THORNDYKE RESOURCE

DRAFT

Light, Glare and Aesthetics Assessment

MAY 2014

Prepared for
Hood Canal Sand and Gravel LLC, dba
Thorndyke Resource
POULSBO WASHINGTON

Prepared by
point environmental consulting, inc.
SEATTLE WASHINGTON

Cover Photos: Taken from Jefferson County WHR Hicks Park in Shine WA, on the shores of Squamish Harbor

Top photo 2006 telephoto, looking southwest toward the former Shine Pit

Bottom photo: 2014 telephoto, looking southwest toward the former Shine Pit

Note: regrowth of reclaimed mining areas

Ver. 1.3 b

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INTRODUCTION

Purpose

This report describes the existing visual environment and potential visual impacts of the proposed Thorndyke Resource project (See Jefferson County DCD File No. MLA 03-00155 for project details).

The report is intended to inform the applicant and others interested in the visual aspects of the proposed project, as well as to assist Jefferson County in developing the environmental impact statement (EIS) being prepared for the proposed project under the Washington State Environmental Policy Act (SEPA). Information presented in this report is preliminary and is subject to review and revision based on the analysis and information generated through Jefferson County's SEPA review.

Methods and Approach

The assessment consisted of the following steps:

1. Establish the project's "viewshed." The project viewshed is the surface areas from which proposed project features could be seen (FHWA 1989). The viewshed was determined based on examination of topographic maps, Google Earth digital terrain modeling, and direct, on-the-ground observation and photography.

2. Establish "visual assessment areas." The project's viewshed was then divided into areas that would have similar views of project elements, called Visual Assessment Areas (similar to the "Landscape Units" concept used in the Federal Highway Administration's visual assessment methodology [FHWA 1989]). The areas were defined by identifying 1) areas where one or more project features would be visible and 2) sharing the same overall viewshed.

3. Select Representative Viewpoints. Representative viewpoints were defined for selected visual assessment areas where additional visual assessment was required (e.g., parks, residential areas).

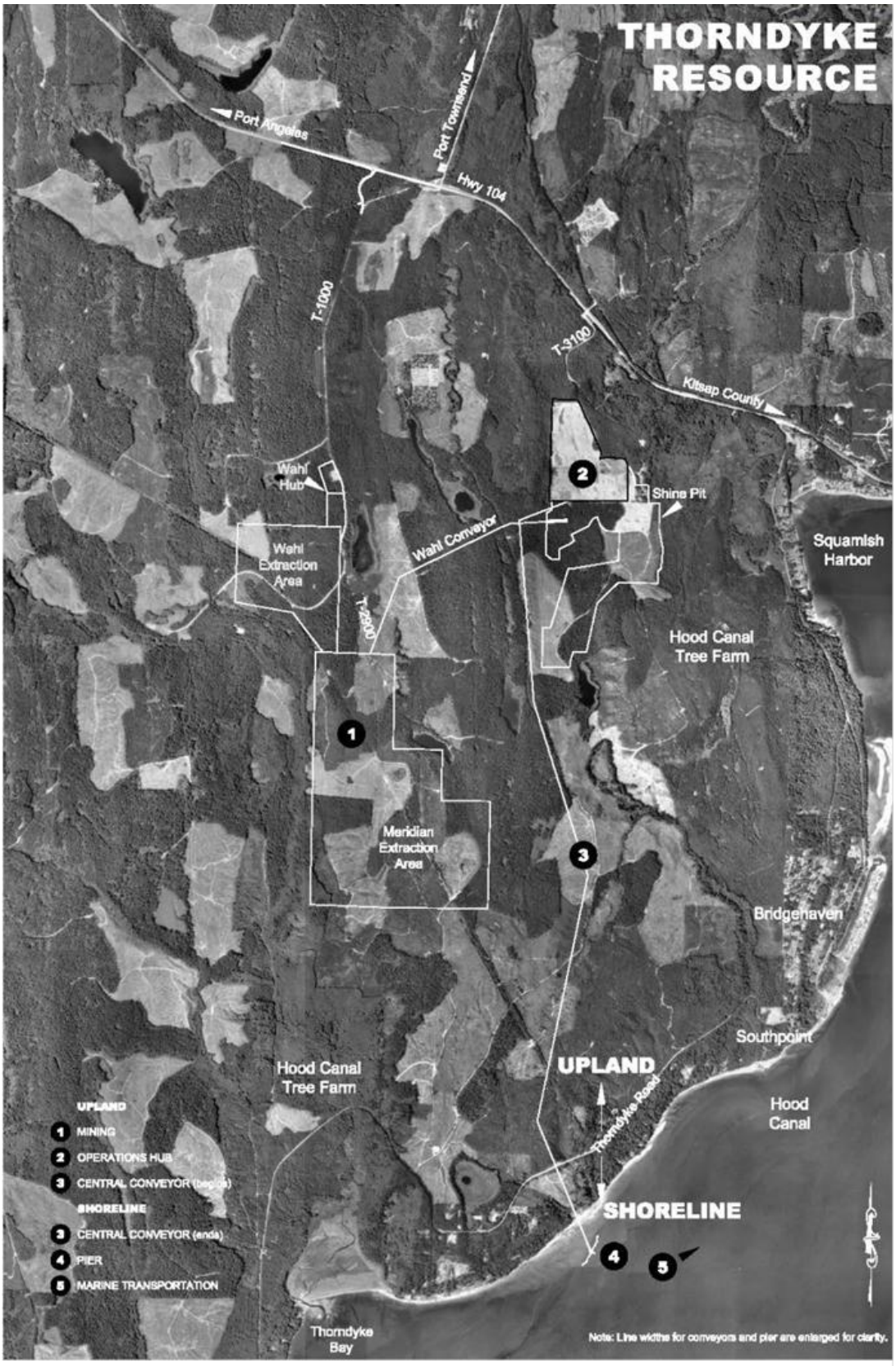
4. Determine who would see the project ("viewer groups"). Viewer types were identified primarily by existing land uses (e.g. rural residential) and uses (e.g. motorists, vessel operators).

5. Describe and assess the existing visual landscape ("affected environment") for each visual assessment area. Existing views were described based on direct observations from the visual assessment areas, with emphasis on representative viewpoints. Terms used to describe visual components are based on the Federal Highway Administration's visual assessment methodology (FHWA 1989).

6. Determine and evaluate views of with the project. The visual components of the project were identified and described, based on the project description and associated drawings provided by the Applicant:

1. Meridian Extraction Area – mining from a designated area of the tree farm;
2. Operations Hub - sand and gravel processing at the former Shine Pit;
3. Central Conveyor - 4-mile long sand and gravel conveyor;
4. Pier - Sand and gravel marine load-out facility on Manhattan Beach; and,
5. Marine Transportation - tugs, barges and ships calling on and leaving the pier on Hood Canal.

See the figure on the following page for the locations of these five visual components.



Project Components

1.0 VISUAL SETTING

1.1 Location

The proposed project is located in east Jefferson County, Washington, in an area known as the Upper Coyle Peninsula, where land use is primarily commercial forest. Proposed mining, processing, and the transport to the pier via conveyor would take place within the interior of the 20,901-acre Hood Canal Tree Farm. The proposed pier location (referred to as "the pier") is on an area called "Manhattan Beach" (LAAS 2003), which includes the shoreline from South Point south to the head of Thorndyke Bay.

Because mining would take place within the interior of the tree farm, the affected visual environment (project "viewshed") is primarily areas located near the shorelines of Hood Canal.

1.2 Landforms

The shorelines and waters of Hood Canal and the overall Puget Sound/Georgia Basin region could be described as a fjord landscape (which includes the "waterscape") with elongated channels, undulating shorelines (with points and bays), and relatively rapid elevation gain on the shorelines.

The visual character from the northern Hood Canal shoreline area is typical of rural, lowland marine areas of Washington's West Sound and northern Olympic Peninsula regions (Kitsap, Jefferson and Clallam counties), with the major visual elements being open waters, sky, shorelines, exposed bluffs, rolling forested lowlands and, in certain places, the Cascades and/or Olympic mountain ranges. Shorelines are primarily forested with evergreens. Some seasonal variance with alder and big-leaf maples are common in some areas. Wide stretches of open water often provide sighting distances ranging several miles, though the relatively narrow fjord channels assure that land is always prominent. Along the shoreline, views may be expansive but can also be obstructed by the undulating shoreline of bluffs, points and bays.

1.3 Human Elements

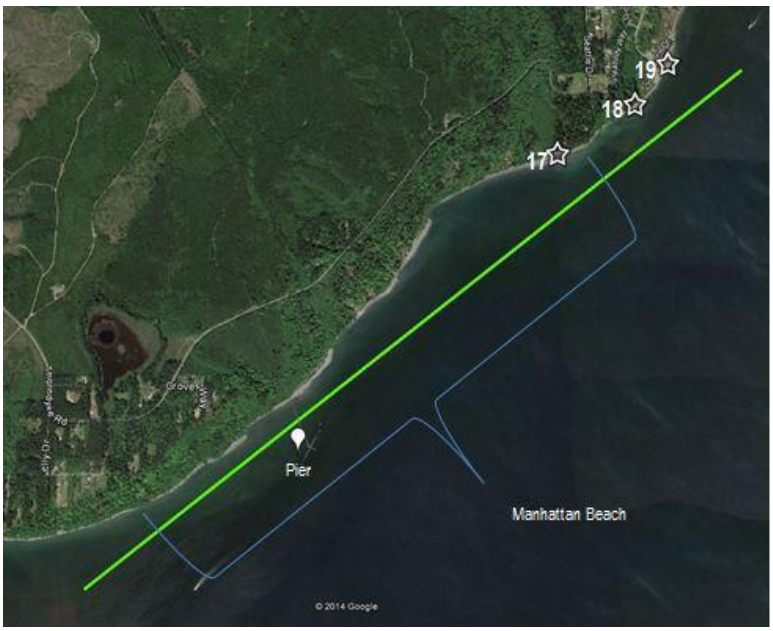
Structures

Major build-features within the northern Hood Canal viewshed include the following:

- the Hood Canal Bridge (approximately 5 miles north of pier)
- Naval Base Kitsap-Bangor (NBK Bangor, approximately 2.5 miles south of pier)
- blocks of even-aged forest stands, clearcuts, and reclaimed and active mining areas within the 20,901-acre Hood Canal Tree Farm
- state and county roads
- scattered houses
- single-family, suburban-density housing developments, many of which are along or near shorelines

The shoreline where the proposed pier would be built (Manhattan Beach) is relatively undeveloped.

It consists of approximately 15 shoreline residences and cabins, along with a few homes that are perched above the shore on the high-bank bluff that abuts the shoreline to the west.



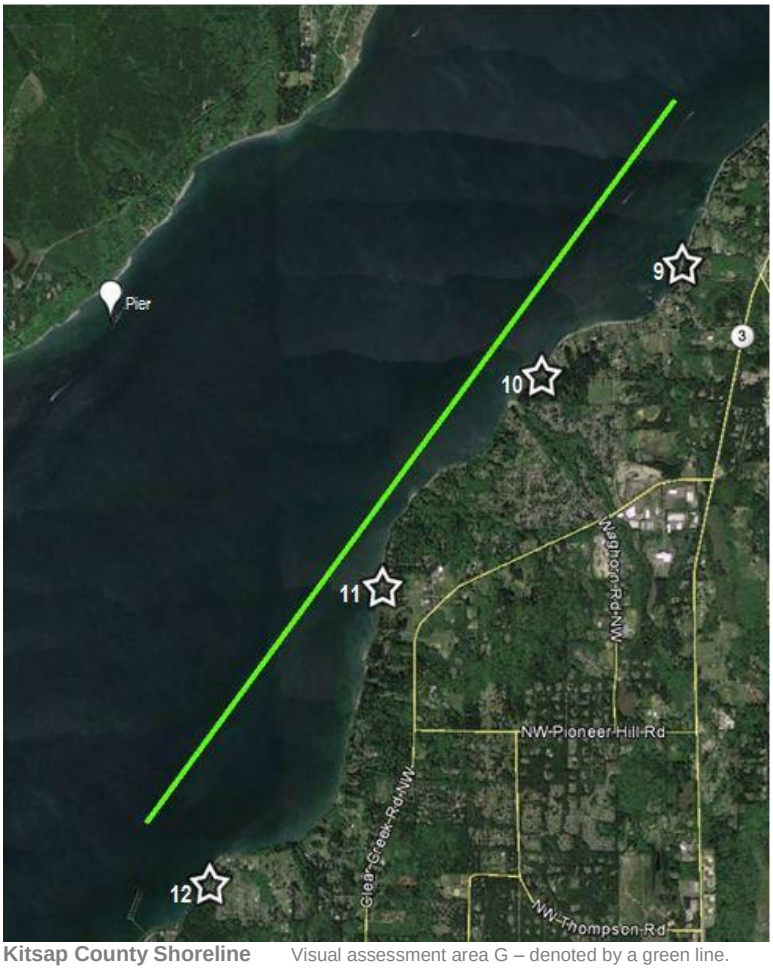
Manhattan Beach Visual assessment area J – denoted by a green line. The stars are viewpoints used to analysis visual impact.

The closest higher-density residential developments from the pier are located north of South Point (and outside the viewshed of the pier), where the sub-divisions of Trails End, Eaglecrest and Bridgehaven are located approximately 1.3 miles north of the pier.

This area includes suburban-density housing on the slopes, highbluff, and shorelines homes. The shoreline area includes a floating dock, with moorage for 20 boats. Further north is the Shine area where suburban-density homes and cabins are built along the shoreline and on the hills above, overlooking Squamish Harbor.

Bridgehaven Source: http://bridgehaven.net

The shoreline opposite the proposed pier location, the eastern (Kitsap) shoreline, includes suburban-density developments at Sunset Beach, Lofall, Edgewater Estates, and Vinland, as well as NBK Bangor, which includes several piers and an extensive, overwater security fence.

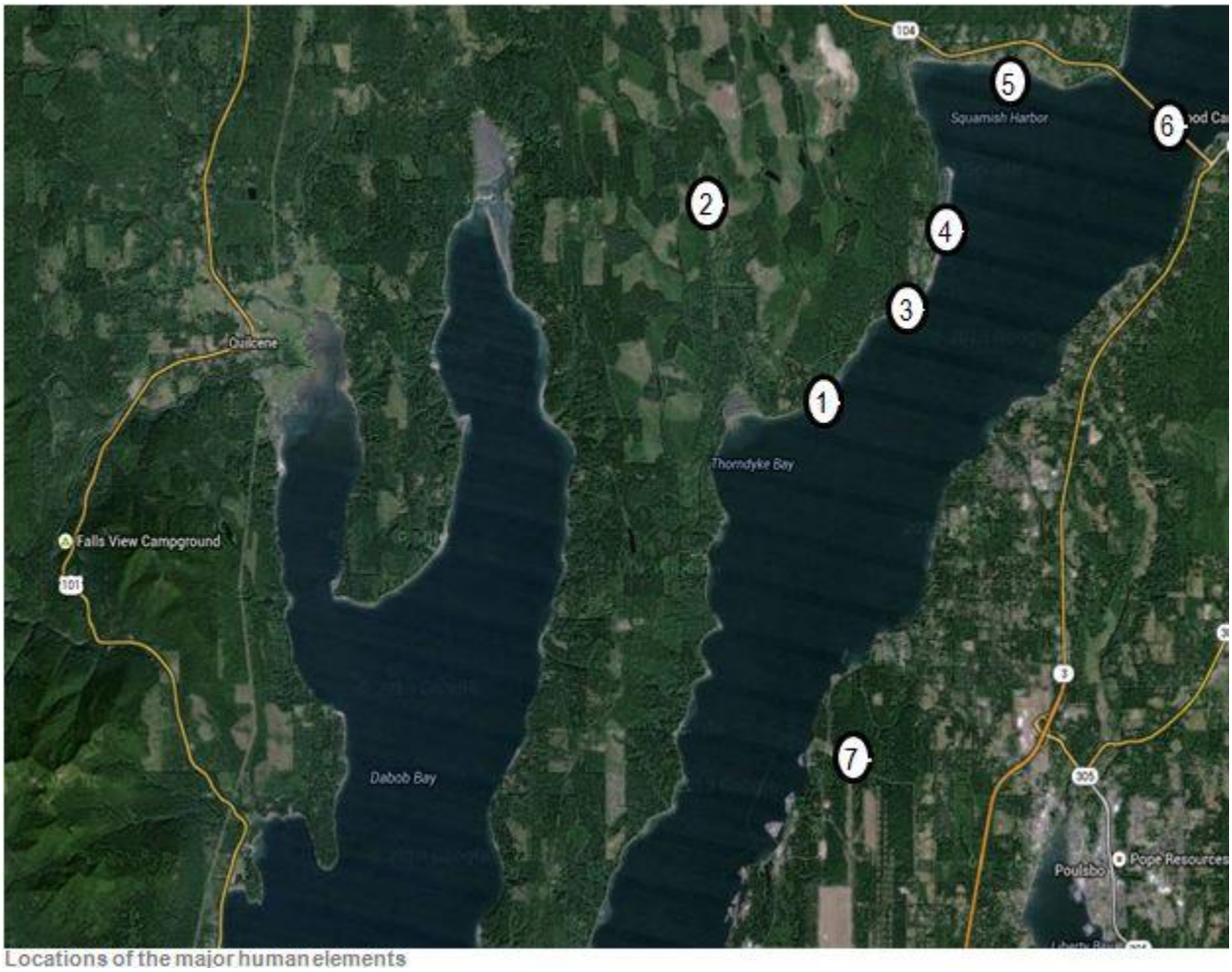


Kitsap County Shoreline Visual assessment area G – denoted by a green line. The stars are viewpoints used to analysis visual impact.

Vessel traffic is another visual aspect of Hood Canal and includes tribal, recreational, Navy, and Coast Guard vessels, as well as tug and barge traffic associated with development at Navy Base Kitsap-Bangor.

Due to national security interests the number of Navy submarines and their Coast Guard escorts that transect the Hood Canal is classified.

USS Pennsylvania arriving at her new homeport, Naval Base Kitsap-Bangor on Hood Canal, from her previous home at Naval SUBASE Kings Bay, GA.
Source: http://.xpda.com



Locations of the major human elements

Major human elements that surround the proposed project.

1. Proposed pier location
2. Hood Canal Tree Farm
3. South Point
4. Bridgehaven residential area
5. Shine residential area
6. Hood Canal Bridge
7. Naval Base Kitsap - Bangor

Light and Glare

Residential lighting is sparse at the proposed pier location. Further north of Manhattan Beach the residential and street lighting gets more intense from the South Point area sub-divisions of Trails End, Eaglecrest and Bridgehaven; as does the shoreline and hillside residents developments around Squamish Harbor.

On the other side of Hood Canal, the Kitsap County shoreline is more developed, with a higher density shoreline and bluff housing, access roads, and associated lighting.

The 1.5-mile-long Hood Canal Bridge is illuminated with surface and navigational lighting as well as from vehicle headlights and taillights.

Daily number of vehicles crossing the bridge is estimated between 14,000 and 22,000 trips. Most of those trips occur during commuter rush hours. Weekend trip counts are the highest; this is due to the high number of weekend visitors crossing the bridge to get to Olympic Peninsula recreational destinations (Heath 2011).

Hood Canal Bridge

NBK Bangor has four separate pier complexes including KB Docks, Delta Pier, Marginal Pier and Explosives Handling Wharf (EHW-1). In 2012, the Navy began a multi-year construction project, to build a 6.2-acre wharf (EHW-2) to expand their capacity to load nuclear missiles on ballistic submarines.

These pier complexes and upland lighting is the greatest sources of light in the project viewshed. The Navy base's security and work-lights generate high levels of nighttime lighting; sufficient to illuminate low level clouds and be readily seen from Manhattan Beach and most all viewpoints in the northern Hood Canal region.

NBK Bangor Source: http//globalsecurity.net

Haze

Forestry and residential burning can create visual haze during temperature inversions, primarily in the winter months. When monitoring data indicate that pollution levels are rising, the state may declare a Burn Ban which restricts certain burning activities in specific areas (ORCAA 2014). Car, truck and vessel traffic can also create visible haze over Hood Canal during temperature inversions in both winter and summer months.

1.4 Viewers

Viewer groups have been categorized based on activities and on location in relation to proposed project elements (also called "exposure"). Different viewer groups typically have different concerns and sensitivities to visual changes in the landscape (USFS 1995).

Existing viewer groups in the project vicinity include:

- Residents
- Highway travelers
- Tribal, government and commercial vessel operators
- Outdoor recreationists

Residents

People are known to be sensitive to changes in the visual landscape as seen from their homes (USFS 1995, FHWA 1989), in large part due to the long-term exposure and the provincial importance people hold to their homes and views.

Manhattan Beach is not highly developed. It consists of approximately 15 shoreline residences and cabins, along with a few homes that are perched above the shore on the high-bank bluff that abuts the shoreline to the west.

Located, to the north of Manhattan Beach - approximately 1.3 miles of where the pier would be located - is the South Point area, where the residential developments of Trails End, Bridgehaven, and Eaglecrest are located.

Further north is the Shine area where shoreline residences and cabins, are close to each other, and tend to abut along the shore of Squamish Harbor.

Further north, along the eastern portion of Shine Road, residences, are on the north side of the road (not shoreline side) and setback, overlooking Squamish Harbor.

Across Hood Canal, from Manhattan Beach is the eastern (Kitsap) shoreline including the more developed areas of Sunset Beach, Lofall, Edgewater Estates, Vinland and NBK Bangor.

Highway Travelers

Highway travelers are expected to be only moderately aware of minor changes at the periphery of their field of view. The FHWA visual assessment manual (FHWA 1989) notes that "as observer speed increases, the sharpness of lateral vision declines and the observer tends to focus along the line of travel."


Hood Canal Bridge

State Route 104 and its Hood Canal Bridge is a primary access route to the Olympic Peninsula for residential, commercial and recreational travelers.

While SR 104 is not a designated scenic byway, views from the bridge are considered important, particularly westbound traffic, as described later as part of the Hood Canal Bridge viewpoint

description. While commercial truck operators along SR 104 may enjoy views as part of their job, they are not particularly sensitive to changes in the visual landscape and more attuned to concentrating on their driving and destination. In general, people are less sensitive to visual changes from work than they are during off work hours.

Tribal, Government and Commercial Vessel Operators

Much of the vessel traffic on the upper Hood Canal is commercial and tribal fishermen, government (e.g. Navy and Coast Guard) and other commercial (e.g. tugs, work barges), particularly outside of the summer vacation season. Maritime workers enjoy views but may be less attentive or sensitive to views than recreational boaters.

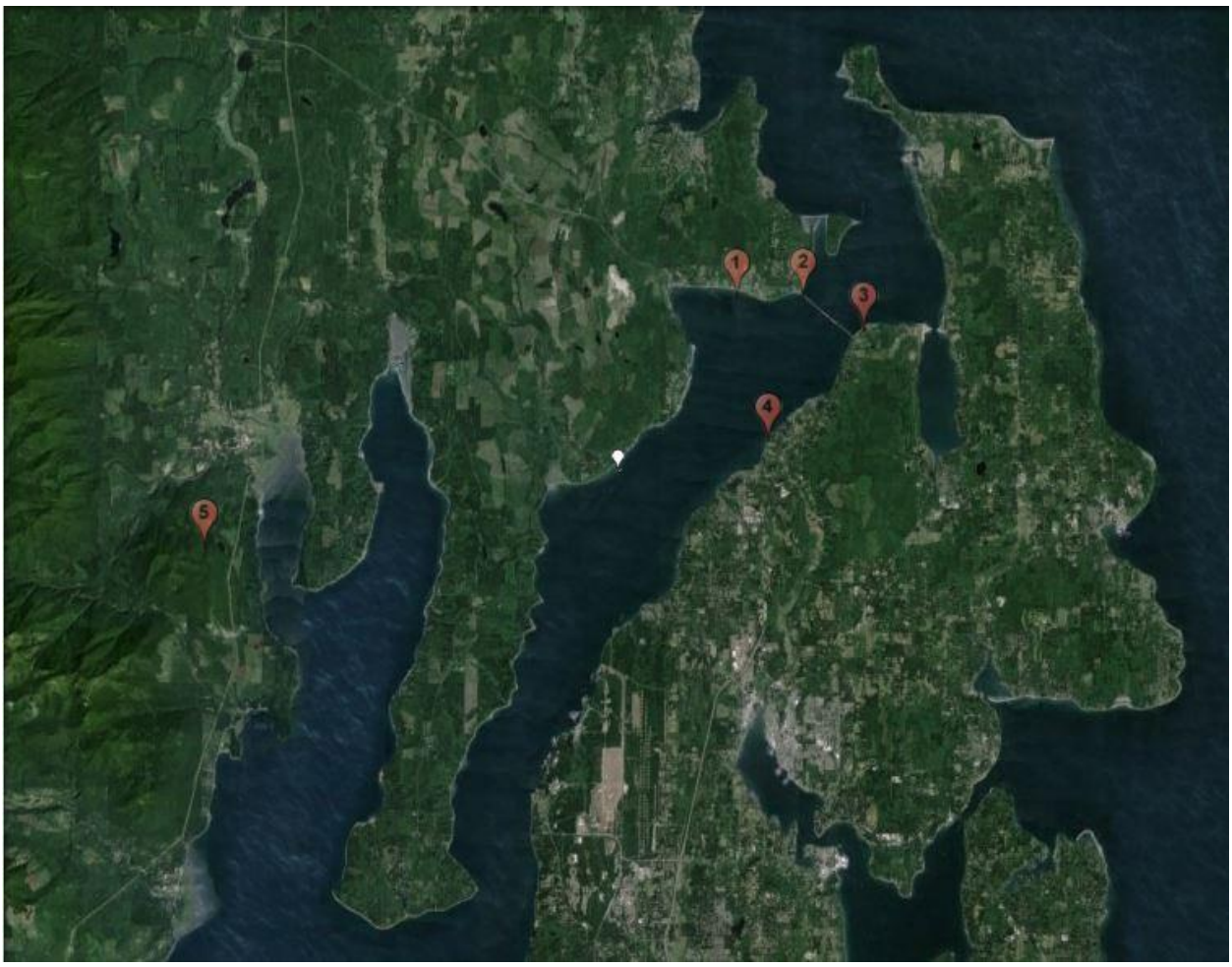
Upper Hood Canal

Outdoor Recreationists

People enjoying the outdoors in undeveloped settings such as the project vicinity are typically sensitive to visual alterations that alter the natural setting (USFS 1995). The waters off shore and throughout Hood Canal are popular with recreational boaters, particularly during summer. However, the Manhattan Beach area has no public shoreline access or boat launches, and recreational use of the beach in the vicinity of the proposed pier is limited, though residents and vacation home owners and guests regularly walk along the beach, including the proposed pier location.

The most popular recreational use area (and most potential recreational viewers) in the project vicinity are as follows, as presented on the figure below.

1. Hicks Shine Park and Boat Ramp
2. Shine Tidelands State Park, located on the west side of the Hood Canal Bridge (approximately 5 miles from pier)
3. Kitsap County Salisbury Point Community Park, located just north of the east side of the bridge
4. Kitsap Memorial State Park is located in Kitsap County (approximately 2.9-miles northeast from pier)
5. Mt. Walker, a 2,800-foot peak located approximately eight miles to the southwest (accessible by road as well as trail



2.0 EXISTING VISUAL ENVIRONMENTAL PROTECTIONS

2.1 Jefferson County Comprehensive Plan

The project site and vicinity are not within special visual designation areas, such as a national scenic area, national scenic byway, wilderness area, or a national park. In addition, Jefferson County has not promulgated any specific rules or regulations for the protection of views and viewsheds (Jefferson County 2004a).

However, the Jefferson County Comprehensive Plan outlines the following goals and policies to protect the visual character of the county.

- ENG 8.0 Protect the habitability, environmental quality and natural beauty of Jefferson County from the adverse impacts of development with respect to viewsheds and noise and mitigate impacts based on the conditions.

- ENP 8.1 The public process for adopting and amending County ordinances should include a discussion of the public interest with respect to protection of views and viewsheds.

- ENP 8.3 Establish standards to limit the glare from outdoor lighting.

2.2 Jefferson County Unified Development Code (UDC)

The UDC defines required standards for lighting that would apply to the proposed project:

- Exterior lighting shall not exceed thirty (30) feet in height from the finished grade for commercial and industrial uses, and twenty (20) feet for residential uses (except when such lighting is an integral part of the building).

- Exterior lighting shall be energy efficient and shielded or recessed so that direct glare and reflections are contained within the boundaries of the parcel.

- Exterior lighting shall be directed downward and away from adjoining properties and public rights-of way.

- No lighting shall blink, flash, or be of unusually high intensity or brightness.

- All lighting fixtures shall be appropriate in scale, intensity and height to the use they are serving.

- Any lighting installed in parking areas shall be of direct cutoff design so that the source is not visible from adjacent property.

2.3 Jefferson County Ordinance No. 08-0706-04

Jefferson County included the following lighting requirements as part of Ordinance No. 08-0706-04 which is applicable to Meridian Extraction Area and Operations Hub. The Ordinance requires:

- Outdoor lighting shall meet the [guideline] specifications of the U.S. National Park Service Interim Design Guidelines for Outdoor Lighting (NPS 2007).

- Building lighting shall be located high on the structures and include forward throw optics to direct lighting away from the sides of the buildings and onto the ground.

- Lighting required for mineral extraction, processing, and transportation activities shall be independently mounted (not directly attached to equipment) to allow for a more downward throw of light to further limit the potential for direct light to reach offsight areas.

2.4 Additional Environmental Protection Proposed in the Application

The applicant proposed two primary measures to reduce the overall visual impact of the proposed pier as part of their application:

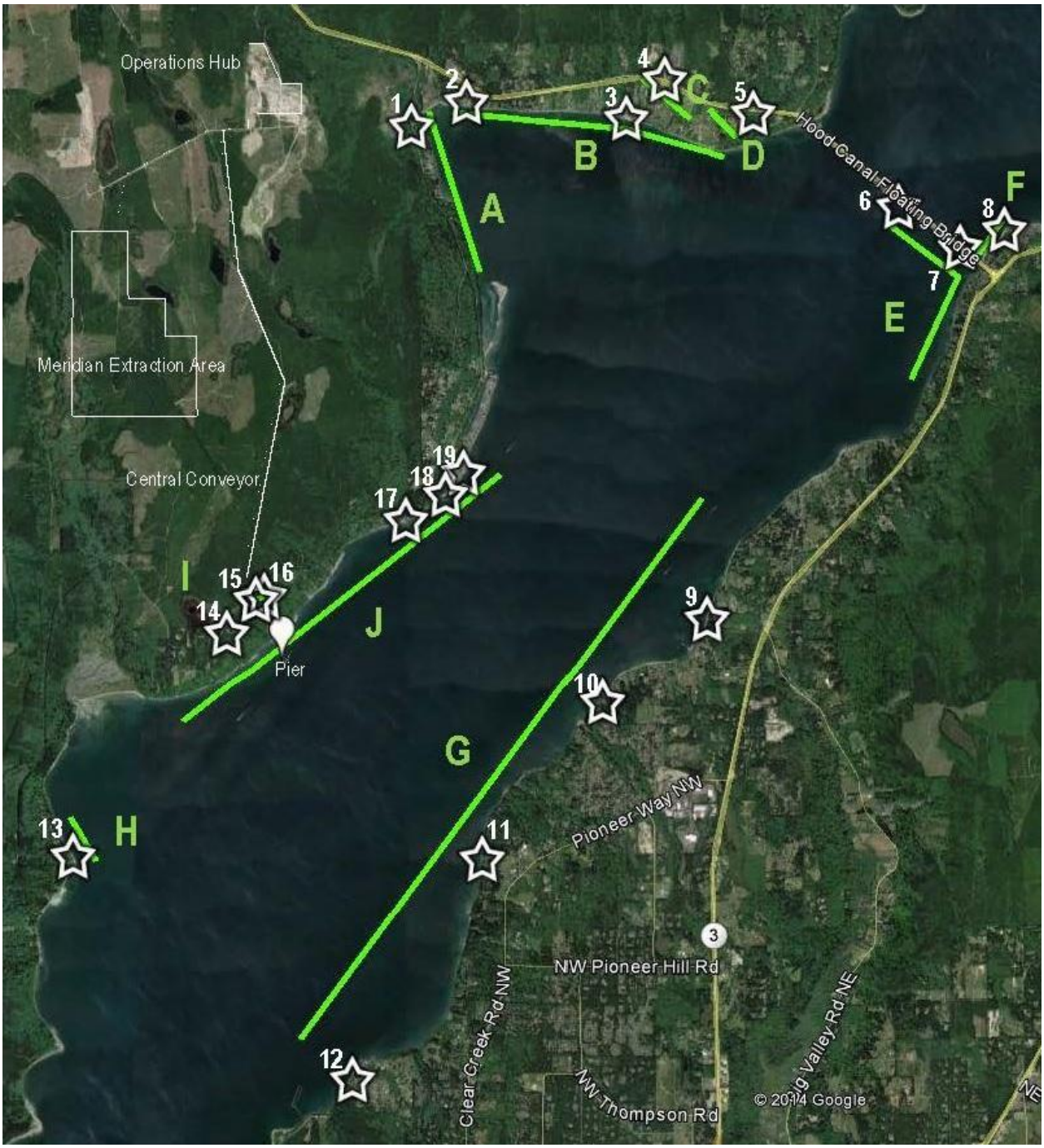
- the proposed pier would be painted in colors conducive to the background. Secondly, that lighting would be kept to the minimum required for safe operation; and,

- lighting of the water surface would be minimized with shielded and/or directional fixtures. Fixtures that limit glare, that are readily available, as approved by the national Dark Sky Initiative and the International Dark Sky Association.

Additional measures proposed by the applicant to reduce visual impacts are listed in Section 5.0.

3.0 EXISTING VIEWS

The following sections describe Visual Assessment Areas (Area A - J) and representative viewpoints (stars) sorted by the proposed project component that would be visible (e.g., mining, pier). The teardrop marker on the map below (left of the letter J) indicates the existing navigational channel marker off Manhattan Beach, where the pier would be located.



Visual Assessment Areas (green lines) and Representative Viewpoints (stars)

3.1 Views toward the mining (Meridian Extraction Area)

Mining would be conducted in the interior portion of the 20,901-acre Hood Canal Tree Farm. A ridge located west and south of the where the proposed Operation Hub (e.g. the former Shine Pit location) would completely screen views of Meridian Extraction Areas from visual assessment areas evaluated around Squamish Harbor.

The Meridian Extraction Area is visible from the 2,800-foot peak of Mt. Walker, located approximately eight miles to the southwest.

Looking northeast from Mount Walker, in the distant background is Mount Baker. The middle ground is upper Coyle Peninsula where the mining would occur. The immediate water is Quilcene Bay. **Source: http://tress.wordpress.com**

Mt. Walker, managed by the Olympic National Forest, is the only peak facing Puget Sound accessible by road. Views from this area are considered vivid due to the great distances afforded, visible features, uniqueness of the site, and the fact that the views are a primary motivation for visiting the peak.

The U.S. Forest Service maintains two primary viewpoints: the north viewpoint that includes views of Mt. Jupiter, Mt. Constance, Buckhorn Mountain, Mt. Baker and the town of Quilcene; and the south viewpoint that looks toward the Hood Canal, Mt. Rainier and Seattle. Due to its distance, Mr. Walker was not designated as a specific visual assessment area, though impacts on views from it are addressed in Section 4.0.

Views from other popular recreational use and/or scenic areas on the Olympic National Forest to areas proposed for increased mining are obstructed by the Quilcene Range. Recreational use in this area is oriented near the Quilcene River and its tributaries.

The Shine Lookout, located within the privately owned Thorndyke Block of the Hood Canal Tree Farm, is approximately one-quarter mile east of the eastern boundary of the Meridian Extraction Area. At 508 feet elevation, it is one of the highest hills on the Coyle Peninsula and provides 360-degree views within a small area near the top, including background views of the Olympic Mountains and expansive views of the Hood Canal Tree Farm. It was historically used as a fire lookout and contained a cabin that burned down in 1958. Public use of this area is very low. Due to the very low public use and restricted access, the Shine Lookout was not included as a visual assessment area.

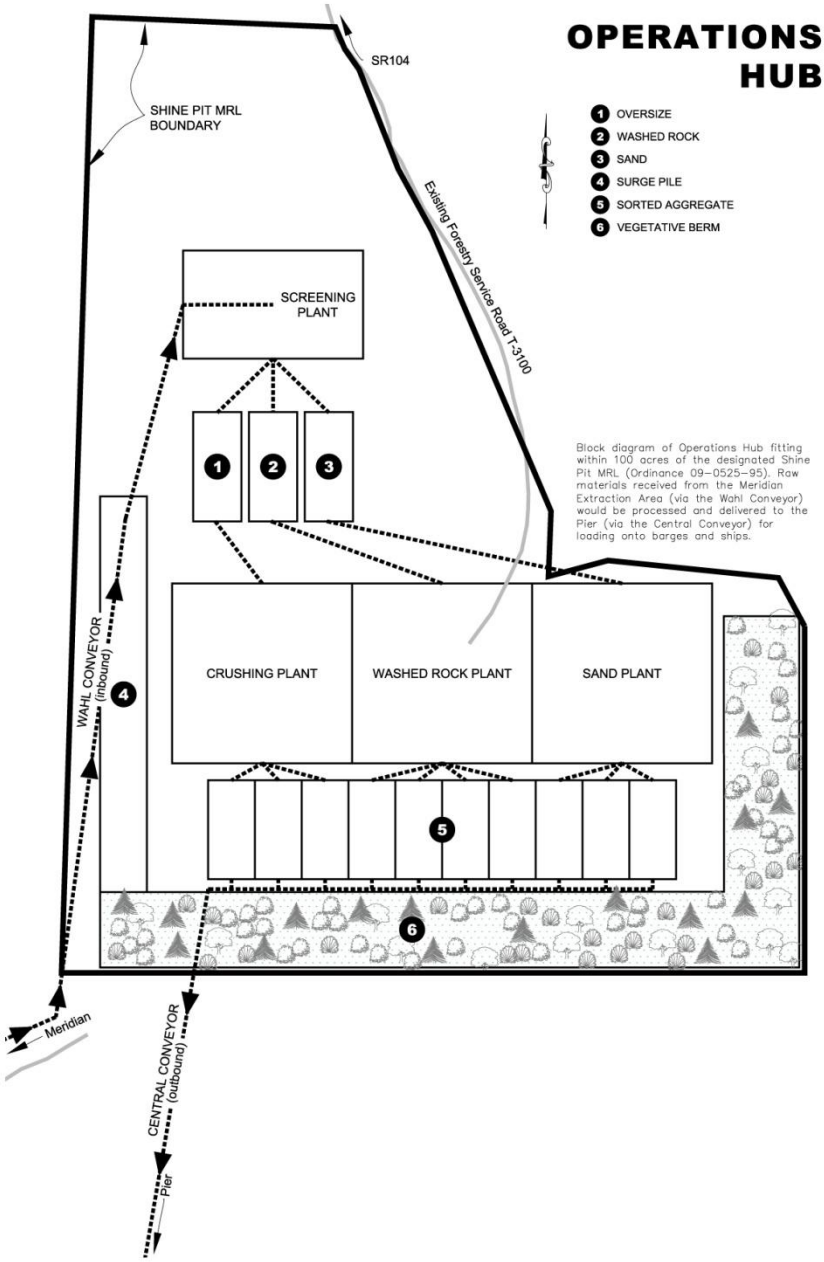
Washington State mining rules and regulations for surface mines require that reclamation be done after extraction. Below is an example what that looks like. The approximately 25-acre mining area provided sand and gravel to the former Shine Pit. The area was on the ridge overlooking Squamish Harbor and was highly visible.

Mining area, overlooking Squamish Harbor (2005)

3.2 Views toward the sand and gravel processing area (Operations Hub)

The Operations Hub would be located on 100-acres within the former Shine Pit. At its fullest extent, the Shine Pit had some 225-acres that were being used for sand and gravel processing, asphalt production, concrete recycling and mining.

The Operation Hub would be located on the northern bench (elevation 300-feet mean sea level) of the former pit, in the same area where processing and asphalt production occurred up until 2013. This area is on the western edge of the slope that faces residential areas along Squamish Harbor.



Past excavation (mining) areas (125-acres plus) have been or are currently being reclaimed. Much of the tree plantings have grown to create a forested (rather than clear-cut) look. In newer clear-cuts and recent reclaimed areas, vegetation remains immature and these areas are still visible as a wedge of exposed earth. The front cover photos illuminate this description.

Further west, behind the former Shine Pit, a steep ridge raises some 100-feet above, covered with trees of various heights. A forestry service road that climbs this ridge is visible from the Squamish Harbor area. Both the inbound conveyor from the Meridian Extraction Area (Wahl Conveyor) and outbound conveyor to the pier (Central Conveyor) would follow this road.

The background view behind the Shine Pit includes the Olympic Mountains from west to southwest (approximate bearings 240 to 275 degrees).

Visual assessment area A through F

The former Shine Pit area can be seen from shoreline residences along Squamish Harbor, travelers on the Hood Canal Bridge, and from residences on the eastern (Kitsap) shoreline of Hood Canal.

Viewpoints from visual assessments areas A through F were identified to assess the impact of the Operation Hub. Since the Operations Hub would be located within the former Shine Pit, past and current views of that operation were considered. For the readers convenience, when described below as former Shine Pit area, that assumes the 100-acres where the Operation Hub would locate.

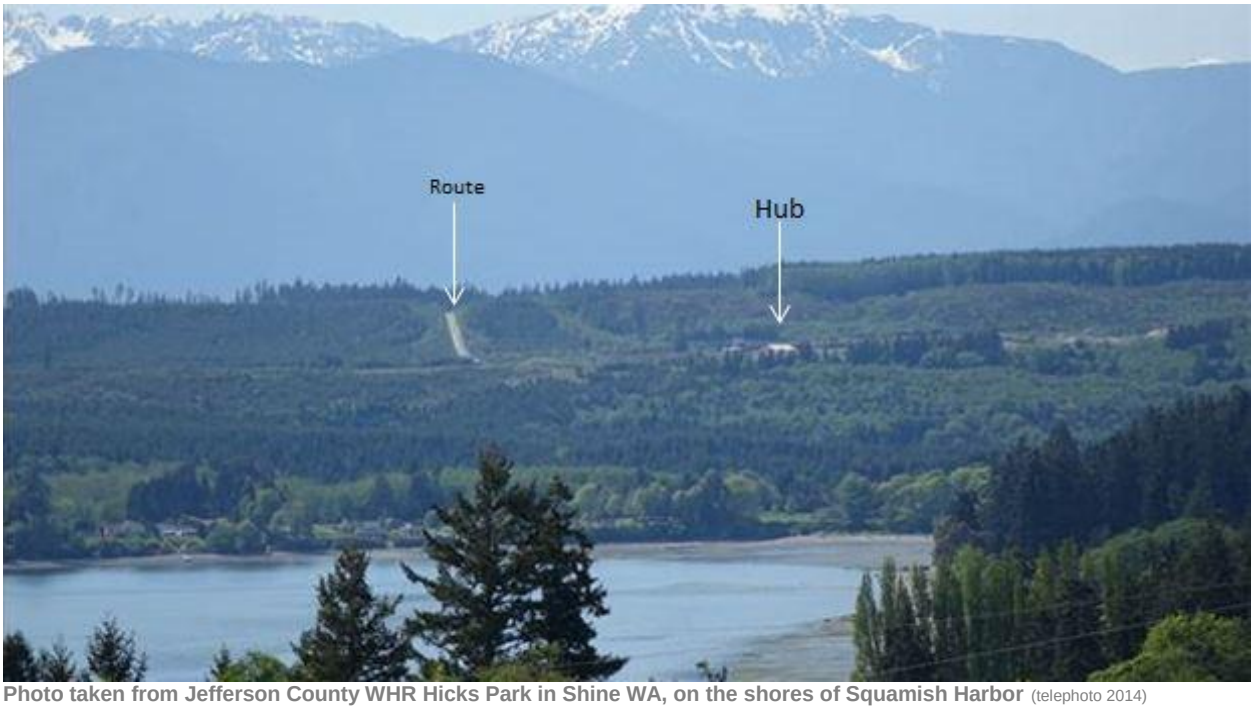
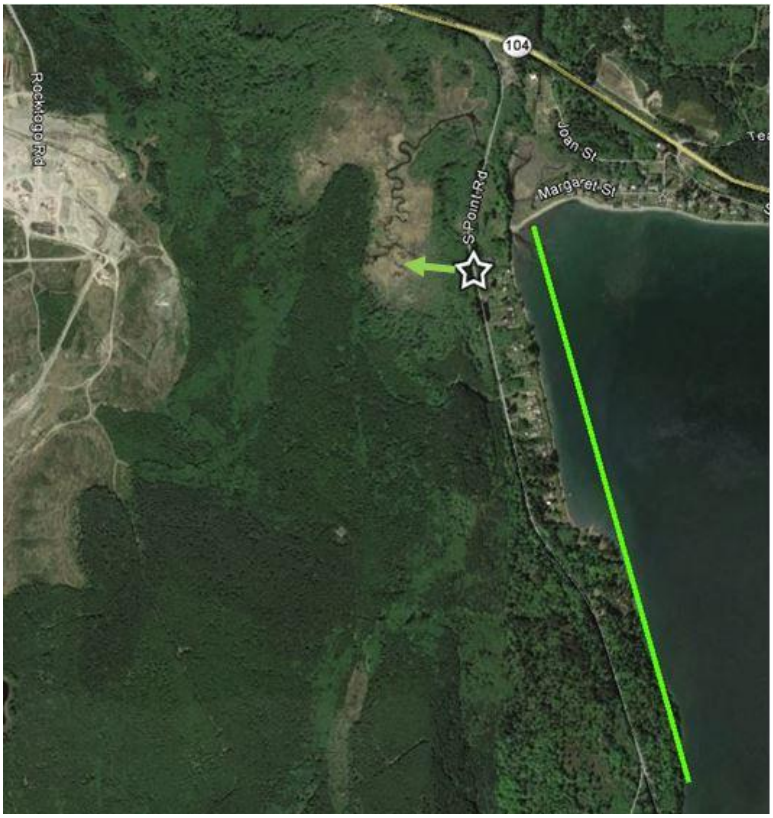


Photo taken from Jefferson County WHR Hicks Park in Shine WA, on the shores of Squamish Harbor (telephoto 2014)

The following photos are of the former Shine Pit operation (2006), where the proposed Operation Hub would be located. This is typical of the colors seen at a sand and gravel facility.

Visual assessment area A: South Point Road



Viewpoint 1: South Point Road (MP .05) looking toward the former Shine Pit area.

This cluster of waterfront homes, located approximately 0.5 mile on South Point Road from State Route 104, is the closest residential area to the former Shine Pit.

Views toward the pit are almost entirely screened by vegetation and approximate 300-foot vertical hillside leading up to the bench.

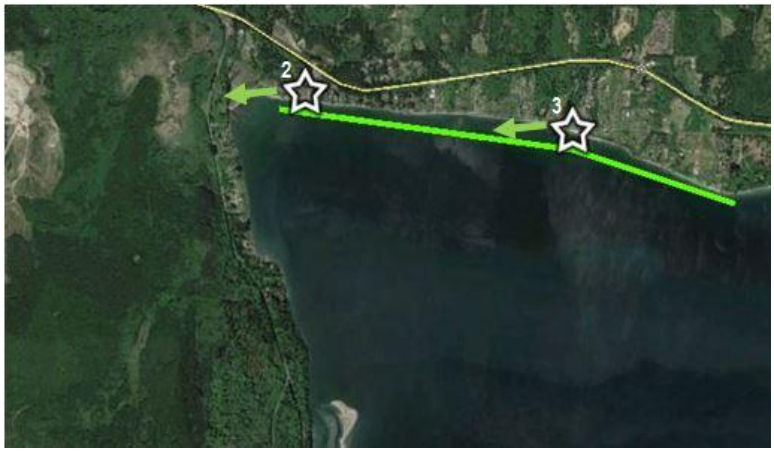
There are no views, west, of the Olympics Mountains. Most homes are oriented east toward Squamish

The 50mm length is considered closest to normal viewing distance (though the eye takes in a slightly broader field of view) and used as the base setting to avoid manipulation of depth of field. Viewpoint photo images from 2014 were captured from a 2013 Sony RX10, 20.2 megapixels camera with a Zeiss F2.8, 24-200mm lens. Focal lengths were pre-set to equivalents 50mm to 200mm. Photos were optimally and automatically determined within the RX10's "landscape" pre-setting.

Poulsbo Media Group provided line-of-sight distances and viewing angles - using digital terrain from Google Earth™ 2013, along with providing the digital simulations, graphics and layout.

Viewpoint 1: South Point Road looking toward the old Shine Pit area 50mm

Visual assessment area B: Squamish Harbor

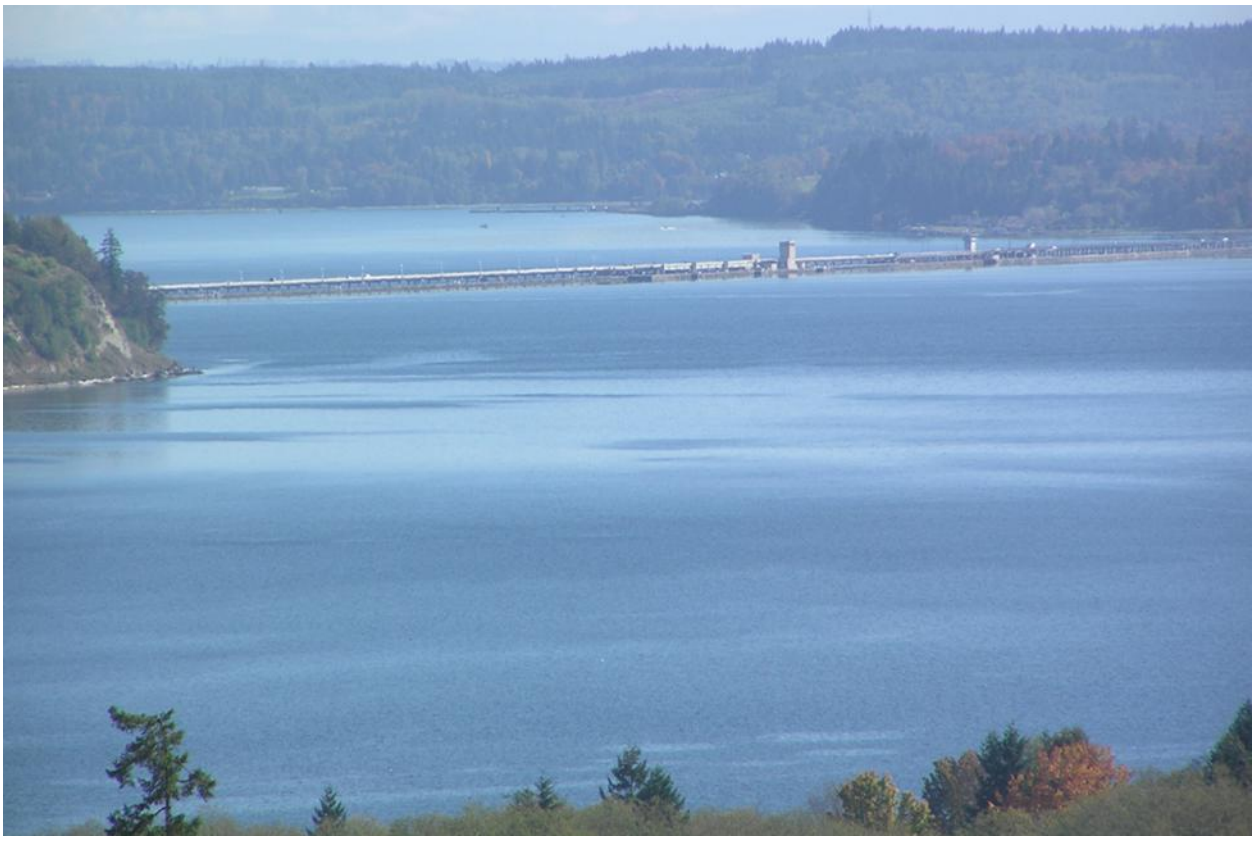


Viewpoint 2: at the intersection of Meredith and Margaret Roads, looking toward the former Shine Pit area

Viewpoint 3: from Jefferson County WHR Hicks Park, looking toward the former Shine Pit area

Sight distances to the former Shine Pit area range from approximately one mile at the western side of the harbor to nearly 3 miles at the east edge from the residences along Squamish Harbor. As is typical for shorelines, most houses in this area water-oriented, facing south, rather than west toward the proposed Operations Hub.

Visual components from this area include Bridgehaven, open water views of Hood Canal, and the shoreline of Kitsap County across the Hood Canal. The Hood Canal Bridge is obstructed by intervening topography.

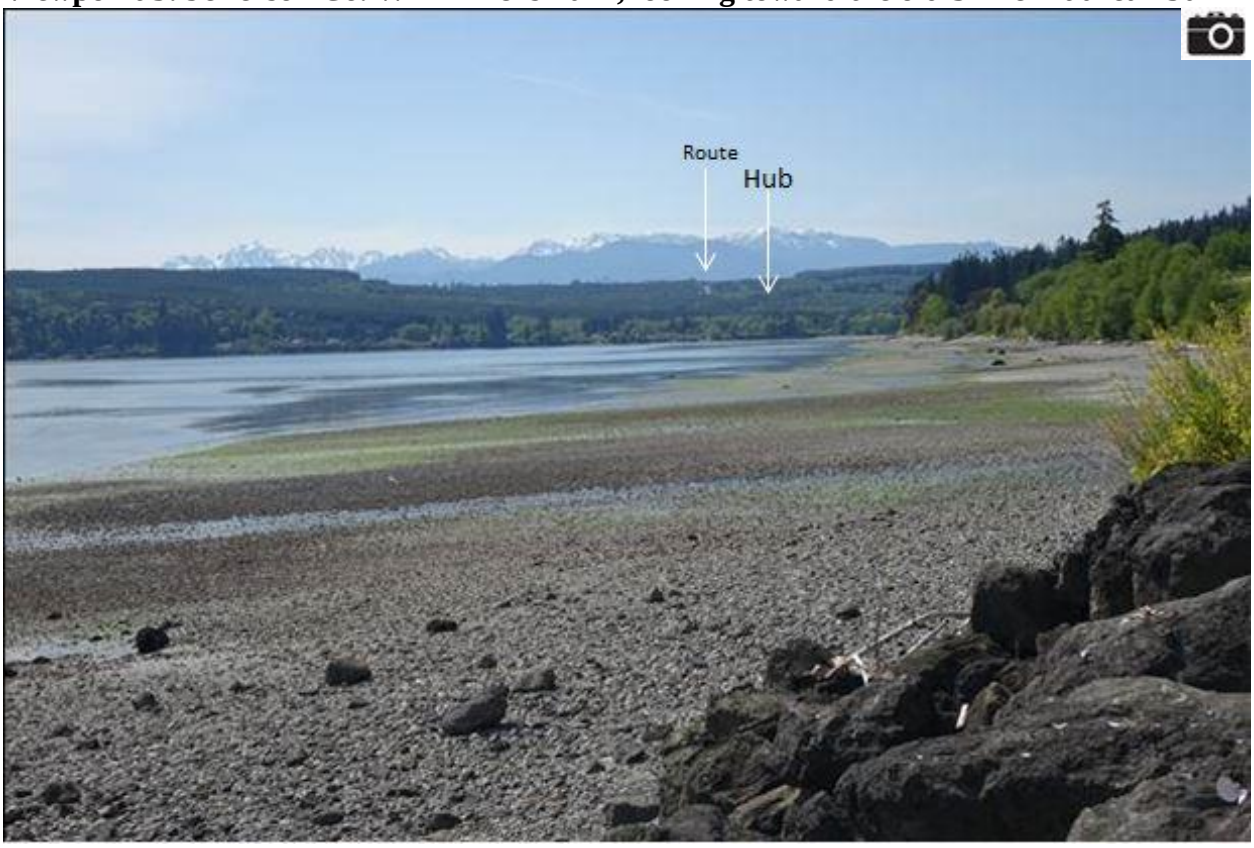


Looking northeast from where the Central Conveyor route would reach the crest of the hill behind the Shine Pit area. To the left is the eastern waters of Squamish Harbor; the middle is the Hood Canal Bridge; behind that is Salisbury Park, then Port Gamble. This viewpoint is marked "Route" on the photos below.

Viewpoint 2: Meredith and Margaret Roads, looking toward the old Shine Pit area 50mm

Viewpoint 2: Meredith and Margaret Roads, looking toward the old Shine Pit area 200mm

Viewpoint 3: Jefferson Co. WHR Hicks Park, looking toward the old Shine Pit area 50mm



Viewpoint 3: Jefferson Co. WHR Hicks Park, looking toward the old Shine Pit area 200mm

Visual assessment area C: Shine Road mid-slope

Viewpoint 4: near the intersection of Shine and Stark roads, looking toward the former Shine Pit area. Viewers are primarily residential

This area is at higher elevation (100-feet plus, MSL) then the shoreline residences along Squamish Harbor (area B).

Views are oriented more to the southwest than west (approximately 200 degrees).

Views are still predominately water views of Squamish Harbor and Bridgehaven but also include views of the Olympic Mountains, west which is behind the former Shine Pit location. The higher elevation provides more exposed views of the former Shine Pit area, although it is approximately 2-miles distant. The former Shine Pit's asphalt plant silos were visible from this point.

Viewpoint 4: Shine Road (Stark Road) looking toward the old Shine Pit area 50mm

Viewpoint 4: Shine Road (Stark Road) looking toward the old Shine Pit area 200mm

Visual assessment area D: Shine Road upper-slope

Viewpoint 5: Shine Road, near Ricky Reach Road, looking toward the former Shine Pit area. Viewers are primarily residential.

Moving westbound on Shine Road the roadway reaches the top of a hill (near the intersection with Ricky Reach Road) where westbound travelers face directly toward the former Shine Pit area, which is approximately 3-miles distant.

Located just above and behind Area B at approximately 160 to 200 feet elevation, this area has similar views from Area B, but the former Shine Pit area is more visible due to the higher perspective. Intervening trees partially obscures some residences views of the former Shine Pit area.

Viewpoint 5: Shine Road (Ricky Reach Road) looking toward the old Shine Pit area 50mm

Viewpoint 5: Shine Road (Ricky Reach Road) looking toward the old Shine Pit area 200mm

Visual assessment area E: Hood Canal Bridge

Viewpoint 6: on the Hood Canal Bridge mid-span, looking west toward the former Shine Pit area.

Viewpoint 7: on the Hood Canal Bridge eastern section, looking west toward the former Shine Pit area.

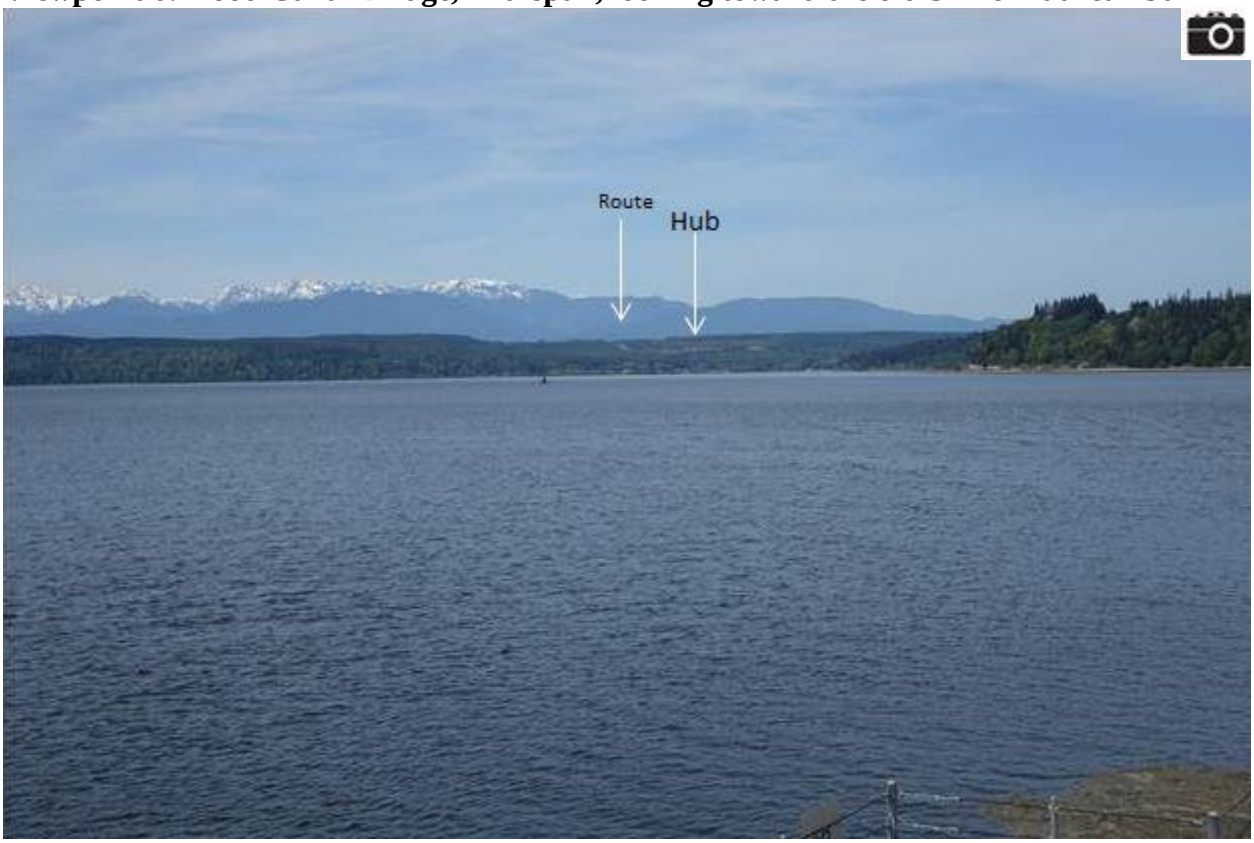
Viewers of both viewpoints are primarily highway travelers.

Views from the Hood Canal Bridge are within line-of-sight of the former Shine Pit area. Considered the gateway of Jefferson County and the Olympic Peninsula, Hood Canal Bridge motorists include visitors, commuters, commercial drivers and those Jefferson and Clallam county residents looking for greater access to employment, shopping, medical and/or other services more readily available in more populated areas like Poulsbo and Seattle.

Westbound motorists turning onto the bridge from the Kitsap side are greeted by an impressive view dominated by the floating bridge, water on either side, Hood Canal shorelines and bluffs in the middle-ground, and the Olympic Mountains (when skies are clear) in the background. Westbound motorists also face the viewshed where the proposed Operations Hub would be sited (former Shine Pit area).

Hood Canal Bridge eastern section (Viewpoint 7) is somewhat representative of eastern Hood Canal (Kitsap) shoreline residences views south of the bridge, Residence views are dominated by the bridge and open waters of Hood Canal and Squamish Harbor, the shorelines and bluff of Jefferson County, and the communities of South Point area and around Squamish Harbor. Views of the Olympic Mountains are present from these properties as well.

Viewpoint 6: Hood Canal Bridge, mid-span, looking toward the old Shine Pit area 50mm



Viewpoint 6: Hood Canal Bridge, mid-span, looking toward the old Shine Pit area 200mm

Viewpoint 7: Hood Canal Bridge, eastern, looking toward the old Shine Pit area 50mm

Viewpoint 7: Hood Canal Bridge, eastern, looking toward the old Shine Pit area 200mm

Visual assessment area F: Kitsap County Salisbury Point Community Park

Viewpoint 8: from Kitsap County Salisbury Point Park, looking toward the former Shine Pit area. Viewers are primarily outdoor recreationalists.

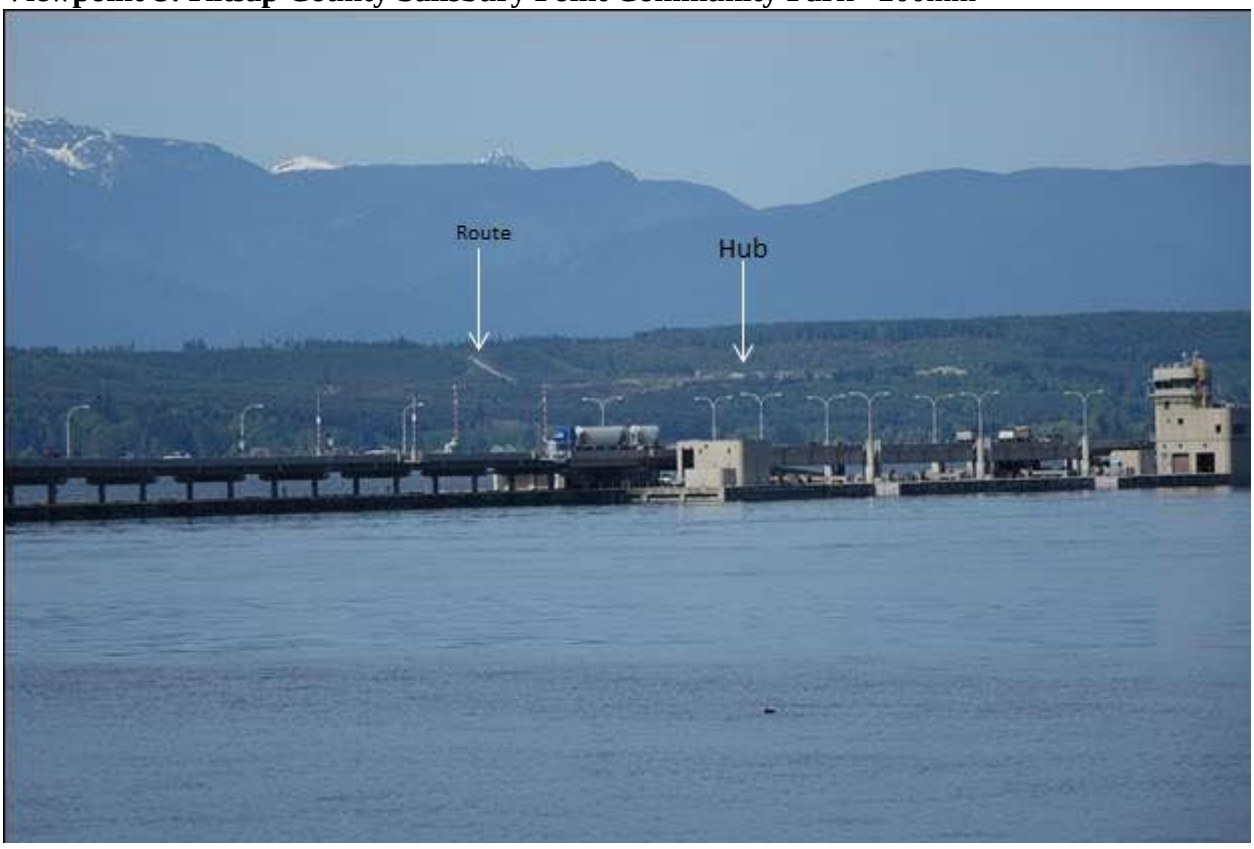
The 6.5-acre Kitsap County Salisbury Point Community Park is located on the eastern shore of Hood Canal, approximately 2,000 feet north of the Hood Canal Bridge.

The park provides saltwater beach access, boat launch, fishing pier, restrooms, group shelters and a picnic area. Views are dominated by the shoreline, open water, the Jefferson County shoreline and the Hood Canal Bridge. The area where the former Shine Pit was, is partially visible in the distance, but is not very noticeable due to screening by the Hood Canal Bridge.

This viewpoint is representative of eastern Hood Canal (Kitsap) shoreline residences views, north of the Hood Canal Bridge. Their views are dominated by the bridge and open waters of Hood Canal, the shorelines and bluffs of Jefferson County, and the communities in the Port Ludlow area. Views of the Olympic Mountains are present from some of these properties as well.

Viewpoint 8: Kitsap County Salisbury Point Community Park 50mm

Viewpoint 8: Kitsap County Salisbury Point Community Park 200mm



3.3 Views toward the sand and gravel conveyor (Central Conveyor)

Approximately 90 percent of the 4-mile long Central Conveyor would be located on a commercial tree farm and would not be visible, outside the tree farm, except:

- where the conveyor route goes up the forestry service road on the ridge behind former Shine Pit, and;
- the route of the Twin Conveyor to the pier, particularly the bridge over Thorndyke Road and its east of Thorndyke Road final leg.

Visual assessment area A through F

As described above, the former Shine Pit area can be seen from shoreline residences along Squamish Harbor, travelers on the Hood Canal Bridge, and from residences on the eastern (Kitsap) shoreline of Hood Canal. Viewpoints from Visual assessments areas A through F were utilized to assess the impact of the Operation Hub, because where the Central Conveyor route goes up the forestry service road is immediately behind the former Shine Pit.

The ability to view this leg of the Central Conveyor would be similar to visual assessment areas that could see the proposed Operation Hub (to be located on 100-acres of the former Shine Pit). However, intervening topography, would limit viewers ability to see the route from much of the Hood Canal Bridge and most of the eastern (Kitsap) shoreline of Hood Canal.

Photo taken from Shine Road, looking toward the route of the central conveyor (50mm 2014)

Visual assessment area I: Thorndyke Road bridge crossing

Viewpoint 14: a residence on Groves Lane, off Thorndyke Road, looking northwest toward the proposed bridge crossing

Viewpoint 15: on Thorndyke Road, looking northeast toward the bridge crossing. Viewers are primarily local travelers (including walking, jogging and biking).

Viewpoint 16: on Thorndyke Road, looking southwest toward the bridge crossing. Viewers are primarily local travelers.

Thorndyke Road, a county road that runs along the eastern side of the Coyle Peninsula, includes a point where the proposed conveyor would cross overhead (just southwest of Mile Marker 3).

The area of interest is at the point where the proposed conveyor would bridge over the road. The crossing is near a portion of a hillside, where a steep road-cut (approximately 60-feet deep V) was cut to build the county road. Views are boxed in by the road cut, which is densely vegetated on either side of the road.

Northbound views along Thorndyke Road are limited by the road cut and vegetation. After cresting the hill, partial views of Hood Canal can sometimes be seen, depending on the season and tree and plant foliage.

Groves Lane' residences (Viewpoint 14), which intersects with Thorndyke Road, are the nearest cluster of homes to the proposed bridge crossing. Due to intervening topography and tree cover, views of the bridge crossing would not be possible from the area.

Viewpoint 14: Residence on Groves Lane looking northwest toward bridge crossing 50mm

Viewpoint 15: Thorndyke Road, looking northwest toward bridge 50mm

Viewpoint 16: Thorndyke Road, looking southwest toward bridge crossing 50mm

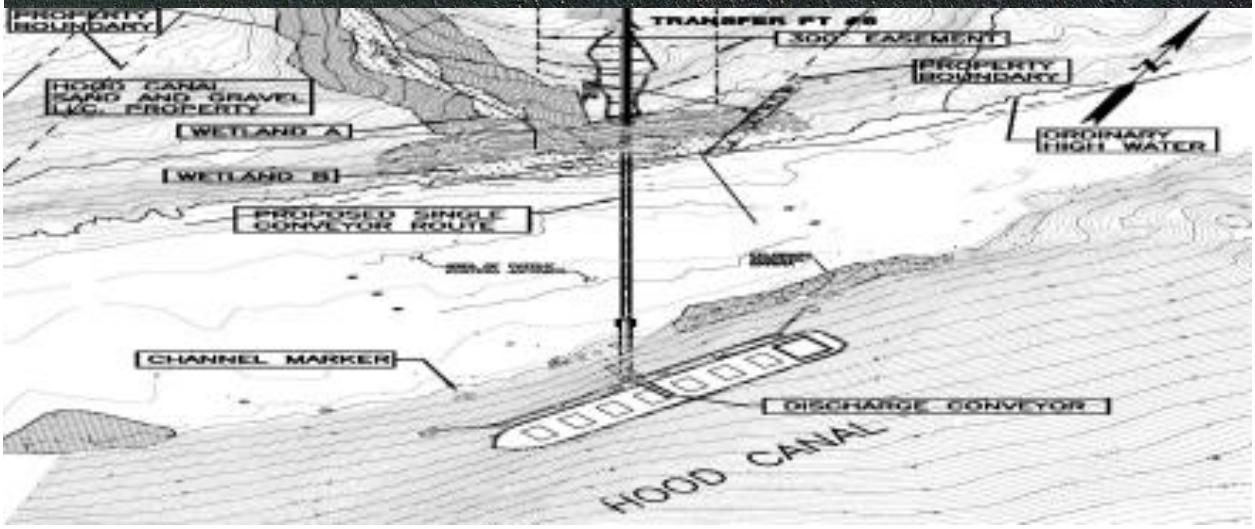
3.4 Views toward the marine load-out facility on Manhattan Beach (Pier)

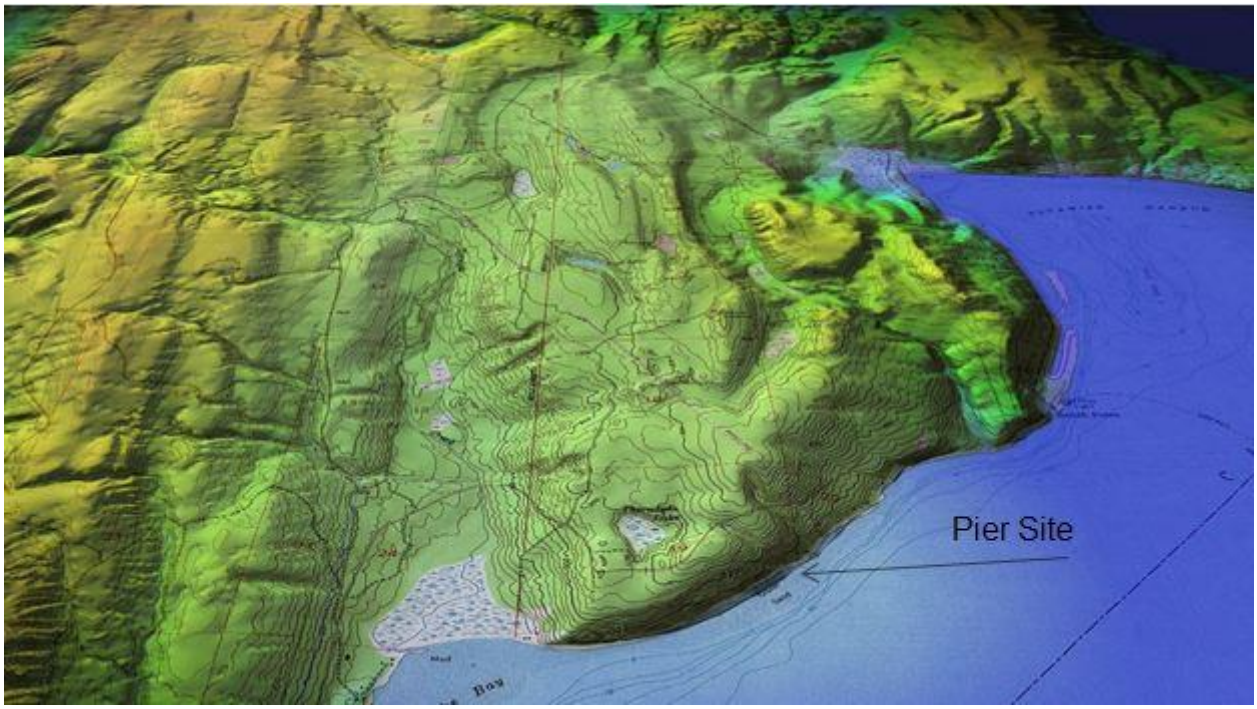
Being on the shore and water, the pier would be visible from many areas throughout the northern Hood Canal. To properly assess its impact, this report considered viewpoints from the Squamish Harbor area (areas D and E) in addition to areas to the south with more direct views of the pier (areas G, H and J).

The photo on the right is the channel marker on the shore of Manhattan Beach where the proposed pier would be located.

On the photos below it is marked as "Channel Marker".


Channel Marker


PROPERTY BOUNDARY
TRANSFER PT #8
300' EASEMENT
PROPERTY BOUNDARY
HOOD CANAL SAND AND GRAVEL LLC. PROPERTY
WETLAND A
WETLAND B
PROPOSED SINGLE CONVEYOR ROUTE
ORDINARY HIGH WATER
CHANNEL MARKER
DISCHARGE CONVEYOR
HOOD CANAL



Topographical illustration of proposed pier site.

Visual assessment area D: Shine Road, upper-slope

Viewpoint 5a: Shine Road, near Ricky Reach Road, looking south, toward the proposed pier location. Viewers are primarily residential.

Viewpoint 5a: Shine Road, near Ricky Reach Road 50mm

Viewpoint 5a: Shine Road, near Ricky Reach Road 200mm

Visual assessment area E: Hood Canal Bridge

***Viewpoint 6a**:* on the Hood Canal Bridge mid-span looking south, toward the proposed pier location.

Viewpoint 7a: on the Hood Canal Bridge eastern section looking south, toward the pier.

Viewers of both viewpoints are primarily highway travelers.

Viewpoint 6a: Hood Canal Bridge mid-span, looking toward the proposed pier 50mm

Viewpoint 6a: Hood Canal Bridge mid-span, looking toward the proposed pier 200mm

Viewpoint 7a: Hood Canal Bridge, eastern, eastern looking toward the pier. 50mm

Viewpoint 7a: Hood Canal Bridge, eastern, eastern looking toward the pier. 100mm

Visual assessment area G: Kitsap County shoreline

Viewpoint 9: from Kitsap Memorial Park, looking toward the proposed pier location. Viewers are primarily outdoor recreationalists.

Viewpoint 10: from the Edgewater Estates area, looking toward the pier. Viewers are primarily residential.

Viewpoint 11: from the Canal View Way area, looking toward the pier. This is the nearest Kitsap shoreline to the pier. Viewers are primarily residential.

Viewpoint 12: from the Vinland area, looking toward the pier. Viewers are primarily residential.

Westerly views from the eastern (Kitsap) side of Hood Canal are comprised of the open waters of Hood Canal, the forested uplands and bluffs along the Jefferson County shoreline, and Olympic Mountains in the background. Views to the east are obstructed by bluffs and/or vegetation, leaving a field of view of approximately 180 degrees (from 200 to 21 degrees, or south by southwest to north by northeast).

The viewpoints along this approximately 5.3-mile shoreline range from approximately 1.5 mile east of the proposed pier (Viewpoint 11, Canal View Way) – the closest point to the pier – to Vinland (Viewpoint 12), some three miles to the east.

Kitsap Memorial State Park is located in Kitsap County (Viewpoint 9), approximately 2.9-miles northeast of the proposed pier. The 58-acre park has approximately 1,800 feet of accessible shoreline and facilities for group and individual recreation, weddings and overnight stays. Viewers are primarily park visitors involved in walking the shoreline, camping or participating in group activities. Cabins are located near the parking area on the high bank and away from shoreline views. The park, with a 73-car parking capacity, attracts more than 100 visitors on busy days.

The background view at Kitsap Memorial State Park includes a profile of the Olympic Mountains with roughly a 45-degree sweep, southwest to west (approximately 238 to 282 degrees). Prominent Olympic peaks, from south to north, include the Brothers, Jupiter, Constance, Buckhorn and Zion; distances to these peaks range from 18 to 25 miles.

Viewpoint 9: Kitsap Memorial Park 50mm

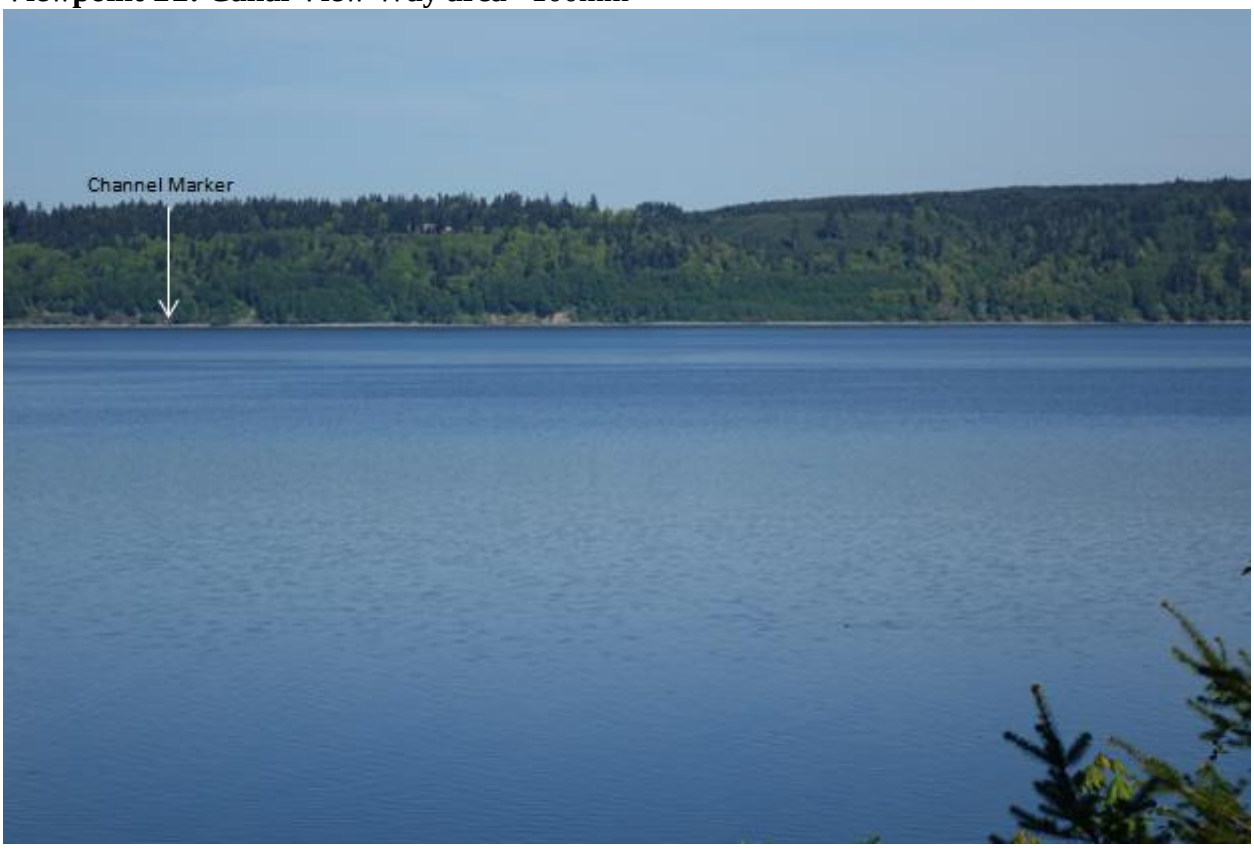
Viewpoint 9: Kitsap Memorial Park 70mm

Viewpoint 10: Edgewater Estates area 50mm

Viewpoint 10: Edgewater Estates area 70mm

Viewpoint 11: Canal View Way area 50mm

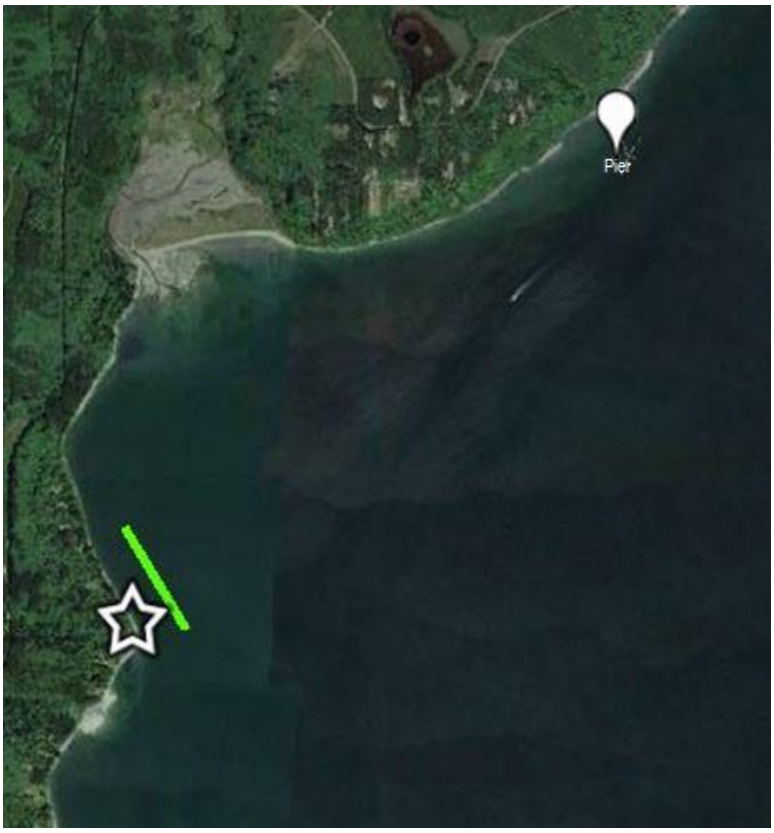
Viewpoint 11: Canal View Way area 100mm



Viewpoint 12: Vinland area 50mm

Viewpoint 12: Vinland area 200mm

Visual assessment area H: Thorndyke Bay



Viewpoint 13: from Thorndyke Bay's southern shore (off Franks Lane) looking northeast toward the proposed pier location.

Viewers are primarily residential and vacation property owners and recreational users of the shorelines and waters of Thorndyke Bay.

The northern shore of Thorndyke Bay has no exposure to proposed project features due to the presence of the bluff forming the bay's northeastern edge.

North facing views from the southern shores of Thorndyke Bay are also obstructed or partially obstructed by the intervening bluff.

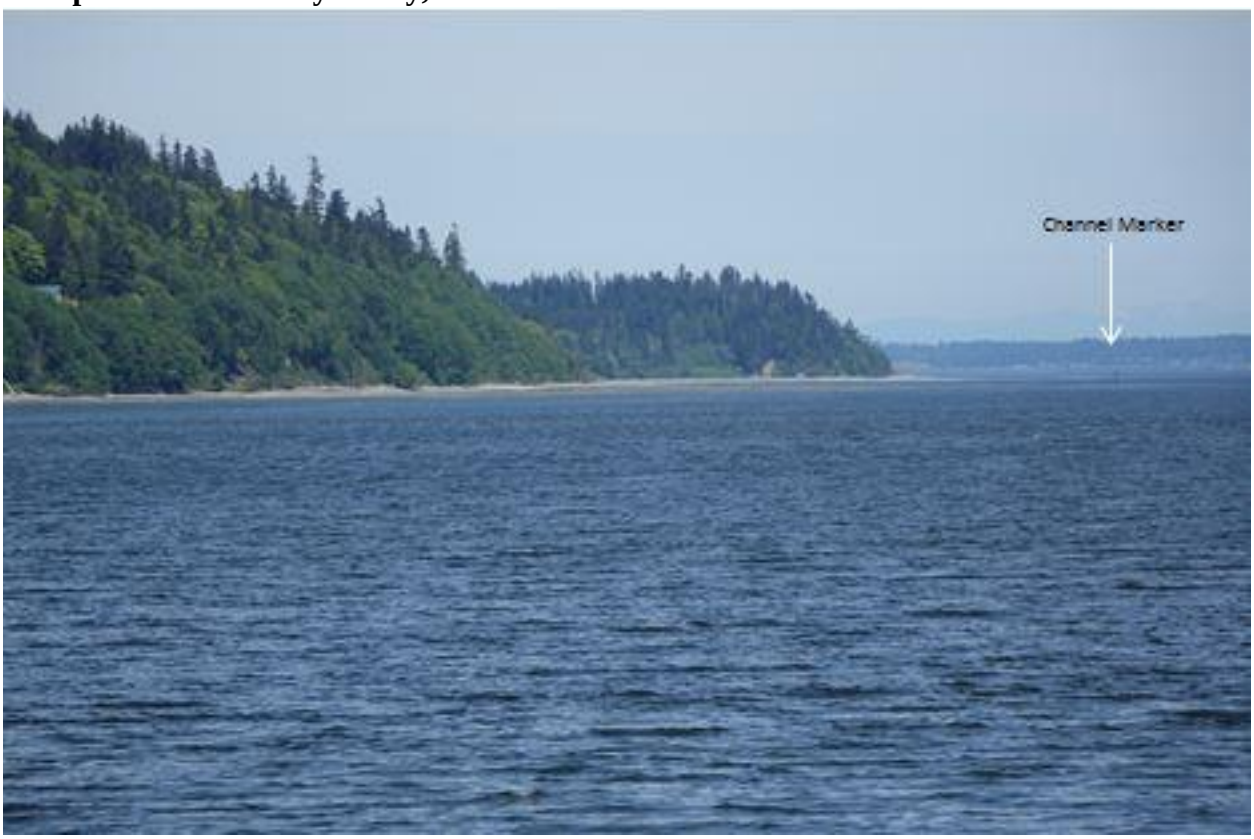
The tidal flat on which the proposed pier would be located becomes more in view as the viewer moves west to east along the southern shoreline of Thorndyke Bay.

This viewshed is dominated by the natural shoreline of this estuary area. Being a small, isolated bay creates more middle-ground views of the bay's shoreline, which is predominantly undeveloped. Views from this area are expected to be particularly variable with tides.

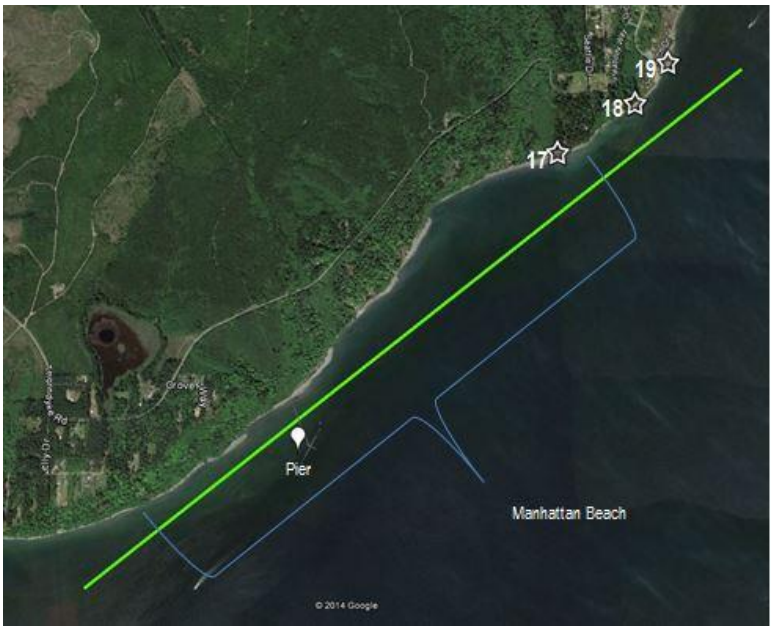
Wildlife, primarily seabirds and perhaps seals, are important visual components to both residential and recreational viewers. Recreational vessel traffic is light but somewhat regular, such that one or two vessels within the bay would not be an uncommon sight. People walking on the shoreline are likely to be occasionally seen.

Viewpoint 13: Thorndyke Bay, southern shore 50mm

Viewpoint 13: Thorndyke Bay, southern shore 200mm



Visual assessment area J: Manhattan Beach



Viewpoint 17: from South of South Point, just past Manhattan Beach Creek, looking southwest toward the proposed pier location

Viewpoint 18: from the southern side of South Point, looking southwest toward the pier

Viewpoint 19: Former Washington State Ferry dock, north of South Point, looking southwest toward the pier

Viewers from all three viewpoints are primarily residential and vacation property owners and recreational users of the shorelines and waters of Hood Canal.

This area, which includes the proposed pier location, has low levels of development and public use. Parcels are privately owned rural residential lots. The pier would be sited where an existing navigational channel marker is located.

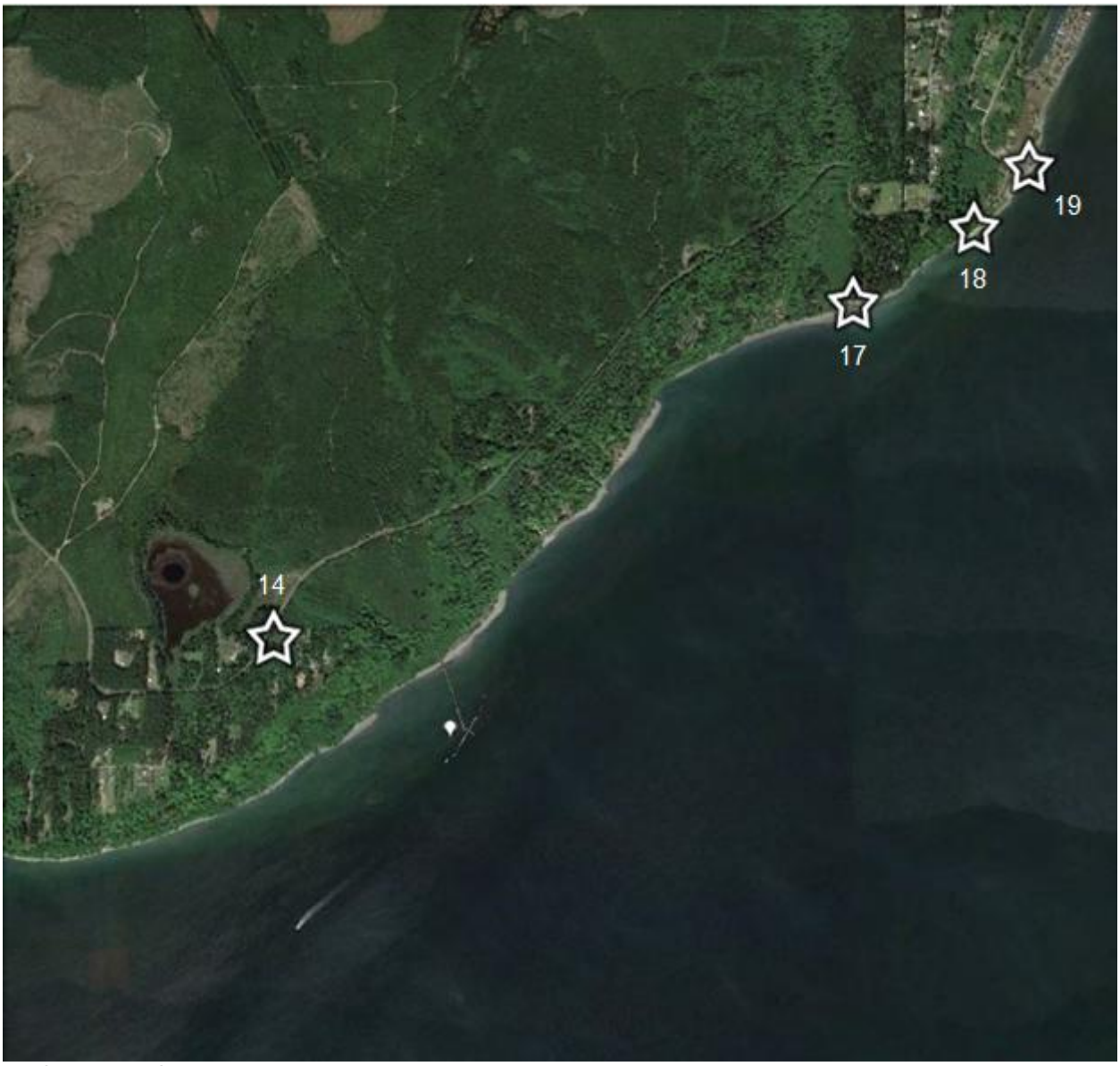
Forested bluffs and open beach, water, sky and the Kitsap shoreline are the major elements of the viewshed from this area. Views from residential parcels may be framed by trees and shrubs in the immediate foreground. Water and shorelines dominate views. Foreground is primarily forest and beach, with driftwood, tilting trees, large rocks and distinct intertidal zones adding texture along the shoreline. Tides produce daily complexity. Weather produces seasonal and daily complexity. At low tide, additional texture and patterns are provided by shallow tide pools, undulating sands, and bands of nearshore zones.

The Manhattan Beach area, south of the proposed pier location, has several homes and cabins; most of which sit atop the beach's shoreline bluff (some 120-feet above mean sea level). Views are oriented toward the south, looking toward Mount Rainier and Hood Canal. Both, intervening topography and vegetation shields the view north toward where the pier would be located, from these residences and vacation homes.

The Manhattan Beach area, north of the proposed pier location, has many parcels which are vacant (undeveloped). It's likely that future development is constrained due to the unstable slopes. Prior attempts to develop a permanent resident on the 18-acres, to the immediate northeast of the proposed pier location have been unsuccessful. This is likely due to the un-stability of the shoreline hillside. Currently, there are approximately 15 shoreline homes or cabins, and a few homes that reside above the shoreline bluff that is west of Manhattan Beach.

South Point is the tip of an outward curve into Hood Canal. It separates the shoreline viewsheds to the north and south. Just north of South Point is the community of Bridgehaven, a residential

cluster developed on a spit along the shoreline as well as along the upland bluff. Views from this area are water-oriented. A steep bluff behind the community shields westerly views.
Views looking north see portions of Squamish Harbor, Termination Point and the Hood Canal Bridge. Most views of the shoreline looking south cannot see south past South Point, where the shoreline bends inward. A small inward curve is present along the shoreline between South Point and the proposed pier location. Background (distant) field of view is expected to vary with vegetation and topography, but due to the high bank, it is generally less than 180 degrees. The pier site is on a narrow outward curve and broad tide flat.



Manhattan Beach

Viewpoint 17: South of South Point 50mm

Viewpoint 17: South of South Point 200mm

Viewpoint 18: Southern side of South Point 50mm

Viewpoint 18: Southern side of South Point 200mm

Viewpoint 19: Former Washington State Ferry dock 50mm

Viewpoint 19: Former Washington State Ferry dock 200mm

4.0 VISUAL IMPACTS

4.1 Mining

Mining would be conducted in the interior of the privately-owned, 20,901-acre Hood Canal Tree Farm. Mining would occur within the Meridian Extraction Area into the foreseeable future. Specific mining plans have not yet been developed and project-specific impacts, including those to visual resources, would be identified as part of project-specific mining permit applications.

However, as stated under 3.0 Existing Views, a ridge located west and south of the former shine pit completely screens views from residential areas located in Squamish Harbor. In addition, based on the FEIS prepared for the Wahl-Meridian Mineral Resource Lands in 2002:

> …Mining would be located in sparsely populated areas where there are fewer people likely to be affected by forestry or mineral resource extraction and would be compatible with the proposed designations and uses. (pg. 3-35)

Lighting is restricted in the Meridian Extraction Area by Ordinance 08-0706-04:

> Outdoor lighting shall meet the specifications of the U.S. National Park Service Interim Design Guidelines for Outdoor Lighting. Building lighting shall be located high on the structures and include forward throw optics to direct lighting away from the sides of the buildings and onto the ground. Lighting required for mineral extraction, processing, and transportation activities shall be independently mounted (not directly attached to equipment) to allow for a more downward throw of light to further limit the potential for direct light to reach offsite areas.

While mining is outside of local public viewsheds, areas of active mining and recently reclaimed areas would be visible from Mt. Walker viewpoints. Such visible changes induced by mining are not likely to be particularly noticeable, since they would occur amid a distant background where contrasting clearcuts and forestry roads create patterns similar to those created by extraction and reclamation. The vividness of views – including those of Quilcene Bay, the Olympic Mountains, Mt. Baker, Seattle, and Mount Rainer – would be retained.

Due to the remote setting of mining, intervening topography and lighting restrictions already in place, mining would result in little visual change outside of the commercial tree farm and would not be visible from residential areas.

4.2 Operations Hub

Visual Attributes

The Operations Hub would be located on approximately 100 acres of land previously disturbed by the former Shine Pit. The application does not include detailed design-level plans of the proposed Operation Hub. However, the potential visual components would be similar to the former Shine Pit, including rock crushers, portable conveyors, stackers, maintenance buildings and stockpiles. No "smoke stacks" or towers would be installed. Stockpiles and associated conveyors are expected to be the tallest feature at the Operations Hub. Lighting would be similar to that occurred at the former Shine Pit, with night-time lighting emitted from offices, vehicles and active work areas, including stockpiles.

Lighting would be minimized as required by Jefferson County Ordinance 08-0706-04 for the Operation Hub, which includes adherence to the Interim Outdoor Lighting Guidelines used by the National Park Service (NPS 2007).

Visual Changes

Visual assessment areas A through D

Viewers in the vicinity of Squamish Harbor would be able to see the eastern portions of the Operations Hub. Based on height, stackers and stockpiles would be the most visible elements. As with the former Shine Pit, the lighter colors of exposed land, stockpiles and built features (e.g. conveyors) at the Operations Hub would visually contrast with the darker forested foothills, but the presence of such contrasting areas would be consistent with Jefferson County's Comprehensive Plan designation as resource areas for mineral and long term commercial forestry. Mineral Resource Lands and Forest Resource Lands are expected to have contrasting visual elements, including open mining areas, recent clear-cuts and forestry service roads.

Lighting would be restricted by the requirements of Jefferson County UDC, which defines standards for lighting that will apply to any reconfiguration of the Operations Hub. And the further restricted by Ordinance 08-0706-04 which requires:

> Outdoor lighting shall meet the specifications of the U.S. National Park Service Interim Design Guidelines for Outdoor Lighting. Building lighting shall be located high on the structures and include forward throw optics to direct lighting away from the sides of the buildings and onto the ground. Lighting required for mineral extraction, processing, and transportation activities shall be independently mounted (not directly attached to equipment) to allow for a more downward throw of light to further limit the potential for direct light to reach offsite areas.

Due to the low elevation of residential areas of Squamish Harbor (Area B), much of the Operations Hub would not be visible, including the entire western side of the area identified in the application. Water views from the shoreline houses along Squamish Harbor (Area B) would remain unchanged, as these views are primarily oriented south and toward the water, rather than west and toward the proposed Operations Hub. The vividness and unity of views of the Olympic Mountains would be reduced. However, being an approved mineral processing area and

commercial forest lands, these types of visual features, including stockpiles and clear-cuts, are visual features consistent with designated mineral resource and forest lands.

Visual assessment areas C and D (Shine Road) are located higher up the hillside and, therefore, viewers in this area would be able to see further into the western portion of the Operations Hub. As with shoreline properties, the primary water-oriented views would remain visually intact, but unity and intactness of Olympic Mountains views from the western side of the viewshed could be reduced by the visual contrasts created by processing activities (e.g., stockpiles and stackers). These visible features would be visually "below" the mountains and would therefore not obstruct or be silhouetted against views of the mountains. While a detraction for the overall unity and intactness of the view, the visual features would be consistent within the context of lands designated for mineral processing.

Westbound travelers in from the eastern, highest elevated portion of Shine Road (Area D) would face directly toward the Operations Hub, approximately 2.8 miles distant. Stockpiles and stackers would likely be features which would be visible.

Views from South Point Road (Area A) are not expected to be substantively altered. Existing views are obscured by topography and forested vegetation while homes generally face away from the proposed Operations Hub and toward Squamish Harbor.

When the trees reach sufficient height, the applicant proposed 20-foot high earthen berm, located south and east of the Operation Hub, would further reduce views of the Operation Hub from Visual assessment areas A through D.

Visual assessment area E: Hood Canal Bridge

The view exposure for travelers on the Hood Canal Bridge is expected to be low. Drivers generally must focus their viewing on the roadway and straight ahead (FHWA 1989), while passengers can view straight ahead and both up and down Hood Canal. People in the front passenger seat are more likely to look north, since the driver is between them and southern views. Bywater Bay and Hood Head just north of the western end of the bridge provide a visual attraction for both drivers and passengers.

The Olympic Mountains are another important component of this view. Where the proposed Operation Hub, would be sited - the former shine pit – would be visible within the same line-of-sight and moderately detract from the unity and intactness of views toward the Olympics. However, as stated in the Affected Environment, views from the Hood Canal Bridge are expansive, including numerous components in the foreground of open water, shorelines and distant horizons up and down the Hood Canal. Therefore, the proposed Operations Hub would represent a small portion of the overall viewshed.

Visual assessment area F: Kitsap County Salisbury Point Community Park

Stockpiles and other new features of the Operations Hub would be visible from Salisbury Point Community Park (Area F). However, due to the prominence of the Hood Canal Bridge and water and shoreline from this area, the distant changes would not be prominent and would not detract from the overall vividness, unity and intactness of views from this park.

Overall Visual Impact of the Operations Hub

As was the case with the former Shine Pit, the Operations Hub would be visible from several areas, including: portions of Shine and its overlooking hillside; shoreline and bluff homes located across the Hood Canal in Kitsap County; the Hood Canal Bridge; and, from Salisbury Point Park (located north of Hood Canal on the Kitsap County side).

Given the mile-plus distances to neighboring residences and the generally higher elevation of the Operations Hub, the processing area would not directly obstruct views and would make up only a small portion of existing views, with relatively low overall prominence. In most cases, nearby homes are below, oriented toward water views and face the Hood Canal away from the Operations Hub. Few homes at Shine and its overlooking hillside face the area of the Operations Hub.

In addition, the visual characteristics of the Operations Hub would be consistent with Jeffferson County Growth Management Act Comprehensive Plan designation as Mineral and Forest Resource Lands.

4.3 Central Conveyor

Visual Attributes

The four-mile long Central Conveyor includes the Twin Conveyors and the Single Conveyor, each having different Visual Attributes. Visual components of the Twin Conveyors located at the northern (outbound) section of the Central Conveyor include two five-foot wide conveyors, four feet apart. Each of the conveyors would have a "half-moon" metal cover. Adjacent to the conveyor would be an approximately 12-foot wide forestry service road. The Twin Conveyors and road have linear form and associated contrast lines against predominantly non-linear backgrounds.

Visual components of the Single Conveyor, located at the southern 0.7-mile end of the alignment, include a bridge (12-foot high by 13-foot wide metal enclosure) spanning 40-50 feet over Thorndyke Road. Materials and colors have not yet been specified.

Visual Changes

Approximately 90 percent of the Central Conveyor would be located on a private tree farm would not be visible to abutting rural residential properties. The conveyor would be visible to outside the tree farm properties in the two areas just mentioned, as it:

- leaves the Operations Hub and ramps up to the forested ridge; and,
- approaches the pier and crosses on a bridge across Thorndyke Road.

Visual assessment area A through E

Climbing the hillside leaving the Operations Hub, the Central Conveyor and associated forestry service road would be visible from residential properties along Squamish Harbor. Areas within potential line-of-sight of this section include some Squamish Harbor and Shine residences (Areas B - D) and the Hood Canal Bridge (Area E). The conveyor would not be visible from the closest properties on South Point Road (Area A).

The overall visual prominence of the Central Conveyor to Squamish Harbor residences would be low, because it would only be visible at one location: its origin at the Operations Hub. In addition, this sole visible area would be located one to three miles away, would make up a very small proportion of the field of view, and would be located within the background of commercial forest lands, where similar visual contrasts created by roads and clear cuts are commonplace.

As the Central Conveyor approaches the shoreline area of the proposed pier, its approximately 30-feet wide swath would be visible from high-bank vantages on the Kitsap side to the east. Due to the approximate 3 mile distance, the overall visual prominence of this change would be low.

Visual assessment area I: Thorndyke Road

On Thorndyke Road, the bridge crossing of the Central Conveyor would be prominent to both south and northbound drivers. The northbound view would still include a glimpse of Hood Canal framed by trees (such glimpses are part of the overall visual charm of Thorndyke Road and others on the Coyle Peninsula). Overall this impact is considered low because it would not obstruct any scenic views and because the road is primarily a local access road and is not a

scenic byway or otherwise highly sensitive to visual change. Views of Hood Canal that are visible to northbound travelers would not be obstructed.

Overall Visual Impact of the Central Conveyor

The most notable visual impact of the Central Conveyor would be the crossing of Thorndyke Road. However, it would not obstruct scenic views of Hood Canal or elsewhere and would affect primarily local travelers.

4.4 Pier

This section evaluates the visual impact of the pier structure itself, absent of any vessels, as well as the portion of the Central Conveyor that traverses down the shoreline bluff on its way to the shoreline and pier.

Visual Attributes

Shoreline elements of the proposed project would include the following visual components:

- an approximate 250 linear foot by 75-foot wide cut and drain section (for bank stabilization) with the 6-foot wide conveyor and 5-foot walkway;
- the 225-foot section that would span the bluff and shoreline wetland;
- the low profile transit section that would cross the tidal flat;
- the 135-foot (linear distance) ramp (12 feet high, 13 feet wide), where the conveyor would reach loading height (for ships), with top elevation sloping from 32 feet above Mean Low Low Water (MLLW) to 91 feet MLLW (25 feet mean sea level (MSL) to 85 feet MSL);
- six sets of support piles spaced 100 feet apart and two open steel support structures located approximately 650 and 950 feet from the beginning of the pier;
- the control room and access stairway;
- eight 20x20-foot breasting and mooring dolphins, two with 10 by 10 foot storage/maintenance enclosures, connected by a grated five-foot-wide catwalk.

The overall dimensions of the proposed pier are approximately 990 feet long from the shoreline and 13 to 18-feet wide, including the enclosed conveyor and a walkway. The highest point of the pier would be approximately 85 feet MSL (91 feet MLLW). At the end of the pier, the eight breasting and mooring dolphins would be placed apart, along a line perpendicular to the pier final section. The dolphins would be connected with 5-foot wide, grated catwalks. There are no other onshore buildings, storage areas, warehouses or other related shoreline developments or industrial infrastructure other than a 10-stall gravel parking lot for employee access to the pier. The six breasting dolphins would include black breasting plates similar to what is used on Washington State Ferry docks. Support piles are expected to be gray or black

Comparable marine sand and gravel load-out facilities are operating throughout the world; including the Pacific Northwest and British Columbia (Georgia Basin). Currently, two facilities in BC are used to load both barges and ships. One (Sechelt BC), the second largest pit in Canada, is next to the town of Sechelt; the other (Port McNeill BC) is north of the town of Port McNeill, situated in a forested area. DuPont WA facility, the largest pit on US West Coast, and a facility in Shelton WA pit load barges.

All outdoor lighting on the pier structure would be of the type (e.g. color and intensity) and design (e.g. directed downward and away from surrounding residences) to minimize glare leaving the site.

Specific lighting requirements would be developed in consultation with the U.S. Coast Guard to provide navigational safety lighting.

Nighttime lighting would be minimal when not in use and limited to that required for navigation, safety and security.

Unlike the open designs of the Sechelt and Port McNeil BC facilities the proposed pier would have much of its structure enclosed.

The sheet roofing and siding, according to the application, would be painted a color that best blends into the visual environment

Top photo: Port McNeill BC at night. Applicant compliance with Dark Sky Association guidelines would limit use of pier catwalk lights.

Mid photo: Port McNeill BC. The covered conveyor on the pier is similar to what is proposed. The pile supports and end of pier is not.

Bottom photo: example of a “dark sky” downward lighting used to illuminate loading of a barge; minimizing excess lighting.

Visual Changes

Visual assessment area E: Hood Canal Bridge

Views of the pier from travelers on the Hood Canal Bridge would be in the far distance (5+ miles) and likely obscured by the dark background of the southern shore of Thorndyke Bay. Overall, the impact on this background portion of the view would be low and, likely, not even noticeable to many viewers, as other views in the foreground of open water and the bridge itself, middle ground views of Thorndyke Bay, and background views of the Olympic Mountains, are the primary visual components of this view. Therefore, the proposed pier would have little to no effect on viewer experiences from the Hood Canal Bridge.

Visual assessment Area G: Kitsap County shoreline

On the eastern (Kitsap) shoreline of Hood Canal, the pier would be within lines of sight (visible) for many shoreline and bluff residences. For example, from the shoreline bluff at Kitsap Memorial Park (some 1.7 miles across Hood Canal), the pier would be viewed at approximately 261.5 to 264.5 degrees, with a three-degree sweep. Overall visual change would be reduced by the oblique angle (not directly in front) and distance of viewer orientation. In addition, the pier structure would be visible below the horizon created by the Jefferson County shoreline bluffs, rather than silhouetted against the skyline.

The pier would be visible from the bluff and shorelines of Kitsap Memorial State Park, where it could detract somewhat from views of Olympic Mountains in the distance. However, the pier would be approximately 1.7 miles distant and visually set against surrounding the background of the high bank shoreline, rather than silhouetted against the skyline. In addition, the applicant has committed to paint the pier to blend into the background, as possible.

The pier could detract somewhat from views of the Olympic Mountains, but the distance across the Hood Canal reduces the overall visual footprint to approximately three degrees, or six percent of the field of view. The pier would be visible but would not dominate views from the park. Mount Constance and Warrior peak, at approximately 22 miles distance, bearing 262 degrees, are roughly within the sightline to the pier and would take dominance of view.

The pier would be more noticeable at night due to required navigational and safety lighting, though the applicant has committed to limit lighting to the minimum required and, absent any vessels, the lighting would not substantially alter nighttime views from across Hood Canal.

The proposed cut and drain system for the conveyor's passage through the landslide deposit area, above the pier, would be visible from eastern (Kitsap) shoreline however, the distance (1.5-miles plus), irregular (non-linear) shape of the cut, colors similar to exposed bluffs and shorelines, and vegetation plantings would reduce visual contrast and associated reduction in unity and intactness of views.

Visual assessment area H: Thorndyke Bay

From the southshore of Thorndyke Bay, a portion of the pier would be visible, with greater visibility to homes located more toward the east, where residences are oriented toward the proposed pier location. The end of pier would be visible, though portions nearer the shoreline would be obstructed by the bluff located at the northeastern edge of Thorndyke Bay. Due to intervening topography, the pier would not be visible from undeveloped portion of Thorndyke Bay, which would retain its natural character.

Visual assessment area J: Manhattan Beach

On the Jefferson County shoreline, South Point would block the view of the pier from residences in Bridgehaven and north including all but the eastern most edge of Suquamish Harbor (some 5-miles away). The pier would begin to be visible from Manhattan Beach (the beach south of South Point). To a viewer walking south of South Point and turning the corner into line-of-sight with the pier, at a 1.3-mile distance the pier would take up approximately 8.2 degrees of the field of view (or roughly five percent of the approximate 165-degree field of view from this area).

The pier structure would be on the peripheral southern view of the approximately 15 shoreline residences on Manhattan Beach north of the proposed pier, due to the eastern view orientation of those homes. Five of those residences (three located near the shoreline and two located on the bluff) would have relatively high exposure looking down toward the pier site and structure. To those located on the shoreline bluff near Manhattan Beach Creek (some 1.2 miles north), the pier would take up approximately 6.5 degrees of the field of view (or five percent of the approximate 145-degree maximum field of view from this area (bearing 235 to 95)). The pier would be on the right edge of their field of view (bearing 208 to 215.5).

With an approximate 120-foot drop to the shoreline from the shoreline bluff residences, the background of the pier would be water during high tide and predominately sand during low tide (with the water's edge near the dolphin structures). The two residences on the bluff line-of-sight going south would be approximately 4.5 miles (bearing 207 degrees, or roughly south by southwest). The pier's dolphins would be oriented close to parallel to line-of-sight from this viewpoint, but the oblique angle would allow a semi-compressed perspective of the dolphin structures and catwalk. The Conveyor portion of the pier would be oriented at approximately 105 degrees to the line-of-sight, or slightly greater than perpendicular (90 degrees), which would also compress the visual exposure somewhat.

The pier structure would not be visible from the closest residences to the southwest. Residences on these parcels are located on the high bank, physically skewed to the south and southeast and do not have views of the shoreline areas where the pier would be located. Further south, residences would have a very limited view of the deep-water portion of the pier.

The proposed cut and drain system for the conveyor's passage through the landslide deposit area would also reduce the overall visual impact. It would be set back against the hillside and not visible from the immediate shoreline (Manhattan Beach).

Overall Visual Impact of the Pier

The pier would convert the existing natural setting within Manhattan Beach to a built maritime setting. The pier structure would add a noticeable overwater structure approximately midway between existing large overwater structures at NBK Bangor (approximately 2.5 to the base; five miles south to Delta Pier) and the Hood Canal Bridge (five miles to the north). Although not as dominant as the structures at NBK Bangor or the Hood Canal Bridge, the pier structure would become a visual landmark in the area.

Jefferson and Kitsap County shoreline residences would retain views of open water, Hood Canal shorelines and, from particular elevations, the Cascade and Olympic mountains. During night, pier would convert a currently dark area to higher density lighting, though the amount would be minimized as part of the Standards of Care (SOC) that would be part of a Harbor Plan that the applicant would be required to prepare as part of their federal permitting review (note that lighting during loading is addressed in the next section).

The pier would be visually prominent from vessels on the waters of Hood Canal with a visual reach of several miles. Kayakers, which tend to stay close to the shoreline and travel at slow speeds, would be exposed to the pier the greatest in terms of distance and duration.

4.5 Tugs, barges and ships on Hood Canal (Marine Transportation)

Visual Attributes

Tugs, barges and ships that would call on the pier would be a notable visual change on Hood Canal.

The pier is designed to moor up to two barges at a time. With up to six barges being loaded per day, barges would likely be present at the pier the majority of its operational time. Initially, only barges will call at the pier. Subject to market demand, up to six barges may be loaded per day at various times during the day or night (24 hours), seven days a week, up to 300 days annually. It is anticipated that at least one barge would be loaded 228 - 258 days out of the overall 300 days the pier would be utilized.

5000-tons (dwt) barge and tug, going under the eastern fixed-span of the Hood Canal Bridge (2002)

Various sizes of barges would be used, the largest of which would be 100-feet wide by 400-feet long, drafting 25-feet, and capable of hauling 20,000-tons (dwt). Due to the constraints of the existing Puget Sound receiving facilities, it is anticipated that most of the barges would be 60-feet wide by 240-feet long, drafting 25-feet and capable of hauling 5000-tons (dwt). Depending on the capacity of the barge, the applicant estimates that it would take one to eight hours to berth, load and depart; the most typical barge would take approximately 2 hours.

The applicant anticipates it may begin using U.S-flagged, Panamax class, bulk carrier ships (65,000 dwt) when they come available, 8 to 12 years after construction of the pier. When U.S.-flagged bulk carrier ships become available, it is estimated that ships would be loaded at the pier 42 - 72 days out of the overall 300 days the pier would be utilized. Up to six ships may call at the pier per month; most ship operations at the pier (berthing, loading and departure) would take 24 hours to complete.

No barges would be loaded or berthed at the pier during days when ships were being loaded. While in Hood Canal, neither the tug and barges or ships would “hold off” or anchor but would travel directly to the pier.

At 745-feet in length and 110-feet wide, ships would have the greatest visual prominence of all project components. The ships would be "Panamax" bulk carriers, the type regularly seen being loaded at the Port of Seattle's grain terminal. Those ships hulls are typically painted dark red and/or black, with a white, rear house "superstructure" that juts above the deck, housing the bridge, crew quarters and stack. Ships would travel directly to the pier and would not anchor (hotel) anywhere within Hood Canal.

CSL Tacoma on her maiden voyage, hauling sand and gravel to Redwood City, California, Nov 6, 2013. The background view is the Golden Gate Bridge. This Canadian Shipping Line Panamax bulk carrier is similar in size and use as what would be be expected to call on the pier.
Source: https://csl.com

The visual character of inbound versus outbound ships would be substantially different. Empty inbound ships, would ride noticeably higher in the water and would show approximately 20 feet of red portion of the hull. Loaded outbound ships would be up to 30 percent lower in the water, with the red portion of the hull mostly underwater.

Bulk carrier ship lighting is dominated by a series of floodlights on the rear house that shine and illuminate the 700-foot deck. Deck light color can be either a yellowish (sodium) or bluish green. Other lighting includes navigational (red, green), deck edge (variable, but typically a string of lights along the rail line), mast lighting at the bow of the ship and stern lighting.


Panamax bulk carrier being loaded at Port McNeill, BC facility.

For barge loading at night, fixed-lighting would be directed downward from the load-out gantry of the pier toward the deck of the barge.

Tug lights, includes navigational and rail lights. Deck lighting would be used only during berthing operations. Cabin lighting is not very bright and a minor visual component. Barge lighting is also minor visual component; limited to navigational lighting.

According to the application, tug and ship operations would use the minimal lighting necessary for safe loading and other operations. Lighting along the pier during loading has not been specified but could include walkway lighting spaced at intervals along the nearly 1,000 foot length. It would be expected that operational lighting on the pier would include downward shields, cut-off sensors during no-use and no-glare lighting, due to following lighting standards and guidelines currently employed by the National Park Service (2007). Specific lighting requirements would be developed in consultation with the U.S. Coast Guard and U.S. Army Corp of Engineers.

The illustration on the next page illuminates the existing glare conditions in the upper Hood Canal surrounding where the pier and the vessels that would call on it would opererate.


Upper Hood Canal - glare from light at night
Google Earth 2012 NASA City Lights
Pt. Ludlow
Pt. Gamble
Pier site
Edgewater
Poulsbo
NKB Bangor

Visual Changes

Visual assessment area E: Hood Canal Bridge.

Loading would create a new source of lights that would be visible to travelers during night from the Hood Canal Bridge. The overall impact would be considered minor due to the distance and orientation of the travelers' view.

Visual assessment area H: Manhattan Beach.

North of the pier, residents and weekend/vacation home visitors in this area would have the closest and most direct view of loading and, at night, associated lighting from tugs, ships and the pier. As described earlier, most dwellings on this shoreline are oriented toward the water and away from the pier, though high bank residences just around (south of) the bend of South Point are oriented more toward the pier and lights, but not directly. Ships would be viewed from above and at an acute angle (i.e. more head on than broadside).

South, of the pier, residents and weekend/vacation home visitors would have a close but indirect view of loading and, at night, associated lighting from tugs, ships and the pier. As described earlier, most dwellings on this shoreline views are oriented south, with the pier being north behind.

Loading would create point and wash lighting in an area currently void of lights, with the exception of the navigational marker at the proposed pier location and scattered homes lined along the southern reach of Thorndyke Bay to the south.

Arriving and departing vessels would transit relatively close to shore in front of properties in this area. A Panamax bulk carrier or a tug and barge traveling close to shore would be a new sight that would temporarily dominate views from the shoreline over several minutes.

Visual assessment area I: Thorndyke Bay

Nighttime views of approximately 10 residences along the southern shore of Thorndyke Bay would be altered during loading of ships and barges.

Visual assessment area K: Kitsap County shoreline

Tugs, barges and ships would be visible from eastern Hood Canal (Kitsap) shoreline residential properties and Kitsap Memorial State Park while at the pier. Currently, most of the Manhattan Beach shoreline parcels are undeveloped; the overall shoreline contains very little lighting seen from the Kitsap side. Thus, the project would introduce lighting to a currently dark area. Cabins and campsites at Kitsap Memorial State Park, which are located away from the shoreline, would not be impacted by lighting at the pier during loading. Views of residents at Lowfall and throughout the western shore of Kitsap County (Area K) would be most changed at night.

Overall Visual Impact of Marine Transportation

Tugs, barges and ships would be very noticeable as they travel in Hood Canal. The high profile and contrast of ships, particularly when inbound, would be more noticeable and have greater visual distraction than the 560-foot long by 42-foot black Ohio-Class submarines, which are currently the largest vessels that regularly transit Hood Canal.

Arriving and departing vessels would transit relatively close to the Manhattan Beach shoreline.

Ships traveling close to shore would be a new sight that would dominate views from the Jefferson County shoreline over several minutes, replacing open water, sky and the eastern (Kitsap) shoreline of Hood Canal as the major visual component.

CSL Tecumseh being berthed at Port McNeill BC. Launched in 2013 from Chengxi Shipyard in Jiangyin China, she is the second trillium class Panamax-size bulk self-unloaders commissioned by the Canadian Ship Lines to haul dry goods - such as sand and gravel.

Marine traffic can create visible plumes from stack emissions. During temperature inversions, emissions can be trapped at view level, resulting in lingering lines of plumes and eventually brownish haze. Such haze forms throughout Puget Sound in the presence of high pressure systems, which typically occur during late summer and mid-winter. Emissions are most visible during rapid acceleration and deceleration of engines. However, most of the time, prevailing winds and upward rise would disperse emissions to the point of not being visible. Overall impacts are expected to be temporary.

Residents and vacation home visitors on Manhattan Beach (area J) would have the closest and most direct view of loading and, at night, associated lighting from tugs, ships and the pier. As described earlier, most dwellings on this shoreline are oriented toward the water and away from the pier, though a few high bank residences just around (south of) the bend of South Point are oriented more toward the pier and its lights.

Lighting would also be visible from residences at the outside edge of the southern shore of Thorndyke Bay (area H) and the Kitsap County shoreline (area G). Since many of the shoreline parcels in the vicinity of the pier structure are undeveloped, and the overall Manhattan Beach shoreline contains very little lighting, the pier would introduce lighting to a currently dark area. The visibility of lighting, particularly floodlights on the ship's deck, would be increased by both the reflective nature of water as well as the unobstructed views water provides.

5.0 MITIGATION

In addition to complying with the rules and regulations outlined in 2.0 EXISTING REGULATIONS, to mitigate the light, glare and aesthetics impact that would be created by the proposed project, the applicant has agreed to:

- Plant patches of fast growing deciduous trees as well as conifers, on the 20-foot earthen berm at the Operations Hub to provide screening;

- Require that structures at Operations Hub and Central Conveyor be painted in low-reflective, natural-colored material to help blend in to the surrounding area;

- Submit a landscape plan along with the grading plan for the cut section at the top of the shoreline bluff to provide measures to reduce visual contrasts. The plan would detail landscaping and planting for both short-term and long-term visual mitigation;

- Develop and implement a lighting plan that minimizes light and glare visible to off-site properties for all components of the Proposed Project. The plan would follow National Park Service guidelines using fixtures and lighting schemes approved by the national Dark Sky Initiative and/or International Dark Sky Association (Dark 2014); and,

- Establish protocols (Standards of Care) to minimize the lighting necessary on the pier to load the barges and ships and onboard lighting on ships berthed at pier as part of their federal review by the U.S. Army Corp of Engineers and U.S. Coast Guard.

APPENDIX A - REFERENCES

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APPENDIX B - TERMINOLOGY

View and Visual Feature Qualities

Several specialized terms and concepts have been used in this assessment and are defined below:

Vividness is a measure of "memorableness" of a particular view. Highly vivid views are often destinations or waypoints for tourists, such as views of Mt. Rainier or Hurricane Ridge in Olympic National Park. Vivid views may also include roadside "vistas" such as found along U.S. Route 101. A moderately vivid view might be one that most people take note, point out to a fellow traveler, and might recall later. A non-vivid view is one that is unremarkable, with little or no outstanding features.

Unity and Intactness is a measure of the overall "harmony" of the visual landscape, or how various visual components fit together to create an aesthetically appealing landscape. Human development, such as industrial parks, cell towers or transmission lines, can clash with the overall setting, detracting from visual unity and intactness. Human development can also be an integral component of a unified and intact view. For example, in an agricultural setting, bridges, barns and silos may fit with the landscape.

Context and Setting relates to how the feature relates to the overall character of the area, including adjacent land uses. This includes special areas, such as areas formally protected for retention of views, such as National Scenic Highways or National Scenic Areas, and wilderness.

Distance zones are generally divided into foreground, middle ground and background. The BLM VIR system also includes a "seldom seen" distance zone. For this assessment, the foreground is considered areas within 100 yards of the viewer, the middle ground areas within two miles, and the background areas two miles or more. In some cases, these three zones are defined by the horizontal visual planes common in the area, with shoreline being the foreground, water being middle ground, and land (opposite shorelines) being background. Where present, the Olympic or Cascade mountains are considered distant background.

Viewer Qualities

Viewer type and sensitivity reflect different people with different activities and priorities that might affect their sensitivity to changes in the visual landscape. For example, a commercial truck driver would be expected to be less sensitive to view changes than would a kayaker or beachcomber.

Viewer number (number of viewers) is a major factor in judging visual impacts. In general, the fewer people affected the lower the level of public interest and adverse impact; the more people affected, the greater public interest and adverse impact.

Viewer position and orientation, sometimes referred to as perspective, is the three-dimensional angle between a visual feature and the viewer. Lateral orientation refers to the compass bearing (or simply bearing), using 360 degrees of a compass. Vertical orientation refers to the vertical angle and is generally evaluated simply as views from above, below or on the horizon. Visual elements that are farther away or to the side, above or below the straight-ahead view tend to have lower visual intensity.

Horizon can refer to three types of horizontal visual components: the furthest distance visible, where land is met by sky; to the center of a 180-degree vertical arch (or simply eye level); or distinct horizontal layers, like the horizon line created by water and opposite shorelines along Canal.

Visual Impact Assessment Terms

Exposure/Contrast describes the extent of the subject feature seen (relates to viewer position). Exposure considers vegetation, topography or structures that may screen or shield views to a visual element. Exposure is also a function of visual contrast, which includes the degree of differences in terms of color and texture of the subject feature and its surroundings. Features of higher contrast to the background are generally more visually exposed than low contrast features.

Prominence, closely related to exposure/contrast, is a factor of the visual subject's distance, size and contrast. BLM describes prominence as the degree to which the subject feature "attracts the attention of the viewer" and its relativity with other features. One measure of prominence is the proportion of field of view taken up by a subject.

Interference describes how a visual feature would obstruct or detract from a view. The greatest potential for impact is obstructions, where a structure blocks vivid or otherwise notable views. Detractions are generally lower level of impact where a structure interferes with views by detracting from the unity and intactness of a visual landscape.

Viewshed is the area visible from any particular point or area. Elements of a viewshed are sometimes described as being within the foreground, middle-ground, and background.

A **Visual Assessment Area**, for this assessment, is typically a line defining areas that would have similar visual exposure to project components.

A **Representative Viewpoint** is the view from a particular point that is representative of the visual assessment area. The FHWA methodology refers to representative viewpoints as "key viewpoints."

Field of View relates to the visible area from a Visual Assessment Area or Representative Viewpoint. Measured in degrees (e.g., 360 degrees being a full circle view, 180 degrees a half circle).

Bearing is the compass direction from one point to another, with 0 degrees being north, 90 degrees east, 180 degrees south, 270 degrees west.