this area has not lead to a significant increase in calls for fire suppression services. This is most likely due to the presence of on-site fire suppression measures, equipment, and personnel at each facility.

There is an existing need for additional personnel within the Fire District. Construction and operation of the new facility would create new service demands on the existing personnel. In addition, an indirect impact associated with the proposed action would be a reduction in the pool of local volunteers for the Fire District. A concern of the District is that as the land within the District is converted from residential/agricultural uses to other non-residential uses that the number of people living in this area that would be available for the volunteer program would be reduced.

Buildings and structures over 29 feet high would be beyond the range of the District's ladder trucks, and buildings and structures over 40 feet high would be beyond the reach of Arco's ladder truck. As a result, the District is in the process of trying to acquire an additional aerial apparatus in response to the large storage structures that are being built on the industrial sites in this area of the County. Since some of the storage structures on the terminal sites are taller than the capacity of the existing aerial equipment, the Fire District would like to purchase an aerial truck for possible rescue from upper floors, as well as for fire fighting access through roof areas.

If the Fire District were to assist on a pier fire, the salt water system would cause extra wear on the Fire District's equipment.

Police

The Whatcom County Sheriff's Office would be responsible for police services to the proposed pier facility. Construction of the project would generate two types of impacts for the Sheriff's Office: increased patrol time and increased service calls to the project site. During construction, a minimal amount of patrol time and service call response time would be required due to potential theft and vandalism. The need for additional patrol time could be offset by security services provided directly by the proponent. The nature and frequency of construction-related police patrol time would depend on the type of construction activity, hours worked by construction crews, and similar factors.

Accidents involving workers and/or construction vehicles could occur during construction and require a police response. No accurate way had been identified to predict the number of accidents caused by on-site construction activities. It is unlikely that significant staffing or equipment demands would be placed on the Sheriff's Office from any of these construction-related impacts.

There is an existing need for additional personnel within the Sheriff's Office. Construction and operation of the new facility would create new service demands on the existing personnel. However, the GPT site would have a private security staff on site on a 24-hour basis, and U.S. Customs also has security requirements for areas within a Foreign-Trade Zone. At neighboring pier facilities, on-site security has been able to maintain order at these sites in most cases. However, some situations might still require assistance from the Sheriff's Office, creating additional demands for sheriff patrol, traffic enforcement, crime prevention and investigation.

Public Works Department

There would be an increase in required maintenance services for the roadways leading to the proposed site.

Solid Waste

Development of the Gateway Pacific site would generate a significant amount of solid waste from commercial/industrial uses on the site. SSC has indicated that it could provide waste collection service if requested.

Mitigation Measures

Fire and Police Services

- The Fire District is involved in the implementation of an impact fee program for proposed developments within the County. This process could be implemented in the near future and would mean, at full buildout, the proponent could be responsible for a specified percentage of the cost of an additional aerial apparatus to aid in fighting fires in this industrial area.

- During detailed designing of the proposed project facilities, the Whatcom County Fire Marshal and Fire District No. 7 would be consulted to assure adequate fire flows are supplied and that site design incorporates adequate safety precautions.

- Site roads would be designed and constructed so that emergency access to all buildings and structures is provided.

- On-site roads and buildings would be clearly signed and numbered for identification by police or fire personnel.

- A security fence would be provided around the site, and access to the site would be controlled at the gates.

- On-site private security would reduce the need for calls to the Sheriff's Office.

Public Works Department

- All roads used as access roads to the site would need to be upgraded to All-weather status to accommodate traffic volumes and type of traffic. The Public Works Department would require structural and widening improvements to Henry, Kickerville and Grandview Roads. These improvements would need to be in place before development began.

Solid Waste

- Recycling of solid waste would be encouraged on the site.

Significant Unavoidable Adverse Impacts

The proposed GPT site would put additional demands on the Whatcom County Sheriff's Office and Fire District No. 7.

Impacts of the Alternatives

No-Action Alternative

Under the No Action Alternative, there would be no additional demands on public services. Industrial development could occur in the future, with unknown impacts on public services.

CPIP Alternative

The impacts under this alternative would be similar to those listed for the proposed action.

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