Final Report September 2008

Skagway Port Development Plan

Municipality of Skagway

KPMG

CH2MHILL

speed and precision worldwide Sandwell

Final Report

Skagway Port Development Plan

Prepared for

Municipality of Skagway

September 2008

Prepared by

KPMG

CH2MHILL

speed and precision worldwide

Sandwell

Contents

Figures

Tables

Appendixes

Acronyms and Abbreviations

AADT	annual average daily traffic
ACRLS	Alaska Canada Rail Link Study
AMHS	Alaska Marine Highway System
AIDEA	Alaska Industrial Development and Export Authority
AML	Alaska Marine Lines
ARM	Alaska Railbelt Marine
ASDT	average summer daily traffic
BC	British Columbia
BST	bituminous surface treatment
CPA	Canada Port Authority
CN Rail	Canadian National Railway
dwt	deadweight tonnes
GVW	gross vehicle weight
kg	kilogram
km	kilometre
lb	pound
IRR	internal rate of return
LPG	liquid propane gas
MARAD	U.S. Maritime Administration
MHHW	mean higher high water
MLLW	mean lower low water
MOS	Municipality of Skagway
PSC	Skagway Port Development Steering Committee
RO/RO	roll on/roll off
tpa	tonnes per annum
tph	tonnes per hour
TOTE	Totem Ocean Trailer Express
USACE	U.S. Army Corps of Engineers
VPA	Virginia Ports Authority
WPYR	White Pass & Yukon Route Railroad

Port Steering Committee

Tom Cochran - Mayor Municipality of Skagway

Tim Bourcy - Skagway Community (Chairman)

Michael Brandt - White Pass & Yukon Route Railroad

John Wood - Alaska Miners Association

Paul Axelson - Southeast Stevedoring

James R. Hemsath P.E., PMP - Alaska Industrial Development and Export Authority

Yukon Economic Development

Clynton R. Nauman - Alexco Resources

Executive Summary

ES.1 Introduction

In response to the growing mining activity in the Yukon Territory, the Skagway Port Development Steering Committee (PSC) initiated a study to assess the potential for Skagway in the resurgence of the Yukon mining industry. The purpose of this study is to help the Municipality of Skagway (MOS) position the port to capture a significant share of the export raw materials from the Yukon. Specifically, the mission of the PSC is to "prepare an actionable business plan with a conceptual port arrangement the municipality may utilize to make sound port fiscal decisions, advancing the interests of the municipality and the region."

The economic livelihood of the MOS and Yukon Territory depends on a thriving and competitive inter-modal port facility designed to provide efficient, cost-effective transshipment of bulk mineral concentrates and general cargo. The MOS is uniquely positioned to provide the nearest tidewater port access for the Yukon Territory. Skagway offers a significant transportation cost advantage over other ports is southeast Alaska and British Columbia (BC). Although the port is currently dominated by the demands of the cruise ship industry, recent developments in the mining industry in the Yukon Territory are providing an opportunity for Skagway to assert itself once again as the "Yukon Port of Skagway."

ES.2 Existing Infrastructure

ES.2.1 Roads

The Yukon is generally well served with surfaced roads traversing the populated southwestern part of the Territory and providing access to Skagway. Highways are generally proximate to the major mining regions, though local resource access roads may need to be upgraded or built for some of the potential mine development to proceed.

Existing highways are generally well constructed, lightly traveled and have sufficient capacity for further freight movements. The South Klondike Highway between Whitehorse and Skagway currently carries and average of 200 to 400 vehicles per day (400 to 600 per day in the summer months). The Yukon and British Columbia allow overweight trucks to operate on the South Klondike Highway under the auspices of the Yukon's Bulk Commodity Haul Regulations. Under their regulations trucks over 63.5 tonnes (140,000 lbs.) and up to 77.1 tonnes (170,000 lbs.) are allowed to move over the highway subject to paying a fee of $0.01 per tonne-kilometre for all weight over the legal maximum GVW of 63.5 tonnes.

ES.2.2 Rail

One existing rail line currently operates in the Yukon. The White Pass and Yukon Route (WPYR) operates a narrow gauge railway from Skagway to Carcross. This line currently only offers passenger service, which is tightly linked with the cruise ship calls in Skagway. While the rail line used to offer freight service between Whitehorse and Skagway, that service was abandoned due to the closure of the Faro Mine. Under the right circumstances, WPYR could upgrade and re-open the track between Carcross and Whitehorse and reinstitute freight service.

ES.2.3 Ports

Skagway, and to a certain extent Haines, are the logical ports of choice for the movement of freight by water to and from the Yukon as evidenced in Figure ES-1.

FIGURE ES-1
Port Hinterlands

Skagway is well served by highway and has a distinct distance advantage compared to other ports. Skagway is significantly closer to potential mines than its principal competitor for this type of traffic, the Port of Stewart. The Port of Skagway has a number of marine terminals for freight and passenger as shown in Figure ES-2 and as follows:

- Ore Dock – Bulk vessels for concentrates, ro-ro barges, fuel barges and cruise ships
- Broadway Dock – Cruise ships
- AMHS Ferry Dock – AMHS ferries and other vessels
- Railway Dock – Cruise ships

FIGURE ES-2
Port of Skagway

ES.3 Potential Port Traffic

The Port of Skagway has three potential significant sources of freight traffic as follows:

- Mineral concentrates (outbound)
- Major projects (inbound)
- Re-supply (inbound)

ES.3.1 Mineral Concentrate Traffic

The complex and varied geological terrain underlying the Yukon is host to a number of past-producing mines of gold, copper, lead, zinc, tungsten, silver and cadmium[1]. Showings of various minerals, including coal, barite, iron ore, molybdenum, nickel and platinum group elements, attest to the untapped mineral richness of the territory. Some of the world's largest known, undeveloped lead-zinc, tungsten and sulphide deposits can be found in districts of the Yukon. Recent developments and refinements to mineral deposit models have created a new perspective for mineral deposit exploration in the Yukon.

Based on work conducted by Gartner Lee[2], aggregate future potential shipments from the mineral deposits with the highest development potential is estimated at a total of about 24.6 million tonnes (27.1 million tons). Table ES-1 presents an overview of all potential mineral deposits and the corresponding total and annual shipments. It is highly unlikely that all of these mines would be producing simultaneously, so potential mineral concentrate traffic could be much different than indicated in Table ES-1.

[1] Yukon Government, *Discover Yukon's Mineral Wealth*, August 2007.

[2] Gartner Lee, Table 2C, 2E, BC & *Yukon Mineral Resource Shippable Commodity Summary* and Yukon Energy Mines and Resources, and *Yukon Mineral Deposits 2007*, Yukon Energy Mines and Resources, August 2007.

TABLE ES-1
Summary of Shippable Volumes of Minerals

Property Name	Likely Shippable Commodity (tonnes)		
	Project Life	Total Shippable Commodity	Annual Shipment
Selwyn	21	14,009,249	467,000
Grizzly (Dy)	11.5	2,330,889	78,000
Swim	9	491,000	53,000
Tom & Jason	14	3,289,635	235,000
Wolverine	12	1,400,000	47,000
Kudz Ze Kayah	9	1,492,650	50,000
Fyre (Kona)	4	711,600	24,000
Minto	12	322,800	11,000
Logtung	30	293,700	10,000
Red Mountain	17	102,098	3,000
Mactung	30	140,986	5,000
TOTAL	**-**	**24,584,607**	

ES.3.2 Major Project Traffic

Freight traffic associated with large resource and infrastructure projects in the Yukon will be largely inbound. The following projects could generate significant inbound freight volumes:

- Alaska Highway Natural Gas Pipeline
- Mackenzie Gas Pipeline
- Mine development projects
- Alaska Canada Rail Link

These projects will cause a large amount of construction materials (machinery and equipment, fuel, tractor services, timber, iron, pipes, steel and camp buildings, consumables, parts and supplies) to be transported into and throughout the Yukon. This traffic is typically of a short term nature and may not be sufficient to justify large capital expenditures on dedicated/shared-use facilities unless project proponents are willing to underwrite a significant portion of the cost.

ES.3.3 Re-supply Traffic

In terms of re-supply traffic, the Yukon is principally served by truck from Alberta along the Alaska Highway and by barge/truck through the Port of Skagway. According to research undertaken during the Alaska Canada Rail Link Study, the Port of Skagway accounted for an annual average of 29,000 tonnes of re-supply traffic over the period 2000 to 2004, while

the Alaska Highway accounted for 47,000 tonnes on an annual basis over the same period. This traffic is expected to grow in line with population growth.

ES.4 The Skagway Advantage

The Port of Skagway has a number of advantages over alternative routings of both inbound and outbound freight.

ES.4.1 Mineral Concentrates

Mining activity in the Yukon is focused in areas surrounding Carmacks, Ross River and Watson Lake. Any mineral concentrate traffic would have to move through these communities to get to a port. Accordingly, it is useful to determine the distance and associated transportation costs from each of these communities to the Port of Skagway and its principal competitor for this traffic, Stewart. Table ES-2 provides a summary of the distances and the associated trucking costs to these two ports. As indicated in Table ES-2, the Skagway Advantage is significant for mines located near Carmacks or Ross River and decrease for mines closer to Watson Lake.

TABLE ES-2
Quantifying the Skagway Advantage

Origin	Destination	Routing	One-Way Distance (km)	Cost Per Tonne[1]
Carmacks	Skagway	Hwy 2	350	$33.95
	Stewart	Hwy 2/1/37	1,218	$134.14
	The Skagway Advantage		**868 km**	**$100.19**
Ross River	Skagway	Hwy 4/6/1/8/2	435	$42.20
		Hwy 4/6/1/2	495	$48.02
		Hwy 4/2	579	$56.16
	Stewart	Hwy 4/1/37	1,017	$112.00
	The Skagway Advantage		**438 – 582 km**	**$55.84 to $69.80**
Watson Lake	Skagway	Hwy 1/8/2	513	$49.76
		Hwy 1/2	573	$55.58
	Stewart	Hwy 37	648	$71.37
	The Skagway Advantage		**75 – 135 km**	**$15.79 to $21.61**

[1]Based on a load of 56.7 tonnes per truck to Skagway and 45.4 tonnes per truck to Stewart.

ES.4.2 Re-supply Traffic

Much of the resupply traffic for the Yukon originates in Western Canada (Vancouver and Edmonton) and is moved by truck to Whitehorse. Additional product is sourced in a number of areas and moved by intermodal service on Alaska Marine Lines from Tacoma to Skagway and thence by truck to Whitehorse. Table ES-3 presents the findings of the

analyses of the relative costs of each option for serving the Yukon, including a potential new service similar to Canadian National Railway's (CN Rail's) AquaTrain.

TABLE ES-3
Summary of Re-supply Transportation Cost Analysis

Mode	Origin	Destination	Rate per Tonne
Truck (origin to destination)	Edmonton	Whitehorse	$225 to $332
	Vancouver	Whitehorse	$315 to $464
Rail Barge (rail from Edmonton to Prince Rupert, barge to Skagway and rail to Whitehorse)	Edmonton	Whitehorse	$116
Intermodal (barge from Vancouver to Skagway and truck to Whitehorse)	Vancouver	Whitehorse	$156

While it is clear that rail barge and intermodal services are cheaper than truck (depending on the actual source of the goods being moved), there remains a question "Why does so much re-supply traffic move via the Alaska Highway?" There are a number of reasons, as follows:

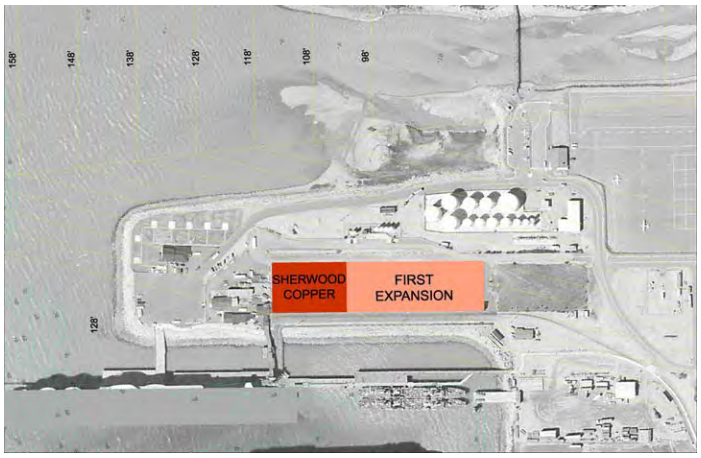
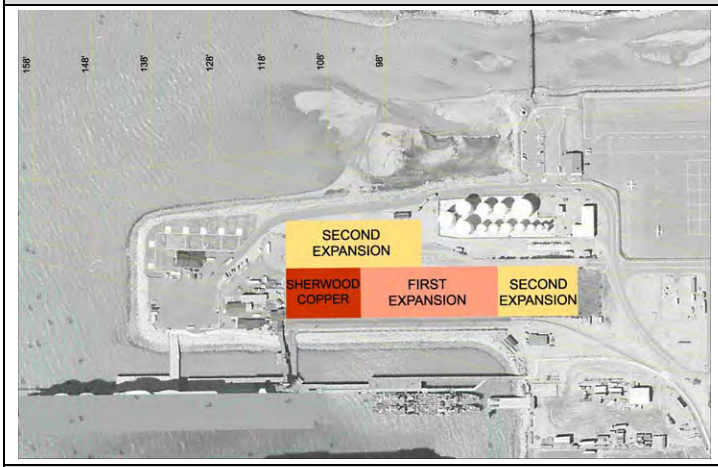
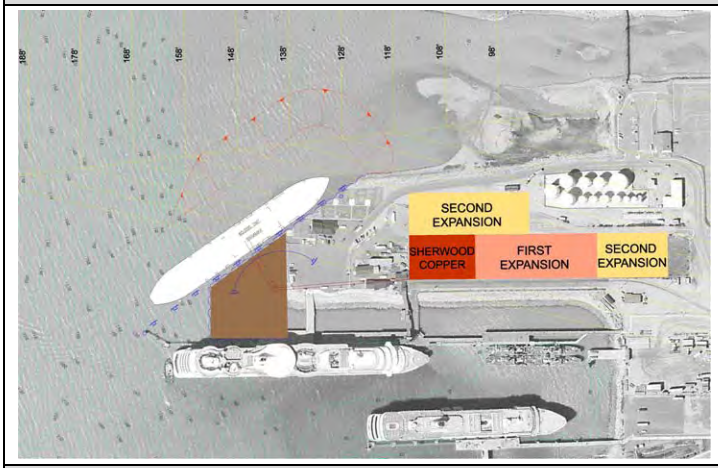
- There is no existing rail barge or intermodal barge service between Prince Rupert or Vancouver and Skagway.
- Some traffic is time-sensitive and may not be appropriate for additional handling and delays associated with a rail barge or intermodal service.
- The shipments could be part of a broader distribution network involving other delivery/pickup points along the route.
- There may not be sufficient containers available for an intermodal service.

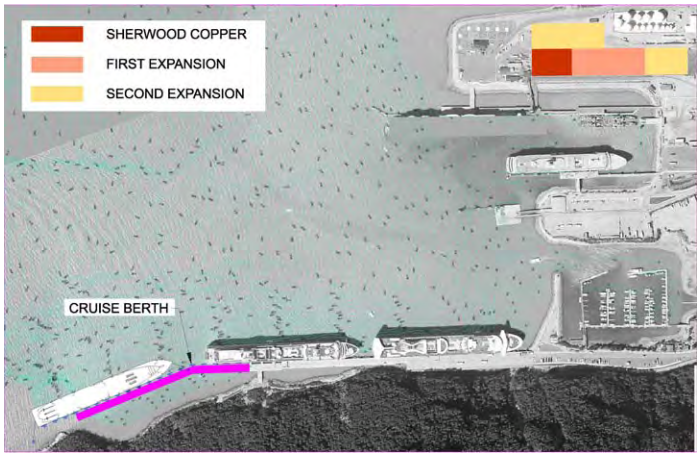
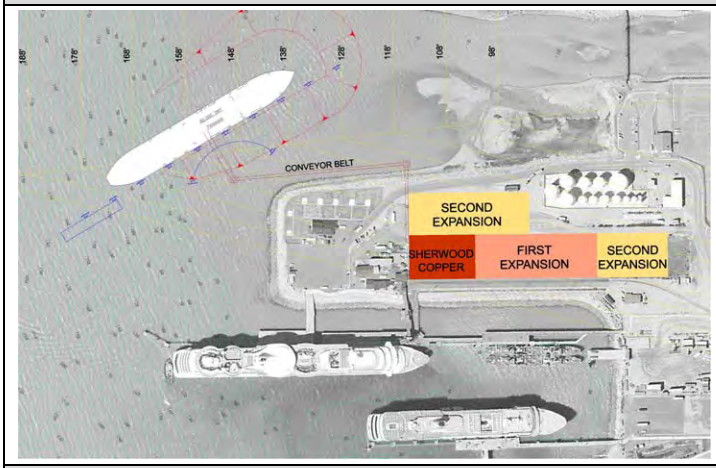
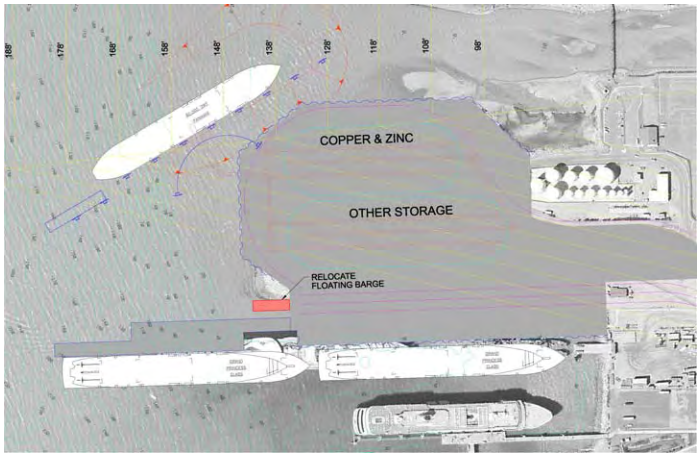
Notwithstanding the above, there may be an opportunity at some point for the Port of Skagway to persuade a carrier to institute a new barge service to Skagway to capture some of the existing re-supply traffic that uses the Alaska Highway.

ES.5 Port Redevelopment Options

A series of development options were developed to respond to potential demand (particularly for new mineral concentrate traffic). The six options are presented and briefly described in Table ES-4. It is intended that these options can be developed in a stepwise fashion.

TABLE ES-4
Redevelopment Options

Redevelopment Concept	Description
	**Option A** – Expansion of the ore storage shed to the full footprint of the previous storage shed. Capacity – 140,000 tonnes
	**Option B-1** – Expansion of the ore storage shed to about double the footprint of the previous storage shed. Capacity – 300,000 tonnes
	**Option B-2** – Expansion of the ore storage shed to about double the footprint of the previous storage shed plus construction of a new berth for ore ships at the south end of the Ore Dock. Capacity – 460,000 tonnes

Redevelopment Concept	Description
	**Option C** – Expansion of the ore storage shed to about double the footprint of the previous storage shed plus construction of a new cruise ship berth at the south end of the Railway Dock. Capacity – 300,000 tonnes
	**Option D-1** – Expansion of the ore storage shed to about double the footprint of the previous storage shed plus construction of a new berth for ore ships at the southwest end of the Ore Dock. Capacity – 460,000 tonnes
	**Option D-2** – Expansion of the Ore Dock to accommodate larger storage facilities, rail service, two cruise ship berths and an ore ship berth. Capacity – 1,000,000+ tonnes

Each of these options was examined from a number of perspectives to determine whether there were any major impediments to their development. This analysis is summarized in Table ES-5.

TABLE ES-5
Assessment of Redevelopment Options

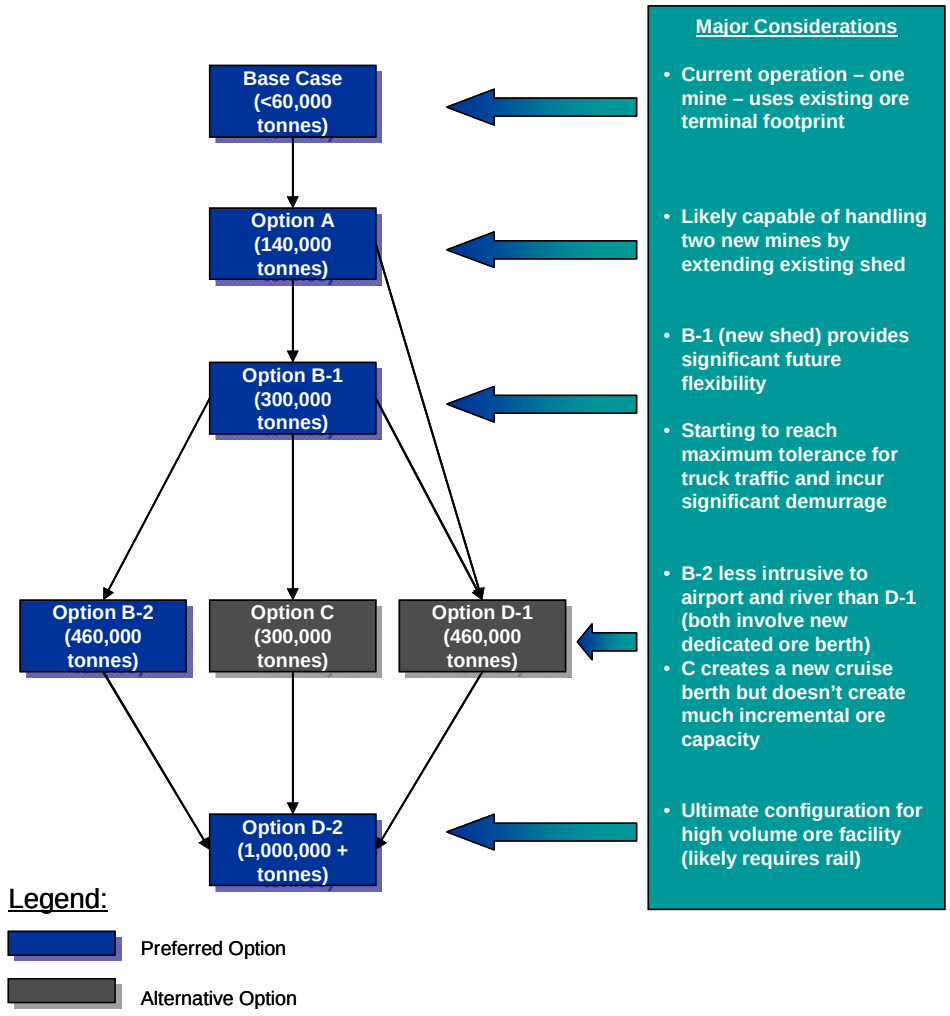
Option	Truck Traffic	Environment	Airport	TEMSCO	Vessel Interference /Demurrage	Port Capacity
A	Not an issue	Not an issue	Not an issue	Not an issue	Some potential interference already being encountered	Significant constraint
B-1	Not an issue	Not an issue	Not an issue	Not an issue	Probable interference with cruise vessels at Broadway Dock and Ore Dock	Potential constraint – little flexibility for future growth
B-2	May be at the maximum truck traffic level acceptable to residents	Potential impact due to dredging of the river estuary	Potential minimal impact	TEMSCO will need to be relocated	Not an issue	Significant capacity potential
C	Not an issue	Not an issue	Not an issue	Not an issue	Potential interference with Broadway dock	Potential constraint – little flexibility for future growth
D-1	May be at the maximum truck traffic level acceptable to residents	Potential major environmental impact due to dredging and impact on the riparian zone	Potential significant impact	TEMSCO will need to be relocated	Not an issue	Significant capacity potential
D-2	Truck traffic level is likely to be completely unacceptable	Potential major environmental impact due to dredging and impact on the riparian zone	Potential significant impact	TEMSCO will need to be relocated	Not an issue	Highest capacity option

Key

	No issue
	Minor issue
	Moderate issue
	Difficult issue

Based on the assessment of potential benefits and impacts of each of the redevelopment options, the preferred sequence of redevelopment would appear to be as depicted in Figure ES-3.

FIGURE ES-3
Summary of Assessment



ES.6 Financial Analysis of Options

A financial model was developed to examine the average level of throughput charges required to produce a rate of return potentially attractive to a private sector operator. The analysis is indicative only, and the results could vary significantly if any assumptions about capital costs, operating costs, mine output, long term traffic prospects and other matters are different than those contained in the model.

Table ES-6 provides a summary of the capital costs and required average rates for each of the options.

TABLE ES-6
Capital Cost Assumptions (USD 2008)

Option	Description	Required Rate per Tonne	Capital Cost ($ x million)
A	Extend existing shed to full footprint	$16.30	$15.0M
B-1	Option A plus construction of a new shed of a similar size to the existing shed	$21.10	$42.3M
B-2	Two sub-options exist: a. Option B-1 plus new ore ship berth and radial loader b. Option B-1 plus new ore ship berth and radial loader and a third shed	$44.20 $41.20	$108M $135M
C	B-1 plus construction of new cruise ship berth at Railway Dock	$36.20	$85M
D-1	Two sub-options exist: a. New ore ship berth west of existing facility with new shed and expansion of existing shed b. New ore ship berth west of existing facility with new shed and expansion of existing shed and a third shed	$42.50 $39.30	$103M $130M
D-2	D-1a plus new cruise berth at Ore Dock and larger storage facilities with potential rail access	$29.30	$151M

As indicated in Table ES-6, options A and B-1 require relatively low rates (tariff charges) to cover the required funding. The other options require significantly higher rates to cover the required funding.

Given the transportation cost differential between shipping concentrates by truck to Skagway or Stewart (see Table ES-2), the potential rates indicated above are still below the "Skagway Advantage" for most mines. For mines closer to Watson Lake, the advantage is smaller and the choice of port would depend on the port development option being considered.

ES.7 Port Governance

The appropriate governance model for the Port of Skagway is largely defined by the issues and opportunities that face the MOS. Table ES-7 notes the key factors and their implications for an appropriate governance model.

TABLE ES-7
Port Governance Considerations

Factor	Governance Consideration
The port is the major economic generator within the MOS and its ongoing viability is critical to the economic health of the Borough.	This suggests that the management of the port needs to be elevated in terms of importance and governance within the MOS. The creation of a Port Commission, Harbor Authority, or a similar organization with management, planning, development and operating capabilities needs to be implemented. The Borough also needs to have ultimate control over the port to ensure that the economic benefits are achieved. Overall port management or planning should not be left to the private sector by default. One individual, with experience in managing ports, should be hired to oversee operation, planning and marketing of the port. This will ensure that the port is seen as being professionally managed – providing a level of credibility to the Borough's efforts.
The MOS has a vested interest in the operation of the port. The Borough receives significant revenues from the passenger charge levied by the Borough and the Alaska Cruise Ship Head Tax.	The Borough, through a ports department (with a Port Commission, Harbors Board or similar organization) needs to be able to manage and plan the future of the port and not leave this important responsibility to other parties with different interests.
The economic justification for using the Port of Skagway (versus competing ports) requires careful messaging about competitiveness and future development plans. The Port of Skagway also needs to be seen as proactive and professionally managed.	This suggests that a formal Port Commission, Harbor Authority or similar organization needs to be created. The mandate of this new organization needs to include: – Marketing the port – Development of a long term plan – Working closely with potential port users
The Yukon is expected to be the source of the large majority of both inbound and outbound industrial traffic using the port of Skagway. The Government of the Yukon has a significant interest in the development of port infrastructure to serve their future needs	Create an advisory role through either an Advisory Board or through an Advisor member to a formal Harbors Board/Port Commission. This position would have no voting privileges but would be useful for provision of feedback on plans and as a means of representing other interests in the Yukon.
The MOS is unlikely to have sufficient financial capacity to take on development of the port as contemplated in this report.	While the Borough may be able to fund development of some of the short term improvements, some of the longer term developments are likely to be beyond the risk tolerance and financial capacity of the Borough to undertake on its own accord. A new port organization with the ability to raise funds, utilize port revenues for port related matters and partner with the private sector is required.
Both the cruise and mining industries have significant and perhaps competing interests in how the port is developed.	If the Borough chooses to create a Port Commission, Harbors Board or similar organization, consideration should be given to structuring memberships on the Board or Commission such that the appropriate stakeholder groups are represented. This is typical requirement of such organizations.

TABLE ES-7
Port Governance Considerations

Factor	Governance Consideration
The MOS currently has little control over how waterfront property is developed or used due to existing long term leases to other parties.	The Port of Skagway must be able to at least influence if not manage the lands necessary for efficient operation of the port. The Port should be proactive in terms of land management, including ensuring that the Borough's interests are protected by ensuring that terms of existing leases are being followed and that where changes would be beneficial, negotiating with appropriate parties for those changes. The Borough should investigate the interest of AIDEA in divesting its interest in the sub-lease of the Ore Terminal and the terms and conditions under which such a divestiture might be considered.
The MOS has limited lands suitable for port activities or to be operated in support of port activities.	The Port of Skagway should be developing a long term land-use strategy for port and associated lands. This should guide the Port, Borough and users of waterfront lands on appropriate uses, future development and public interest matters.
The Borough receives very little revenue directly from its ownership of waterfront lands.	The creation of a new governance structure provides the opportunity to play a more significant role in future development and diversify revenue sources.

The MOS has already started on the process of formalizing a more fulsome role in the management of the Port. MOS has prepared a preliminary draft of a revision to the Skagway Municipal Code that would see the adoption of a port authority model to deal with the considerations previously mentioned.

ES.8 Implementation Considerations

The MOS has already embarked upon some of the short term actions suggested in the Yukon Ports Access Strategy prepared in 2006. The creation of a Port Steering Committee reflects the commitment of the MOS to move forward with further port development that meets the needs of potential users and the community. The following actions represent those that are needed to give port development some momentum and prepare the MOS and the port for longer term actions.

ES.8.1 Short Term Actions

1. **Governance –** The MOS has taken the first step in developing a governance structure for the port, as discussed in the previous chapter. We recommend that the MOS continue with implementation of a governance structure based on the principles discussed in the previous chapter including:

    a. Representation on the agency that is put in place to govern the port.

    b. Determine the powers required to effectively manage the port (regulations, land ownership – both on-dock and off-dock, financing, etc.).

    c. Ensure that one individual (either a new hire or a current MOS staff member) has full time responsibility for the management of the port.

d. Acquire the capability to manage port projects.

e. Reinforce relationships with key stakeholders/groups.

2. **Create the Skagway Advantage –**MOS and the Port need to take this concept of the Skagway Advantage and develop an appropriate marketing/branding strategy that:

   a. Notes that the port is open for business.

   b. Highlights the MOS's commitment to port development, as evidenced by the creation of a new port organization.

   c. Partners with the private sector (mines, motor carriers, marine carriers, terminal operators and others) to ensure that the port reaches its potential.

   d. Identifies the advantages to using the port compared to other alternatives for moving freight to and from the Yukon.

   e. Proactively targets potential sources of traffic (mines, major projects, etc.).

3. **Engage the Community –** It is clear that redevelopment of the port will have an affect on the community. These changes can be both positive and negative. It is important to engage the community to:

   a. Determine their concerns.

   b. Seek ideas.

   c. Showcase the plans and develop buy-in.

   d. Discuss the need for port redevelopment and what it will do for the community in both the short and longer term.

4. **Engage Key Port Stakeholders –** The success of any port development plan depends on the buy-in from key port stakeholders including the cruise ship industry, key port tenants or leaseholders and AIDEA. Each has a different perspective on port operation, different needs and decision processes. It is important that the MOS and the Port understand these matters such that ongoing plans can involve these stakeholders and determine how they can best contribute to the future success of the port. These stakeholders could have ideas and or funding that will assist in the further development of the port.

5. **Work with AIDEA regarding the existing facility**. In the short term, most needs of the mining industry can probably be handled through expansion of the existing ore shed and perhaps creation of a second shed if required. AIDEA appears to have this process well in hand. AIDEA should be consulted to determine their future (longer term) plans regarding their role in port facility ownership and operation. This could be the first step in devolution of these responsibilities to the MOS and the Port on a sustainable basis.

6. **Engage Regulatory Agencies –** The port development plans that are proposed in this report will have potential impacts on the environment, the community and the airport. As with any major development initiative it is import to meet with the regulatory

agencies on an informal basis to discuss the nature of the project and seek guidance/advice/comments on development and the permitting processes/issues.

7. **Environmental Baseline –** Identify and undertake the appropriate environmental baseline studies that will facilitate future permitting/approval processes for the program or particular elements of the program. Discussions with regulatory agencies should provide an indication of the appropriate timing of such work and how long it will be valid if a particular development is delayed for a period of time.

8. **Funding Availability –** The MOS now has a source of funding that was not present two years ago, that being the Borough's share of the head tax on cruise ship passengers. This is a good start at providing funding for new initiatives that will enhance the port.

   Private sector funding will become more viable once the MOS has established a new port organization and is seen as effectively managing the port. This has been the case at other west coast ports, where significant investments of time and resources have been put into marketing the port and its particular advantages (for example, Prince Rupert Port Authority). Private sector port operators and users are loath to invest in ports where the local government is not closely identified with the port and is actively seeking proposals for improving service or facilities.

ES.8.2 Medium Term Actions

The medium term is likely to be the period in which most change will occur within the port. Some of the mining projects that are currently in the planning and development stage could be coming to fruition, requiring significant investments and changes to the ore handling facilities in the port. In addition, some of the proposed major projects may be in their implementation stages. This will require significant financing, planning and permitting efforts. Whereas the first 5-year period will be focused on gaining capabilities and profile, the medium term is likely to be focused on significant developments, beyond just simple expansions of storage sheds. The key activities are likely to include the following:

1. **Development of detailed engineering plans –** Detailed engineering plans will be required for each new project for financing, permitting and development purposes.

2. **Applications for environmental permits and approvals where required –** The application process should be started for improvements where specific permits or approvals are required. Some of the processes may be time-consuming.

3. **Land acquisition –** Where land is required for a particular development, appropriate arrangements to acquire the land should be initiated. Outright purchase, land swaps, land-use bylaws, and options could be considered as some of the key property management and acquisition tools.

4. **Funding applications for relevant pieces of infrastructure –** Once it is clear that new infrastructure is required for which funding may be available from government programs, the applications should be completed and submitted.

5. **Planning for major projects –** The construction of a major project such as one of the pipelines provides an opportunity for the MOS to consider a number of issues:

a. Can new port infrastructure be justified (or funded by the project proponent) that will provide lasting benefits to the Port?

b. What land-use decisions need to be made that will facilitate this traffic?

c. How will the port stakeholders need to work together to deal with this traffic?

ES.8.3 Long Term Actions

Fifteen years from now will see the end of the current lease with WPYR for the waterfront lands. If nothing else, this will provide the MOS with an opportunity to build on what has worked up to that point and new ideas for organization, ownership and operation of the waterfront.

Beyond this, the Port or the MOS will be monitoring performance and responding to new opportunities as they arise.

1 Introduction

In response to the growing mining production in the Yukon Territory the Skagway Port Development Steering Committee (PSC) has initiated a study to assess the potential for Skagway in the resurgence of the Yukon mining industry. The purpose of this study is to help the Municipality of Skagway (MOS) position the port to capture a significant share of the export raw materials from the Yukon. Specifically, the mission of the PSC is to "prepare an actionable business plan with a conceptual port arrangement the municipality may utilize to make sound port fiscal decisions, advancing the interests of the municipality and the region."

The economic livelihood of the MOS and Yukon Territory depends on a thriving and competitive inter-modal port facility designed to provide efficient, cost-effective transshipment of bulk mineral concentrates and general cargo. The MOS is uniquely positioned to provide the nearest tidewater port access for the Yukon Territory. Skagway offers a significant transportation cost advantage over other ports in southeast Alaska and British Columbia (BC). Although the port is currently dominated by the demands of the cruise ship industry, recent developments in the mining industry in the Yukon Territory are providing an opportunity for Skagway to assert itself once again as the "Yukon Port of Skagway."

1.1 Purpose

The purpose of this study is to provide an actionable business plan with the following planning horizons:

- Short term projects that can be constructed in the next 5 years
- Medium term projects that can be constructed in the next 6 to 15 years
- Long term projects beyond 15 years

1.2 Outline

The following sections can be found in this report.

2 Existing Infrastructure Assessment

This chapter provides a brief description of the transportation infrastructure that serves the Yukon. Understanding the state, capacity and usage of this infrastructure is critical for the development of a port development strategy for Skagway.

2.1 Current Road Infrastructure

2.1.1 Highways

The Yukon is well served with surfaced roads traversing the populated south-western part of the Territory and providing access to various ports in Southeast Alaska. Figure 2-1 illustrates the major highways in the Yukon.

FIGURE 2-1
Yukon Highways

The main highway across the Yukon is the Alaska Highway. It originates in Dawson Creek, BC and runs for 909 kilometres (km) through the Yukon from the BC border east of Watson Lake to the Interior Alaska border at Beaver Creek. The Alaska Highway and the Haines Road were built in 1943 as military pioneer roads. They were improved during the 1950s and substantially upgraded in the 1980s. These two principal highways are well-paved and well-maintained. Other Yukon highways include the Klondike Highway from Skagway through Whitehorse to Dawson City and the Dempster Highway from east of Dawson City to Inuvik. The South Klondike Highway parallels the old White Pass trail between Skagway and Log Cabin.

Whitehorse is the centre of travel in the Yukon. Table 2-1 summarizes distances to the nearest ports and centers from Whitehorse, indicating the remote nature of the Yukon.

TABLE 2-1
Distances from Whitehorse

To Principal Ports or Other Northern Centers	Distance (kilometres)
Skagway, AK	177
Haines, AK	396
Stewart, BC	1,050
Prince Rupert, BC	1,438
Seward, AK	1,234
Fairbanks, AK	951
Beaver Creek, Alaska Border	456
Haines Junction, Yukon	156
Dawson City, Yukon	536
Carmacks, Yukon	176
Watson Lake, Yukon	453
Dawson Creek, BC	1,426
Prince George, BC	1,622
Inuvik, NWT	1,222

2.1.2 Current Road Traffic Levels

The Alaska Highway and Haines Road carry a small amount of annual average daily traffic compared with provincial highways in BC and Alberta. The highest vehicle movements are within the Whitehorse area, between Whitehorse and Skagway and between Whitehorse and Haines Junction.

In 2005 the annual average daily traffic (AADT) on the Alaska Highway was approximately 500 vehicles per day, rising to 800 vehicles per day during summer months (ASDT). This

compares with AADT of 1,350 vehicles per day and an ASDT of 1,820 vehicles per day on BC Highway 16 at the Highway 37 junction. The point of this comparison is to note that the traffic volumes on the Alaska Highway are significantly lower than those on a comparable highway in northern BC.

The South Klondike Highway (between Skagway and Whitehorse) carried an average of between 200 and 400 vehicles per day in 2005, with 400 to 600 per day during summer months.

Other roads, such as the Campbell Highway and the Canol Road are gravel surfaced. The Yukon government plans to improve the surface of the Campbell Highway from Watson Lake to Carmacks by upgrading the gravel with bituminous surface treatment (BST). The Canol Road is only open in the summer and fall seasons and carries very little traffic

2.1.3 Pavement Strength

All principal roads in the Yukon have been designed to withstand standard highway loading equivalent to 2,000 standard truck movements per day. Yukon's year-round highway system is built and maintained to accommodate a maximum allowable gross vehicle weight (GVW) of 63.5 tonnes (140,000 pounds [lbs.]) and may be reduced in spring depending on the structure of a highway. A higher weight limit may also be allowed under closely controlled and unusual conditions pursuant to a bulk haul agreement.

The Yukon and BC transportation regulators allow overweight trucks to operate on the South Klondike Highway and other highways under the auspices of the Yukon's Bulk Commodity Haul Regulations. Under these regulations, trucks with a maximum GVW of 77.1 tonnes (170,000 lbs.) are allowed to move over the highway subject to paying an additional $0.01 per tonne kilometre for all weight over the legal GVW on the highway. Maximum legal weights are established at the authority of the Minister of Highways and Public Works.

There appears to be sufficient capacity on Yukon highways to accommodate approximately five times more vehicles than the current traffic levels. If the number of trucks using these highways will increase substantially, or if this load class of truck will increase, the pavements will have to be strengthened and climbing lanes will need to be added on the steeper gradients.

2.2 Current Rail Infrastructure

One existing rail line currently operates in the Yukon. The White Pass & Yukon Route (WPYR) is a narrow gauge railway running from Skagway to Whitehorse over a distance of approximately 180 km. The only section of this rail link currently in operation is the section from Skagway to Carcross. WPYR has been improving the existing rail line through replacing older ties with newer, full-length ties and upgrading the rail. While WPYR has no plans to reactivate the balance of the old line to Whitehorse, the railroad is open to evaluating opportunities for future freight and passenger traffic that would be interested in using the full route. While it is possible to move freight over the portion of the line that is currently operated, the WPYR does not have any rail freight equipment and does not have any current plans to institute freight service. Discussions

with WPYR have indicated an interest in potential re-institution of freight service if the traffic becomes available and can be moved profitably.

A study into the benefits of additional rail: the Alaska Canada Rail Link Study (ACRLS) was completed in 2006. The results of this study are currently being considered by the Governments of both Alaska and the Yukon. Further action on the results of this study are not known, though the project has a very high capital cost and will likely require a significant financial incentive for it to proceed.

One stream of analysis[3] involved the assessment of upgrading the WPYR to facilitate the movement of larger quantities of mineral products for export as well as other traffic. The study examined the potential to reinstitute rail service as far as Whitehorse as well as extending the line to Carmacks. The capital costs ranged from about $160 million to $750 million.

2.3 Current Port Infrastructure

Figure 2-2 illustrates the logical hinterlands of the Yukon, Alaska and BC port areas. Depending on type and volume of the transportable commodities, the Yukon is potentially serviced by several ports in Alaska and BC. As is evident in Figure 2-2, the Port of Skagway is geographically well placed to meet the needs of most of the Yukon. The highway systems are well aligned with Skagway and distances are shorter than to competing ports.

Over the past 100 years the southern Alaskan ports in Skagway (since the gold rush) and Haines (more recently) have been the Yukon's main supporting ports. The Port of Skagway has a demonstrated capacity to handle hundreds of thousands of tonnes of concentrates and similar quantities of general cargoes. The existing narrow gauge White Pass Railway formerly delivered mineral concentrates from the Yukon's Faro Mine to Skagway's bulk concentrate terminal. Skagway's mostly containerized general cargoes arrive by barge. The general cargoes are then carried by truck to the Yukon and Alaska.

In southern Alaska, the Bradfield Inlet is also available for Yukon commodities and in northern BC, Stewart, Kitimat, and Prince Rupert are potential outlets for volumes of the Yukon's bulk exports that are beyond the current capacities available at Skagway. The following section provides a description of the port facilities in Skagway.

[3] Southern Yukon and Port of Skagway Analysis, Pacific Contract Company, HDR Engineering and TEC Infrastructure, March 28, 2006.

FIGURE 2-2
Hinterland and Focal Ports[4]

[4] Source: Alaska – Canada Rail Link Study - Multimodal Port Access Work Package B2(d) Operations Evaluation, Banjar Management Inc. and DKA Marketing, January 2006.

2.4 Skagway Port Infrastructure

The development of the port is severely constrained by the small physical size of the waterfront (see Figure 2-3). The remaining tidelands open to development are bounded by the town site to the north, the ferry terminal road to the east, deep water to the south and the Skagway River and the Skagway airport to the west (see Figure 2-4).

FIGURE 2-3
Port of Skagway

Source: KPMG, 2006

Furthermore, the White Pass tidelands lease, which includes the majority of the conceptual plan footprint, runs until March 2023. Centered under the existing ore terminal ship loader in the marine sediments is a lead sulfide contamination issue from legacy port activity.

2.4.1 Railroad Dock[3]

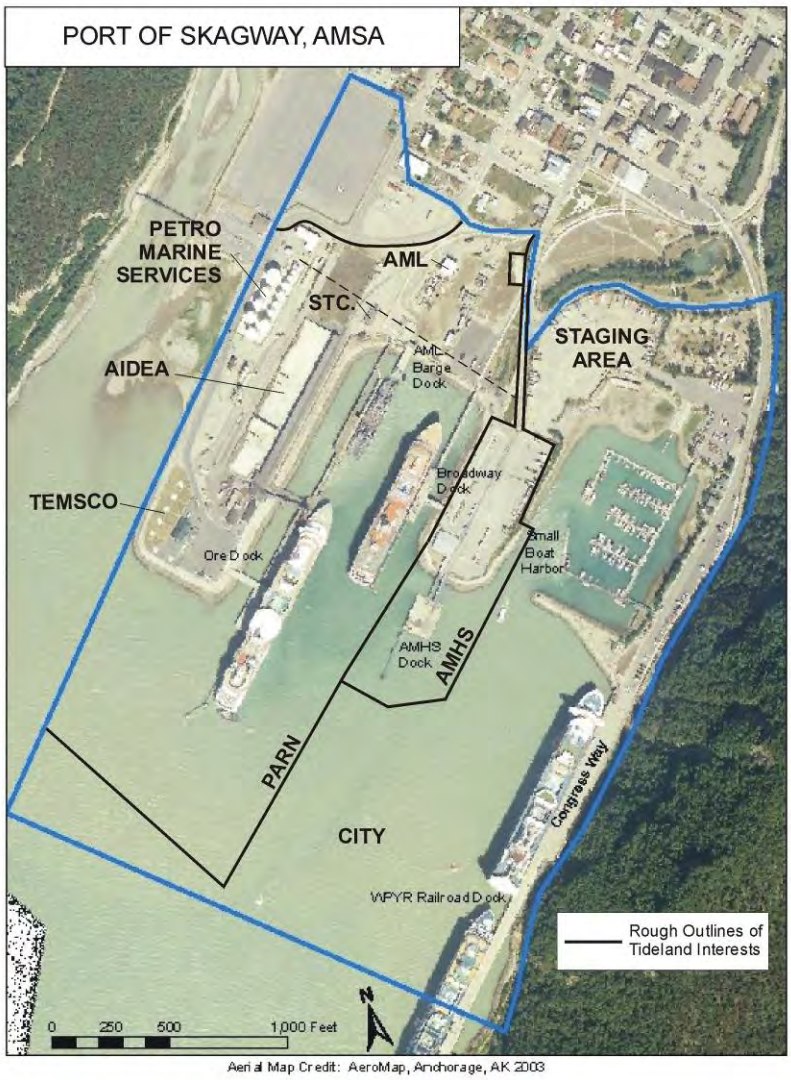
WPYR owns the dock and leases the underlying tidelands under the Railroad Dock. The Railroad Dock is 1,825 feet long with additional breasting dolphins that provide for berthing of two of the longest cruise ships that serve the Alaska market. The Railroad Dock is made up of two distinct docks (North Dock and South Dock), joined by a short steel plate.

2.4.1.1 Railroad Dock North[3]

The north 800 feet of the Railroad Dock is a heavy duty freight dock (800 feet long by 100 feet wide) designed to sustain a HS20-44 truck loading (Alaska bridge loading) or the punching load of a 60-ton axle forklift load. A single railroad track with a third rail for standard gauge operations, is located on the back side of the dock constructed to the railroad bridge rating of Cooper E-80 (heavy railroad loads). The north portion of the Railroad Dock is well suited to the heavy freight transfer operations for ship to rail or truck.

The minimum draft alongside the Railroad Dock is 36-feet at the head of the dock and becomes progressively deeper towards the open inlet end.

FIGURE 2-4
Land Ownership



2.4.1.2 Railroad Dock South[3]

The South Dock is 784 feet long and is built to a lighter standard. It is still capable of HS20-44 loading, but not heavy forklift loading. There is no railroad track on this dock. The South Dock is only 50 feet wide, and is therefore very constrained in its use by its width. WPYR also owns the Broadway and the Ore Dock—the only two docks on the Skagway waterfront capable of docking either cruise or cargo ships. WPYR owns the dock structures and the underlying tidelands are leased from the MOS until 2023.

2.4.2 AMHS Ferry Dock

The Alaska Marine Highway System (AMHS) operates a ferry facility on the Broadway Dock fill area, which is on tidelands purchased from the City of Skagway in 1962. The facility includes a parking lot, waiting-room and office-building, and a floating dock which it owns jointly with the City. While AMHS owns the entire area built on fill to the south of the City's "Staging Area," the City owns 1/3 of the floating dock. The City also owns the transfer bridge. The City occasionally collects a fee for ships or barges to moor at the dock.

2.4.3 Broadway Dock[3]

The Broadway Dock was constructed as a light duty, 300-foot by 44-foot wide, cruise ship dock with only very limited capability for handling cargo. This dock has been used to load exported Yukon logs and containers have been unloaded from the WPYR container Ship, the Frank. H. Brown, to the dock. The Broadway Dock is now only suitable for cruise ship berthing, but the useable berth length was extended recently to accommodate 900-foot long cruise ships beginning in 2006. The Broadway Dock is also heavily used during the summer tourist season, but the dock itself does not have the length, width, or favorable ship maneuvering properties of the Railroad Dock.

2.4.4 Ore Dock[3]

The Ore Dock, as its name implies, was first built as an ore dock in 1969 suitable for only the bulk loading of ore. Over the years, the dock has been modified to handle cruise ship berthing. During 2000, a construction project added a 235-foot by 50-foot HS20-44 concrete dock at the extreme south end of the dock to better serve cruise ships. The 2000 construction added additional breasting dolphins and a new end dolphin to the Ore Dock. The overall usable face length of the Ore Dock is about 1,600 feet. The older wood pile passenger platforms on the Ore Dock, dating from 1969, cannot be used for any cargo transfer due to light duty construction. (See Figure 2-5)

Harbor Enterprises operates the marine fuel depot located near the mid-point of the dock. Harbor Enterprises services Skagway and more importantly the Yukon, moving approximately 30 million gallons of fuel annually. All of the fuel arrives in Skagway on barges. Alaska Marine Lines (AML) constructed a container barge facility at the head of the Ore Dock in 2001. The approach dock forming the AML ramp is constructed to a high standard for loaded forklifts. The old ore concentrate ship loading tower, located near the mid-point of the dock, is a no-go obstruction to cruise ships. Cruise ships are prevented from being able to use the full face length of the dock because of cruise ship overhang, including some lifeboats, fouling the clearance of the old ore loading tower. The Ore Dock draft is a minimum of 42 feet and gets progressively deeper toward the open inlet end.

FIGURE 2-5
Ore Dock[5]

2.4.5 Ore Dock – Bulk Materials Handling Considerations

2.4.5.1 Background

The ore terminal had been operating intermittently until 1998, when soft base metal prices forced the mines to shut down. The terminal had not been in operation after that time until the first shipment of concentrate from Sherwood Copper Corporation in October 2007.

The Alaska Industrial Development and Export Authority (AIDEA) currently controls the terminal site and facilities. WPYR currently control the dock area immediately adjacent to the terminal, which is currently used for berthing cruise ships during cruise ship season from May to September every year.

The Skagway ore terminal was originally designed to operate with the following parameters for the export of base metal concentrates:

- Concentrates were delivered to the terminal, initially by railcars operated by White Pass and Yukon Route Railway (White Pass), and then later by trucks.
- Concentrates were reclaimed from stockpiles with front end loaders and placed over openings in the storage area floor above the feeders.
- The peak original reclaiming and shiploading rate was approximately 1,350 tonnes per hour (tph) of concentrate.
- The design ship was a Handy/Handymax sized ship, with a capacity of 35,000 deadweight tonnes (dwt).

[5] Source: AIDEA. 2008. *Skagway Ore Terminal Information Sheet*. April 2008.

- Concentrates have also been delivered to the terminal in 'pots' by highway trucks. Forklifts were then used to offload these 'pots' from the trucks and empty them in the storage area within the concentrate building.

The original concentrate building was badly corroded and due to safety concerns, the building was demolished in 2003. The 150 feet x 720 feet concrete paved floor and perimeter containment walls remain. In 2007 a smaller (150 feet x 180 feet) concentrate storage building was rebuilt on the existing foundations. The maximum storage capacity of the new storage building is approximately 13,000 tonnes of copper concentrate. The maximum storage capacity on the existing concrete floor, if the building was extended, would be approximately 50,000 to 55,000 tonnes of concentrate.

The system used for reclaiming concentrates from storage originally included the use of front end loaders to feed vibratory feeders onto a reclaim belt conveyor feeding to the shiploader. In 2007, the shiploader and associated reclaim and dust collection systems were completely refurbished, all six of the vibratory feeders were removed, and two of them replaced with belt feeders to service Sherwood Copper's current requirements. The old vibratory feeders were badly corroded and the belt feeders were selected to provide a more controlled feed system.

The existing shiploader is a fixed position design, with a maximum capacity of about 1,350 tph of mineral concentrates. There is a hoist system complete with counterweights for raising and lowering the loading boom. The loading boom can be luffed to a vertical position when the shiploader is not operating and lowered to a horizontal position when operating. Depending on whether the ship being loaded has cranes, the loading boom may have to be luffed to a vertical position whenever the ship is warped (moved) for loading into a different hold.

The boom can be raised to a maximum elevation of approximately 76.0 feet above Mean Lower Low Water (MLLW) and lowered to a minimum of 36.0 feet above MLLW. The Mean Higher High Water (MHHW) is approximately 16.7 feet above MLLW. The water depth alongside the dock is about 40.0 feet at MLLW, which is sufficient for a Handy size ship.

The boom conveyor can shuttle in and out to provide a maximum reach of 48.0 feet from the dock face and a minimum reach of 33.0 feet. The maximum reach of 48.0 feet is approximately half the breadth or beam of a Handymax ship. An articulated loading spout at the end of the boom conveyor intended to direct the concentrate to the outer sides of the ship's holds was replaced with a fixed canvas dust spout in the 2007 rebuild.

The existing berth alongside of the shiploader is owned by White Pass and currently used by the cruise ships during the summer. The current condition and structural integrity of the piles supporting the shiploader and the timber pier area are such that the operator is unable to drive a front end loader over the timber pier to access ships for trimming.

2.4.5.2 Current Operation

Sherwood Copper now exports copper concentrates from its Minto Project located about 240 km north of Whitehorse, Yukon. Sherwood is now considering increasing its current production. Annual throughput is expected to be approximately 65,000 tonnes of copper concentrates.

Receiving

Concentrates are normally delivered to the terminal by side-dump trucks capable of carrying up to 50 tonnes each (10-axle B-train). When required, these side-dump trucks are supplemented with some conventional highway trucks. Although originally designed for unloading through a dump hopper, feeder and stacker system rated at 1,000 tph, the stacker is no longer used. Truck unloading time is approximately 5 minutes and turnaround time of the trucks is approximately 15 hours.

Storage

The unloaded concentrates are placed into stockpiles (up to 12 feet high) using mobile equipment. Sherwood uses a covered storage area approximately 180 feet long with a capacity (with heavy dozing) of approximately 13,000 tonnes of copper concentrate located on the south end of the existing storage pad, leaving room (540 feet) on the north end for Sherwood expansion and other potential users. Required capacity is dictated by the shipping lot size plus tolerance for ship scheduling as well as mine logistics. Sherwood has indicated a desire to increase that safety margin beyond their current 3,000 tonnes. Handling could be more efficient if storage was limited to 11,000 tonnes. At this level of planning, allowing for storage of 1 ½ to 2 package lots seems reasonable. Since there is a significant price point at 10,000 tonnes and a further break at 12,000 to 13,000 tonnes, planning should be based on future tenants requiring approximately 20,000 tonnes storage or 280 to 320 feet of building length. This establishes a likely constraint of three tenants on the existing pad.

Shipping

Reclaiming of the product from the storage area is by mobile equipment taking product from the stockpile(s) to openings in the storage floor above the belt feeders. Two of the six existing vibratory feeders have been replaced with new feeders to provide a maximum total reclaim capacity of about 1,100 tph.

The existing belt conveyor system, which has a maximum capacity of approximately 1,350 tph, is used for delivering the reclaimed product to the existing shiploader, which also has a capacity of approximately 1,350 tph. The current lot size of each shipment to be loaded into ocean-going Handy or Handymax ships is approximately 10,000 t. The ships have to be warped in order for the shiploader to load concentrates into more than one hold. Experience during 2007/2008 has averaged 750 tph (including warping time) enabling turn around of these vessels in under 24 hours although it has peaked at 36 hours.

3 Port Traffic Assessment

This chapter provides a discussion of the types, quantities and direction (inbound/outbound) of potential Skagway Port traffic.

The following commodities are considered in these economic potential projections:

- Mineral concentrates
- Major project traffic
- Re-supply traffic

As a result of discussions with the Port Steering Committee, this study has not included assessments of potential coal and iron ore projects, as the volumes from such operations would generally be of a scale that would be inappropriate for the Port of Skagway. The discussions about particular mining projects are based on the best available public information. Differences in timing, scope of development, and potential output, are likely given the ongoing exploration and development activities for individual projects.

Most commodity projections pertain to Yukon originated or destined traffic as Skagway is not a logical feeder port to/from other points in Alaska. Due to uncertainties about the future development of mineral resources, and major projects such as the planned pipelines, this study examines the overall potential but does not develop time-based forecasts of potential traffic.

The port traffic assessment is presented in terms of tonnes. One tonne is equivalent to 2,205 pounds or about 1.1 tons.

3.1 Mineral Concentrates

The complex and varied geological terrain underlying the Yukon is host to a number of past-producing mines of gold, copper, lead, zinc, tungsten, silver and cadmium[6]. Showings of various minerals, including coal, barite, iron ore, molybdenum, nickel and platinum group elements, attest to the untapped mineral richness of the territory. Some of the world's largest known, undeveloped lead-zinc, tungsten and sulphide deposits can be found in districts of the Yukon. Recent developments and refinements to mineral deposit models have created a new perspective for mineral deposit exploration in the Yukon. Figure 3-1 on the following page provides an illustration of advanced mining exploration projects in the Yukon.

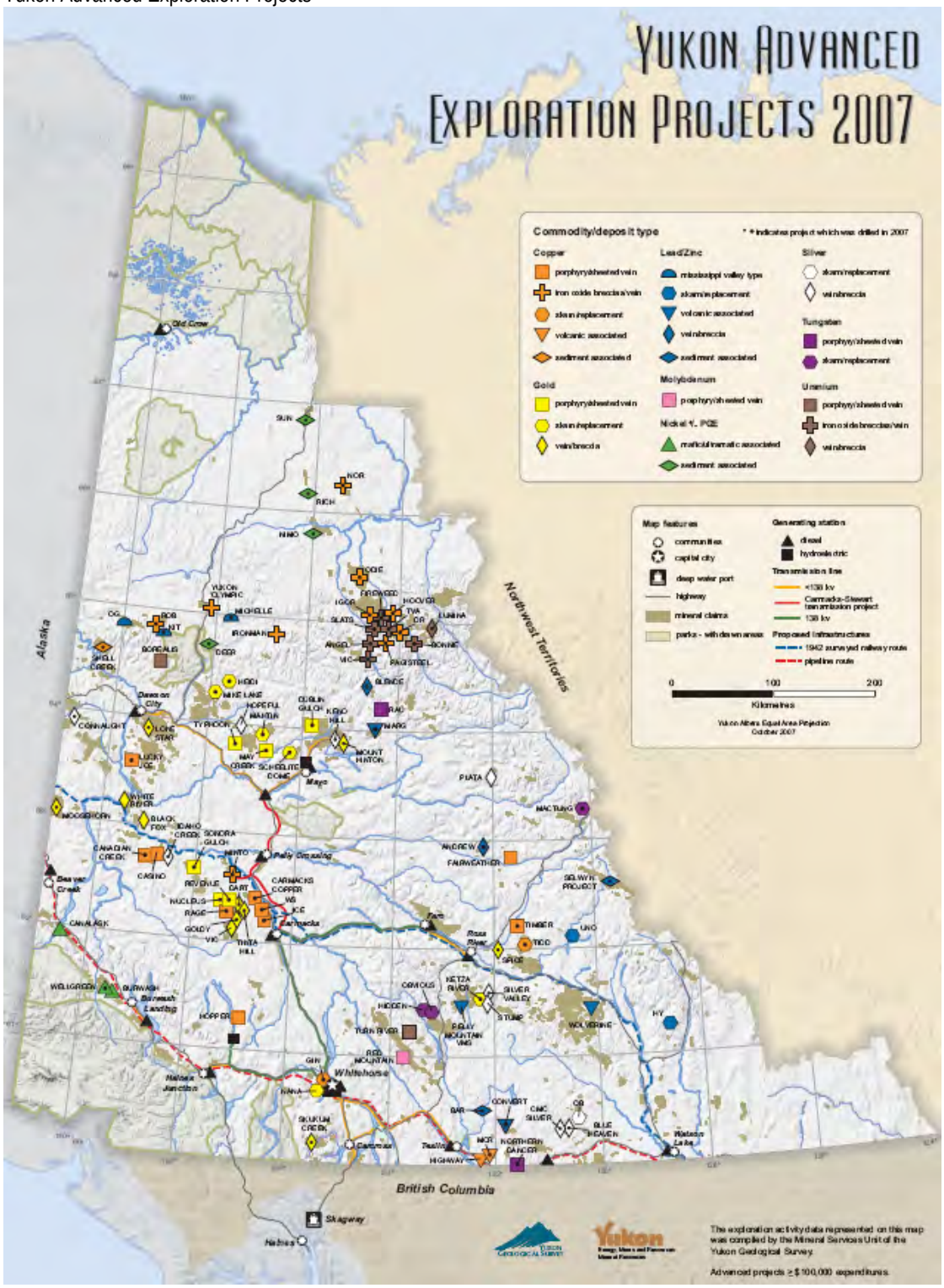
Deposits most likely to go into production (priority deposits) are described in the following paragraphs, ordered by mineral concentrate type. For each deposit that is likely to go into production, the volume, location, and traffic specifications are indicated.

All data presented in this section relies on information and analyses conducted by Gartner Lee for the Alaska Canada Rail Link Project supplemented with more current information from Yukon Energy Mines and Resources. Shippable volume represents the probability

6 Yukon Government, *Discover Yukon's Mineral Wealth*, August 2007.

weighted potential shipment from a particular mineral deposit. This may be less than the volume available to ship due to the analytical methodology employed by Gartner Lee[7].

FIGURE 3-1
Yukon Advanced Exploration Projects



[7] Gartner Lee Ltd, WPA2a – *Outbound Traffic Data Development for Mineral Resources – Overview of Assessment Methodology*, 27 January 2006.

3.1.1 Base Metals

Base metals represent a significant portion of the potentially shippable mineral commodities in the Yukon. The most important ones are lead, zinc, silver and copper. Project lives range from 4 to 25 years. Table 3-1 provides a summary[8].

TABLE 3-1
Base Metal Deposits in Yukon Territory

Property Name		Commodity	Total reported In-ground Resource (tonnes)	Mineable Resources, if known or reported (tonnes)	Likely Shippable Commodity	
					Total Shippable Commodity (tonnes)	Project Life (years)
Selwyn Project		**Lead, Zinc**	**302,000,000**	**115,500,000**	**14,009,249**	**21**
Faro Camp	**Grizzly (Dy)**	**Lead, Zinc**	**17,240,000**	**14,860,000**	**2,330,889**	**11.5**
	Grum	Lead, Zinc	18,649,000	19,630,000	1,837,500	5
	Swim	**Lead, Zinc**	**4,300,000**	**4,300,000**	**490,773**	**9**
Finlayson Lake District	**Wolverine**	**Polymetallic**	**4,989,000**	**6,400,000**	**1,400,000**	**12**
	Kudz Ze Kayah	**Polymetallic**	**11,300,000**	**9,400,000**	**1,492,650**	**9**
	Fyre (Kona)	**Polymetallic**	**15,400,000**	**8,200,000**	**711,600**	**4**
	Ice	Copper	4,561,863	3,400,000	152,740	8
Marg		Polymetallic	8,230,000	N/A	N/A	N/A
Andrew		Lead/Zinc	5,918,506	N/A	N/A	N/A
Carmacks Copper		Copper	9,980,000	N/A	N/A	N/A
Tom & Jason		**Lead, Zinc**	**19,835,900**	**18,366,627**	**3,289,635**	**14**
Dawson Range	Casino	Copper, Gold, Molybdenum	964,000,000	178,200,000	2,421,004	25
	Cash	Copper, Molybdenum	36,290,000	34,475,500	201,772	16
	Minto	**Copper**	**20,550,000**	**7,500,000**	**322,800**	**12**

These minerals have been located in several polymetallic deposits in the Yukon. The deposits indicated in bold font in Table 3-1 were the ones considered by Gartner Lee as being the most likely to go into production in the foreseeable future, based on their assessment in 2006. These potential mines are further described in the following sections.

3.1.1.1 Selwyn Project (formerly Howard's Pass)

The Selwyn Project is a lead, zinc and silver deposit, currently owned by Selwyn Resources. It is considered feasible for mining due to its global significance. Combined in-ground

[8] Gartner Lee, Table 2C, 2E, BC & *Yukon Mineral Resource Shippable Commodity Summary* and Yukon Energy Mines and Resources, *Yukon Mineral Deposits 2007*.

quantity is over 490 million tonnes, of which 14 million tonnes is shippable. With a projected life-span of 21 years, this mine will generate approximately 467,000 tonnes on average per year. The site is located about 175 km east to north-east of Ross River on the border of the Yukon and the Northwest Territories. On June 19, 2008, the mine received notice that the Mackenzie Valley Land and Water Board intended to issue the necessary Land Use Permit and Water License for the rehabilitation and use of the existing all-seaon access road to the Selwyn Project. The access road connects the Selwyn Project directly to the existing Nahanni Range Road that services the North American Tungsten Corporation's operations at the Cantung mine and connects to the Robert Campbell Highway.

3.1.1.2 Tom and Jason

Tom and Jason are both lead, zinc and silver deposits. Tom and Jason are currently owned by Hudbay Minerals, Inc. According to Yukon Energy & Mines officials, both deposits are considered feasible for mining, however, the socio-environmental values and remoteness associated with the locations continue to pose question marks at this stage.

Combined in-ground quantity of the Tom and Jason deposits is almost 20 million tonnes, of which 3.3 million tonnes is shippable. With a projected life-span of 14 years, this mine will generate approximately 235,000 tonnes on average per year. The sites are in close proximity to one another, located about 170 km north-east of Ross River on the border of the Yukon and the Northwest Territories. The sites are adjacent to the North Canol Road.

3.1.1.3 Grizzly (Dy)

Grizzly, or Dy, is a deposit containing lead, zinc, silver, and gold. It holds almost 17.3 million tonnes of in-ground minerals, generating 2.3 million tonnes of total shippable future resources. Over a project life of 11.5 years, the discounted average annual amount of shippable minerals is estimated at 78,000 tonnes. The site is located approximately 10 km[9] north-east of Faro, close to the Campbell Highway.

Dennison Environmental Services has been awarded a 3-year contract to take over care and maintenance of the Faro Mine. Deloitte and Touche is the current interim receiver.

3.1.1.4 Grum

Grum is a deposit containing lead, zinc, silver and gold. It has been appointed by the court to Deloitte & Touche as the interim receiver. It holds almost 18.7 million tonnes of in-ground minerals, generating 1.8 million tonnes of total shippable future resources. Over a project life of 5 years, the discounted average annual amount of shippable minerals is estimated at 367,500 tonnes. The site is located approximately 9 km[9] north-east of Faro, close to the Campbell Highway. The Grum property is currently committed to the reclamation and closure plan for the Faro mine and is not likely to be developed in the near future.

3.1.1.5 Swim

Swim is a deposit containing lead, zinc, and silver. It has been appointed by the court to Deloitte & Touche as the interim receiver. It holds 4.3 million tonnes of in-ground minerals, generating almost half a million tonnes of total shippable future resources. Over a project life of 9 years, the discounted average annual amount of shippable minerals is estimated at

[9] Discover Yukon's Mineral Wealth, Yukon Energy Mines and Resources and Yukon Economic Development, 2007.

53,000 tonnes. The site is located approximately 17 km[9] east of Faro, close to the Campbell Highway.

3.1.1.6 Kudz Ze Kayah

Kudz Ze Kayah is a lead, zinc, copper and gold deposit, currently owned by Teck Cominco Limited. It is considered feasible for mining given its current status permissions. Combined in-ground quantity is 11.3 million tonnes, of which almost 1.5 million tonnes is considered shippable. With a projected life-span of 11 years, this mine is estimated to generate approximately 50,000 tonnes on average per year (YEG, 2007). The site is located about 110 km southeast of Ross River in the Finlayson Lake District. Although no access roads exist, it is close to the Campbell Highway.

3.1.1.7 Wolverine

Wolverine is a volcanic sediment site containing lead, zinc, copper, silver and gold. It is currently owned by Jinduicheng Molybdenum Group Limited and Northwest Nonferrous International Investment Company, Limited and contains 4.9 million tonnes of in-ground minerals. It is estimated that 1.4 million tonnes of total shippable resources can be mined from this deposit in the future. Over a project life of 12 years, this results in 47,000 tonnes average annual shippable commodity. The site is located in the Finlayson Lake District, approximately 135 km south-east of Ross River. Phase I of the access road was completed in September 2007 and permitting includes a Class A water license and Quartz Mining License.

3.1.1.8 Fyre (Kona)

Fyre, or Kona, is a copper, gold and cobalt deposit, currently owned by Pacific Ridge Exploration Limited. It is considered feasible for mining assuming nearby mines in the Finlayson Lake District proceed through development. Combined in-ground quantity is 8.2 million tonnes, of which only about 712,000 tonnes is considered shippable. The site is located approximately 130 km[9] south-east of Ross River in the Finlayson Lake District. Although no access roads exist, it is close to the Campbell Highway.

3.1.1.9 Minto

Minto is a copper, silver and gold deposit. It is currently owned by Sherwood Copper Corporation and contains about 20 million tonnes of inbound minerals, generating approximately 320,000 tonnes of total shippable resource. Over a planned project life of 82 years, this results in about 40,000 tonnes of annual shippable commodity. Current shipments are about 60,000 tonnes per year and indications are that this could increase in 2009. The site is located about 75 km northwest of Carmacks.

3.1.1.10 Cash

The Cash property is a copper and molybdenum deposit located near the Minto property, about 75 km northwest of Carmacks. Its current ownership is unclear – the last records indicate that it is owned by Archer, Cathro and Associates, a consulting geological firm with offices in Whitehorse and Vancouver. The property is estimated to contain about 36 million tonnes of reserves.

3.1.1.11 Andrew

The Andrew property is a lead and zinc deposit. It is currently owned by Overland Resources and is estimated to include reserves of 5.9 million tonnes. The Andrew property is located 110 km northeast of Faro and is accessible by a 70 km winter road from a point 120 km northeast of the North Canol Road. A feasibility study is expected to be completed by December 2008 with production targeted for 2012.

3.1.1.12 Marg

The Marg property is a polymetallic deposit owned by Yukon Gold. It is located 80 km northeast of Mayo and contains estimated reserves of 8.2 million tonnes.

3.1.1.13 Carmacks Copper

The Carmacks Copper property is a copper deposit owned by Western Copper. The project site is located approximately 38km northwest of the village of Carmack, near Williams Creek and 8 km west of the Yukon River. The site is currently accessible by an existing 12 km exploration road that leads north from km 33 of the Freegold Road, a secondary, government maintained, unpaved roadway that originates in Carmacks. The property is estimated to contain reserves of nearly 10 million tonnes.

3.1.2 Other Minerals

Other minerals, including tungsten, molybdenum, barite, nickel, uranium, selenium and asbestos account for only a very small portion of potential future shippable minerals. One molybdenum deposit and two tungsten deposits are likely to go into production in the near future and are described below. Project lives range from 4 to 21 years. Table 3-2 presents a summary of these minerals[8].

The deposits indicated in bold font in Table 3-2 (Logtung, Red Mountain, and Mactung), are the most significant and most likely to go into production in the foreseeable future. These potential mines are further described in the following sections.

Aggregate shipments from these potential mines would be around 70,000 tonnes per annum if they are all in production at the same time. Although unrealistic, this assumption helps create a picture of the magnitude of potential shipments of these minerals out of the Yukon.

TABLE 3-2
Other Mineral Deposits in Yukon Territory

Property Name	Commodity	Total Reported In-ground Resource (tonnes)	Mineable Resources, if known or reported (tonnes)	Likely Shippable Commodity	
				Total Shippable Commodity (tonnes)	Project Life
Wellgreen	Copper, Nickel	46,700,000	36,500,000	500,000	10
Logtung	Tungsten, Molybdenum	162,000,000	162,000,000	293,700	30
Red Mountain	**Molybdenum**	**187,270,000**	**46,000,000**	**102,098**	**17**
Mactung	Tungsten	13,699,000	12,985,550	140,986	30

3.1.2.1 Wellgreen

Wellgreen is a copper and nickel deposit, currently owned by Coronation Resources. The Wellgreen Mine property is located 317 km north-west of Whitehorse, just 10 km off the Alaska Highway. Significant surface and underground work has been carried out on the property between the initial discovery in 1952 and limited mining in 1972 and 1973 by Hudson Bay Mining Company Limited. Three zones of Copper-Nickel-Platinum-Palladium-Cobalt-Gold-Silver have been outlined on the property. Probable and possible reserves are calculated to be 50.03 million tonnes.

3.1.2.2 Logtung

Logtung is a tungsten and molybdenum deposit, currently owned by Strategic Metals Limited. It contains approximately 162 million tonnes of in-ground minerals, generating almost 294,000 tonnes of total shippable resources. Over a planned project life of 30 years, this results in almost 10,000 tonnes of annual shippable commodity. The site is located approximately 65 km[9] southeast of Teslin, on the Yukon, BC border, in proximity of the Alaska Highway.

3.1.2.3 Red Mountain

Red Mountain is a molybdenum deposit, currently owned by Tintina Mines Limited. It contains more than 187 million tonnes of in-ground minerals, generating approximately 102,000 tonnes of total shippable resources. Over a planned project life of 17 years, this results in a discounted 3,000 tonnes of annual shippable commodity. The site is located approximately 75 km[9] northeast of Whitehorse.

3.1.2.4 Mactung

Mactung is a tungsten deposit, currently owned by North American Tungsten Corporation Limited. It contains approximately 13.7 million tonnes of in-ground minerals, generating almost 141,000 tonnes of total shippable resources. Over a planned project life of 30 years, the discounted amount of annual shippable resources has been estimated at 5,000 tonnes on average. The site is located approximately 187 km northeast of Ross River on the Yukon, Northwest Territory border, in proximity of the Upper Canol Highway.

3.1.3 Summary of Shippable Volumes of Yukon Minerals

Aggregate future potential shipments from the mineral deposits as described in the previous sections is estimated at a total of about 24.6 million tonnes (27.1 million tons). Table 3-3 presents an overview of all potential mineral deposits and the corresponding total and annual shipments.

TABLE 3-3
Summary of Shippable Volumes of Minerals

Property Name	Likely Shippable Commodity (tonnes)		
	Project Life	Total Shippable Commodity	Annual Shipment
Selwyn	21	14,009,249	467,000
Grizzly (Dy)	11.5	2,330,889	78,000
Swim	9	491,000	53,000
Tom & Jason	14	3,289,635	235,000
Wolverine	12	1,400,000	47,000
Kudz Ze Kayah	9	1,492,650	50,000
Fyre (Kona)	4	711,600	24,000
Minto	12	322,800	11,000
Logtung	30	293,700	10,000
Red Mountain	17	102,098	3,000
Mactung	30	140,986	5,000
TOTAL	**-**	**24,584,607**	

It is highly unlikely that all of the mines shown in this table would be in production at the same time; hence it is not useful to sum the potential annual volumes. It is highly probable that some of these mines may never be developed, other mines not shown above may be developed, their estimated lives may be different than those shown above and annual production could vary. The projects identified in Table 3-4 represent the most likely source of near term concentrates for movement according to Yukon Energy Mines and Resources.

TABLE 3-4
Potential Development Projects

Mine	Stage	Main
Carmacks Copper	Permitting, feasibility study complete	Copper
Division	Feasibility study complete	Coal
Wolverine	Permitting, feasibility study complete	Zinc, silver, selenium
Skukum Creek	Permitting, feasibility study ongoing	Gold, silver
Ketza River	Permitting, feasibility study ongoing	Gold, silver, zinc
Mactung	Feasibility study complete	Tungsten
Sa Dena Hes	Care and maintenance	Silver, lead, zinc
Andrew	Permitting, feasibility study ongoing	Zinc, lead
Howards Pass (Selwyn)	Scoping study	Zinc, silver, lead

3.2 Project Commodities

Freight traffic associated with large resource and infrastructure projects in the Yukon will be largely inbound. The following projects should be considered in estimating the inbound freight volumes:

- Alaska Highway Natural Gas Pipeline
- Mackenzie Gas Pipeline
- Mining Development Projects
- Alaska Canada Rail Link

These projects will cause a large amount of construction materials (machinery and equipment, fuel, tractor services, timber, iron, pipes, steel and camp buildings, consumables, parts and supplies) to be transported into and throughout the Yukon. The following sections provide an overview of the projected commodity volumes.

3.2.1 Alaska Highway Natural Gas Pipeline

In August 1, 2008, the Alaska legislature has signed off on a license for Calgary-based TransCanada Corporation to start the $26-billion Alaska Pipeline Project. TransCanada Corp. will now start the engineering, environmental reviews, aboriginal relations and commercial work and is targeting to have the pipeline in service by September 2018.

Freight volumes associated with the construction of the Alaska Highway Natural Gas Pipeline were estimated by QGI Consulting and Gartner Lee for the ACRLS as indicated in Table 3-5. Total tonnage of approximately 1.1 million tonnes is expected to be shipped into the territory over a period of 2 years for this project. The timing of the construction of the pipeline is dependent on energy prices, financing and the environmental approval processes. This report does not attempt to forecast the timing of the construction of this pipeline; rather it indicates the potential volume of products to be shipped during the construction period, when it happens.

This amount includes pipes, equipment and fuel. Equipment of approximately 48,000 tonnes will have to be shipped out of the territory again upon completion of the project.

TABLE 3-5

Alaska Highway Gas Pipeline - Inbound Commodity Volumes (tonnes)[10]

Required Delivery By:	Winter 1	Winter 1	Total	Summer 1	Summer 1	Total	Winter 2	Summer 2	Project - Total
To: Spread	AW 1	BW 1	Winter 1	AS 1	BS 1	Summer 1	AW 2	BS 2	
Km. Post Location	KP0-109	KP555-687		KP226-375	KP375-555		KP109-226	KP687-832	
Camp	Koidern	Morley R.		Canyon Cr.	Marsh L.		Burwash	Rancharia	
Facility		CS No. 3		K.Lk. Crossing	CS No. 2		CS No. 1		
Facility Location		KP 651			KP 455		KP 213		
Destination Volumes									
LINE PIPE (1)	118,772	143,113	261,885	170,888	196,359	367,247	119,098	156,805	**905,035**
EQUIPMENT									
Pipeline Construction	18,800	18,800	37,600	Repositioned	Repositioned		Repositioned	Repositioned	
CS/Facility Construction		3,500	3,500		3,500	3,500	3,500		
Total	18,800	22,300	41,100		3,500	3,500	3,500		**48,100**
FUEL									
P/L Construction	11,200	11,200	22,400	11,500	9,500	21,000	11,200	9,500	
CS/MS Construction		1,700	1,700		1,700	1,700	1,700		
Camp Fuel	6,900	6,900	13,800	8,400	6,400	14,800	6,900	6,400	
Total	18,100	19,800	37,900	19,900	17,600	37,500	19,800	15,900	**111,100**
TOTALS	**155,672**	**185,213**	**340,885**	**190,788**	**217,459**	**408,247**	**142,398**	**172,705**	**1,064,235**

[10] Gartner Lee, *Alaska Highway Natural Gas Pipeline Traffic Flows*, Yukon Segment.

3.2.2 Mackenzie Gas Pipeline

Given the recent announcement about the Alaska Highway Gas Pipeline, it is not clear what the status of the Mackenzie Gas Pipeline will be.

Potential freight volumes associated with the construction of the Mackenzie Gas Pipeline in the Northwest Territories and Alberta were estimated by QGI Consulting and Gartner Lee for the ACRLS.

The major pipeline materials will need to be transported into Alberta; in Alberta they will move between the NGTL Interconnect Facility in the south and Niglintgak in the north. The Alaskan ports Skagway and Haines could be involved in the logistics of the gas pipeline development, mainly for the pipes that will be used. Railway and highway infrastructure in the Yukon will also be used for carrying supplies to this project. The following volumes are estimated to be required throughout the implementation of this project.

This report does not attempt to forecast the timing of the construction of this pipeline; rather it indicates the potential volume of products to be shipped during the construction period, when it happens. It is also not clear if all of the volume shown in Table 3-6 will actually move through Alaskan ports.

TABLE 3-6
Mackenzie Gas Pipeline - Inbound Commodity Volumes (tonnes)[11]

Commodity	Year 1	Year 2	Total
Pipe	**240,780**	**189,700**	**430,480**
Fuel	**65,680**	**126,140**	**191,820**
Equipment[1]	**61,100**	**16,000**	**77,100**
Total Volume	367,560	331,840	699,400

[1] The 77,100 tonnes of equipment needed for this pipeline development will be shipped out of the territory after completion of the project.

3.2.3 Mineral Resource Development Projects

According to Gartner Lee data, freight volumes associated with the construction and operation of mining activities in the Yukon can be divided into two categories:

- Mine construction
- Mine operation

3.2.3.1 Mine Construction Freight Volumes

The analytical model used by Gartner Lee indicates that about 0.00123 tonnes of construction freight is generated per tonne of shippable mineral resources. Information provided by Sherwood Copper suggests that this figure may be too low. Sherwood Copper estimates that their construction supplies amounted to about 0.031 tonnes per tonne of shippable product.

[11] Gartner Lee, Mackenzie pipeline data, 2006.

Apart from the equipment, most of this traffic will be inbound into the Yukon. Using the higher benchmark rule of thumb and assuming that the 24.6 million shippable tonnes of concentrate indicated in Table 3-3 eventually are shipped, this will generate up to 787,000 tonnes of construction material perhaps over a 25 to 30 year period. This would result in average annual shipments of 26,000 to 31,000 tonnes per year if the indicated mines are developed. The following breakdown of materials can be expected as illustrated in Table 3-7.

TABLE 3-7
Mine Construction Freight Volume Composition[10]

Commodity	Allocation
Fuel	23%
Pit & Surface Equipment	23%
Cement	18%
Civil/Mechanical Equipment and Supplies	12%
Structural Steel	12%
Tankage	6%
Camp/Office	4%
Cladding	2%

3.2.3.2 Mine Operation Freight Volumes

Mine operation support freight will include diesel fuel, crusher liners, mill liners, grinding balls, lime, fluxes, lubricants, mill and lab supplies, food and other consumables. Diesel fuel will take up more than half of the freight.

According to Gartner Lee data, the ratio of inbound freight volume to mining operations support is approximately 0.00353 tonnes of inbound supplies for each tonne of concentrate shipped. Recent information from Sherwood Copper and Novagold indicate that this could be quite a bit higher:

- Sherwood Copper (Minto property) – 0.33 tonnes per tonne of concentrate
- Novagold (Galore Creek property) – 0.08 tonnes per tonne of concentrate

Assuming an average of the estimates from these two mines, and an annual volume of 300,000 tonnes of concentrate, this would thus result in 60,000 tonnes of inbound freight. The actual volumes will depend on the rate of development and operation of new mines.

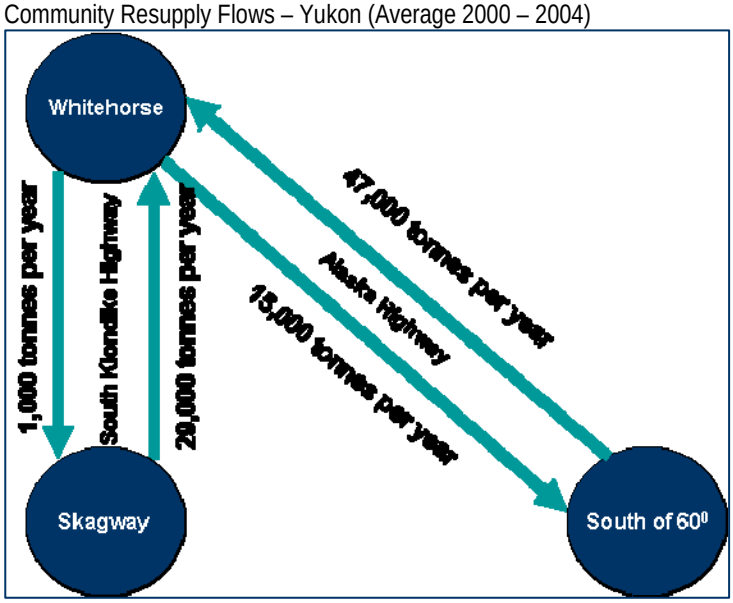
3.2.3.3 Alaska Canada Rail Link

The Alaska Canada Rail Link could provide significant volumes of construction materials and equipment if the project were to proceed. No estimates of volumes are available, but they could be as significant as the pipeline projects, though the volumes could be spread over a longer period of time.

3.3 Re-Supply Commodities

In terms of the community re-supply, the Yukon is generally served by truck from Alberta along the Alaska Highway and by barge/truck through the Port of Skagway and then along the South Klondike Highway. According to work undertaken by Vector Research as part of the ACRLS[12], community resupply flows for the period 2000 to 2004 averaged as shown in Figure 3-2.

FIGURE 3-2
Community Resupply Flows – Yukon (Average 2000 – 2004)



As indicated in this figure total inbound resupply traffic was about 76,000 tonnes, while outbound traffic was about 16,000 tonnes. The composition of the Alaska Highway inbound traffic was as shown in Table 3-8. These volumes are projected to grow by about the rate of population growth in the Yukon, so significant volume increases are not expected.

TABLE 3-8
Inbound Resupply to Yukon via Alaska Highway – Top 5 Commodities

Commodity	Average Tonnage	Share of Total
Petroleum products	22,221	47.0%
General merchandise	11,505	24,4%
Vehicles, machinery & equipment	4947	10.5%
Construction materials	4,391	9.3%
Iron, pile and steel	2,160	4.6%
Total	**45,223**	**95.7%**

[12] Inbound Traffic Data Development – Community Resupply (WPA1a), Vector Research, 2006.

Traffic moving to Whitehorse through the Port of Skagway is comprised of petroleum products (over 70 percent), general merchandise (24 percent and largely liquor shipments to the Yukon Liquor Corporation) and a small amount of other traffic.

3.4 Summary

The key conclusions to be drawn from the analyses of potential shipping volumes include the following:

- Mineral concentrates are likely to be the major traffic that could use the Port of Skagway.
- Mining activity will also generate additional traffic for mine construction and operation, though this could come by either road or marine services (through Skagway).
- Yukon community resupply volumes are relatively small and split between the Alaska Highway and barge service to Skagway. These volumes are expected to generally grow at the rate of population growth in the Yukon.
- Major project traffic could be quite large, but may only last a few years.

4 Port and Supply Chain Competitiveness

This chapter provides a description of the competitive situation with respect to the use of the Port of Skagway for mineral concentrate, re-supply and potential intermodal traffic.

4.1 Mineral Concentrate – Port Competitiveness

4.1.1 Port versus Port

Ports and their linking transport logistics chains for the Yukon's major export products were assessed from the perspective of estimates of truck transport costs to competing ports. In the case of mineral development in the Yukon, the only practical ports for access are Skagway and Stewart. The following analysis thus focuses on these two ports.

Very few route options exist for the movement of mineral concentrates:

- Alaska Highway (1)
- Robert Campbell Highway (4)
- Klondike Highway (2 and 8)
- Canol Road (6)
- Stewart Cassiar Highway (37)

These are illustrated in Figure 4-1 below.

FIGURE 4-1
Principal Highways

As noted earlier in this report, mining activity is focused in areas surrounding Carmacks, Ross River and Watson Lake. Any mineral concentrate traffic would have to move through these communities to get to a port. Accordingly, it is useful to determine the distance from each of these communities to the ports of Skagway and Stewart and the associated transportation costs. Table 4-1 provides a summary of the distances, via various routes, to the ports at Skagway and Stewart.

TABLE 4-1
Distance to Ports

Origin	Destination	Routing	One-way Distance (km)
Carmacks	Skagway	Hwy 2	350
	Stewart	Hwy 2/1/37	1,218
	The Skagway Advantage		**868 km**
Ross River	Skagway	Hwy 4/6/1/8/2	435
		Hwy 4/6/1/2	495
		Hwy 4/2	579
	Stewart	Hwy 4/1/37	1,017
	The Skagway Advantage		**438 – 582 km**
Watson Lake	Skagway	Hwy 1/8/2	513
		Hwy 1/2	573
	Stewart	Hwy 37	648
	The Skagway Advantage		**75 – 135 km**

As indicated in this Table, Skagway is much closer than Stewart for mines in the Carmacks and Ross River areas. From Watson Lake, there is less of an advantage.

Tables 4-2 and 4-3 quantify the benefit associated with the Skagway Advantage for each of these origin areas. The assessment is based on a number of assumptions, as follows:

- Legal GVW for shipments to Skagway is 77.1 tonnes (170,000 lbs) on a Bulk Commodity Haul Permit. This enables a truck to carry a maximum payload estimated at 56.7 tonnes.
- Legal GVW for shipments to Stewart is 63.5 tonnes (140,000 lbs.) This enables a truck to carry a payload estimated at 45.4 tonnes. For comparative purposes, a legal GVW of 77.1 tonnes is also considered.
- Truck rates are $2.75 per kilometre for a truck of 77.1 tonnes GVW. This assumes a load of 56.7 tonnes. Truck rates are assumed to be $2.50 per kilometre for a truck of 63.5 tonnes GVW and able to carry a load of 45.4 tonnes. These figures are based on estimated costs of trucking in Canada in 2005[13], indexed by CPI and adjusted for the

[13] Operating Costs of Trucks in Canada – 2005, Transport Canada, 2007. Adjusted for estimated increase in CPI between 2005 and 2008 – 6.0 percent and increase in fuel surcharge – 23 percent. Total increase of 30.0 percent.

estimated increase in trucking fuel surcharges between 2005 and 2008 (the fuel surcharge was about 24 percent in late 2005 and is currently about 47 percent, based on quotes from motor carriers).

TABLE 4-2
Quantifying the Skagway Advantage

Origin	Destination	Routing	Cost Per Tonne[1]
Carmacks	Skagway	Hwy 2	$33.95
	Stewart	Hwy 2/1/37	$134.14
	The Skagway Advantage		**$100.19**
Ross River	Skagway	Hwy 4/6/1/8/2	$42.20
		Hwy 4/6/1/2	$48.02
		Hwy 4/2	$56.16
	Stewart	Hwy 4/1/37	$112.00
	The Skagway Advantage		**$55.84 to $69.8**
Watson Lake	Skagway	Hwy 1/8/2	$49.76
		Hwy 1/2	$55.58
	Stewart	Hwy 37	$71.37
	The Skagway Advantage		**$15.79 to 21.61**

[1] Based on a load of 56.7 tonnes per truck to Skagway and 45.4 tonnes per truck to Stewart.

As indicated in Table 4-2, the Skagway Advantage is significant for mines located near Carmacks or Ross River. The advantage decreases significantly for a mine located near Watson Lake.

TABLE 4-3
Quantifying the Skagway Advantage (All Loads 56.7 tonnes)

Origin	Destination	Routing	Skagway Advantage (kilometres – one way)	Savings vs Stewart ($ per tonne) Assuming load = 56.7 t
Carmacks	Skagway	Hwy 2	868	$84.28
Ross River	Skagway	Hwy 4/6/1/8/2	582	$56.45
		Hwy 4/6/1/2	522	$50.63
		Hwy 4/2	438	$42.49
Watson Lake	Skagway	Hwy 1/8/2	135	$13.10
		Hwy 1/2	75	$7.28

As indicated in Table 4-3 above, the Port of Skagway has a cost advantage of over $80.00 per tonne for shipments from the Carmacks area, $40 to $50 per tonne for shipments from the Ross River area and around $10 per tonne from the Watson Lake area.

4.1.2 Port versus Rail

In addition to competition between ports, consideration has to be given to competition via rail. In the existing circumstances the options would be as follows:

- Ship by truck to Skagway and then by vessel to domestic or foreign smelters
- Ship by truck to railhead at Fort Nelson and then by rail to domestic smelter

The rail option may be feasible if there is a smelter in Canada or the US that could take the concentrate and the rail costs are competitive.

According to Sherwood Copper, it is almost a breakeven proposition to ship their concentrate to Flin Flon for processing by rail when the capital costs associated with restarting the Skagway Ore Terminal are considered.

4.1.3 Additional Considerations

The cost of moving concentrate by truck to Skagway could be reduced through a number of innovative considerations, including:

- Moving fuel in bladders that could be placed inside the hoppers on the ore trucks
- Moving other bulk supplies (for example, lime, steel balls for the grinding mills) for the mines in the hoppers on the ore trucks

Using the trucks for backhaul freight destined for the mines could reduce overall transportation costs. Consideration could be given to setting up a depot in Skagway to pool products bound for the mines.

4.2 Competitiveness for Re-Supply Traffic

Much of the resupply traffic for the Yukon originates in Western Canada (Vancouver and Edmonton) and is moved by truck to Whitehorse. Additional product is sourced in a number of areas and moved by intermodal service on AML from Tacoma to Skagway and thence by truck to Whitehorse. The following discusses the relative costs of each option for serving the Yukon, including a potential new service similar to CN Rail's AquaTrain that provides service between Prince Rupert and Whittier (for furtherance to Anchorage and Fairbanks).

4.2.1 Trucking Costs

A number of larger motor carriers haul freight between Whitehorse and Edmonton, including Byers Transportation Services Inc., Canadian Freightways Ltd., MATCO Transportation Systems, Northwest Transport Ltd. and Pacific Northwest Freight Systems. Several of these carriers also haul between Vancouver and Whitehorse. These carriers were contacted for rate quotes for semi-trailer movements of goods between Vancouver/ Edmonton and Whitehorse.

Details on the rates are shown in Table 4-4. This table also includes an extrapolation of the rates to B-Train tractor-trailer combinations based on relative cost differences[14].

TABLE 4-4
Truck Rates for Re-supply Traffic

Origin	Destination	Distance (kilometres)	Truck Type	Quoted Rate[1]	Cost per Tonne	Cost Per Kilometre
Edmonton	Whitehorse	1,993	Semi- Trailer (27.5 tonne load)	$9,126	$332	$2.29
			B-Train (45 tonne load)	$10,122	$225	$2.54
Vancouver	Whitehorse	2,554	Semi- Trailer (27.5 tonne load)	$12,775	$464	$2.50
			B-Train (45 tonne load)	$14,155	$315	$2.77

[1] Includes fuel surcharge (currently 47.4 percent) and Goods and Services Tax (5.0 percent).

4.2.2 Rail Barge Service

CN Rail currently operates a combination rail barge service to Alaska – the AquaTrain. Rail freight is shipped from locations such as Prince George and Edmonton to Prince Rupert, where it is loaded onto the rail barge. The rail barge interconnects with the Alaska Railroad at Whittier, from where it services Anchorage, Fairbanks and other locations.

The following analysis examines the cost of a theoretical rail barge service to Skagway that would be similar to the existing rail barge service to Whittier. While contact has been made with CN Rail regarding such a service, potential pricing has not been received. Accordingly an analysis has been undertaken using the following assumptions:

A. Liquid Propane Gas (LPG) has been used as the base commodity for examination

B. The existing tariff for the movement of LPG from Edmonton to Anchorage (CN 511476-AB) has been used to identify the existing through freight rate.

C. The appropriate fuel surcharge has been developed from the current fuel surcharge tariff (CN 7403)

D. The existing tariff for the movement of LPG from Edmonton to Prince Rupert (CN 511560-AD) has been used to identify the existing freight rate for this leg of the trip.

E. The per kilometre rate for rail transport between Edmonton to Prince Rupert was used to construct a rate for the rail movement from Whittier to Anchorage.

F. The cost of the AquaTrain service was determined to be B-(D+E).

G. The cost of the AquaTrain service was converted into a cost per kilometre per rail car for the rail barge service.

H. An estimate of the cost per tonne for a new rail service on the White Pass and Yukon Route was provided by Pacific Contract Company.

[14] Operating Cost of Trucks in Canada – 2005, Transport Canada, 2007.

I. Standard gauge rail service is available between Skagway and Whitehorse.

The results of the analysis of the cost of this hypothetical rail barge service are provided below in Table 4-5.

TABLE 4-5
Rail Barge Service Cost Estimate

Origin	Destination	Carrier	Tonnes/Car	Distance (kilometre)	Estimated Rate		Freight Charges	Cost per Tonne
					Per Tonne	Per Km		
Edmonton[1]	Prince Rupert	CN Rail	90	966	$64.90		$5,841	$64.90
Prince Rupert[2]	Skagway	AquaTrain	90	588		$3.93	$2,310	$25.66
Skagway[3]	Whitehorse	WPYR	90	109	$25.43		$2,289	$25.43
							Total	**$115.99**

[1] Based on CN Freight Tariff CN 511476-AB and Fuel Surcharge Tariff CN 7403.

[2] Based on difference in through rate from Edmonton to Anchorage via CN AquaTrain service, and through rate from Edmonton to Prince Rupert. An allowance has also been made for the short rail service from Whittier to Anchorage. The difference has been prorated for the relative distance to Skagway (588 km) versus the distance to Whittier (1,143 km).

[3] Based on an estimated rate from Pacific Contract Company.

As indicated above, the cost of moving LPG by rail and barge from Edmonton to Whitehorse has been estimated at $116 per tonne. Similar rates are applicable for the movement of other commodities such as lumber.

4.2.3 Intermodal Service

Intermodal service between Southern BC, Washington, and Alaska is currently provided by three principal carriers. These include Lynden Transport, Totem Ocean Trailer Express (TOTE) and Horizon Lines.

4.2.3.1 Lynden Inc.

Lynden Inc. is the parent company of a family of transportation and logistics companies primarily serving Alaska and the Pacific Northwest. Lynden companies serving the Alaska market provide multi modal transportation services including air, railcar barge, container barge, roll on/roll off (RO/RO) barge, and highway services to, from, and within the State of Alaska. Key Lynden subsidiaries include AML, Lynden Transport, and Alaska Railbelt Marine (ARM).

AML services both the Central and Southeast Alaska markets with regularly scheduled barge services for the movement of containerized, refrigerated, and break bulk cargo through the ports of Anchorage, Juneau, Skagway and Ketchikan among others. Lynden Transport provides LTL and truckload services via barge from Tacoma and direct via highway from Seattle, California, Alberta, and Texas.

ARM operates scheduled, once per week railcar barge service between Seattle and Whittier, Alaska in partnership with the Alaska Railroad. ARM provides a direct connection between Alaska and the North American railway system to enable direct rail car movements of various industrial commodities from origins throughout the United States to Alaska.

4.2.3.2 Totem Ocean Trailer Express

TOTE is an Alaska based transportation company offering marine and highway transportation services between Tacoma, WA and the state of Alaska. TOTE operates regularly scheduled RO/RO vessel service between Tacoma and Anchorage for highway trailers and automobiles. Non-marine services include overland highway and intermodal connections throughout the lower 48 states, Canada, and Alaska with its Alaskan line haul division providing direct service to various Alaskan destinations including Fairbanks, Valdez, and the Kenai Peninsula.

4.2.3.3 Horizon Lines Inc.

Horizon Lines Inc. is a Charlotte, NC-based container shipping and logistics company that services Alaska from the Port of Seattle, Washington. Horizon Lines provides year round, twice weekly scheduled container vessel service between Seattle and Anchorage. Truck and barge services connect these three principal destination ports with surrounding coastal and inland locations.

Table 4-6 illustrates rates for the movement of containers/trailer from Seattle/Tacoma to Anchorage. These rates are based on information from Horizon Marine Lines and TOTE. As illustrated, rates per tonne vary significantly, as the density of the loads change.

TABLE 4-6
Container/Trailer Rates to Alaska – Tacoma to Anchorage

Carrier	Commodity	Equipment	Rate	Load (tonnes)[1]	Rate per Tonne
Horizon	Building Materials	40-foot container	$4,146	19	$218
Horizon	Electronics	40-foot container	$5,809	8	$726
Horizon	Freight – All Kinds	40-foot container	$4,733	18	$263
TOTE	Beverages	40-foot trailer	$3,440	18	$191
TOTE	Groceries	40-foot trailer	$3,558	18	$198
TOTE	Department Store Merchandise	40-foot trailer	$3,558	8	$445

[1]Based on minimum expected weights for each type of equipment.

While there is no container or trailer barge service from Vancouver to Skagway, the rates for Tacoma to Anchorage can be used to roughly estimate the rates for such a service by pro-rating for the difference in distance. The sailing distance from Vancouver to Skagway is about 1,465 km while the sailing distance from Tacoma to Anchorage is about 2,382 km. Table 4-7 provides the output of this analysis.

TABLE 4-7
Estimated Container/Trailer Rates to Alaska – Vancouver to Skagway

Commodity	Equipment	Rate	Load (tonnes)	Rate per Tonne
Building Materials	40-foot container	$2,566	19	$135
Electronics	40-foot container	$3,596	8	$450
Freight – All Kinds	40-foot container	$2,930	18	$163
Beverages	40-foot trailer	$2,129	18	$118
Groceries	40-foot trailer	$2,202	18	$122
Department Store Merchandise	40-foot trailer	$2,202	8	$275

To these rates for the marine service must be added the costs of moving the containers at each end. The only common distance is for the movement from Skagway to Whitehorse, 175 km (110 miles). The incremental truck costs (@ $2.25 per kilometre) are thus $394. Depending on the size of the load (8 to 19 tonnes), this can equate to between $21 and $48 per tonne.

4.2.4 Summary

Table 4-8 provides a summary of the three analyses conducted above. For ease of presentation, this table only shows the results for heavier loads.

TABLE 4-8
Summary of Re-supply Transportation Cost Analysis (load = 19 tonnes)

Mode	Origin	Destination	Rate per Tonne
Truck	Edmonton	Whitehorse	$225 to $332
	Vancouver	Whitehorse	$315 to $464
Rail Barge	Edmonton	Whitehorse	$116
Intermodal	Vancouver	Whitehorse	$156

While it is clear that rail barge and intermodal services are cheaper than truck (depending on the actual source of the goods being moved), there remains a question "Why does so much re-supply traffic move via the Alaska Highway?" There are a number of reasons, as follows:

- There is no existing rail barge or intermodal barge service between Prince Rupert or Vancouver and Skagway. The marine terminals exist to handle this traffic if it were available. This suggests that the potential level of traffic is not sufficient to justify such a service.
- Some traffic is time-sensitive and may not be appropriate for additional handling and delays associated with a rail barge or intermodal service.

- The shipments could be part of a broader distribution network involving other delivery/pickup points along the route.
- There may not be sufficient containers available for an intermodal service. While there are significant volumes of steamship owned containers available, the rules governing their use prohibit pulling them out of their standard routing back their next destination, other than for the incidental loading of backhaul freight. This would preclude using these containers for service to Whitehorse. While CN Rail has domestic containers, they may not wish to dedicate these to a service to the Yukon as there may be a higher financial return for them on other routes (particularly high speed services between CN intermodal terminals across their network).

Notwithstanding the above, there may be an opportunity at some point for the Port of Skagway to persuade a carrier to institute a new barge service to Skagway to capture some of the existing re-supply traffic that uses the Alaska Highway.

5 Bulk Future Infrastructure Assessment

5.1 Ore/Bulk Handling Facilities

5.1.1 Infeed System

Current truck unloading involves unloading the contents of 28 to 60 tonne trailer trucks into a receiving hopper and then moving the product via a 1,000-tph feeder conveyor and stacker. Winter unloading may prove difficult and truck bed liners or the use of a release agent may be warranted. Sherwood Copper currently employs this technique.

5.1.2 Shipping system

From May 1 through September 30, the effective average berth availability for ore shipments is 36 hours per week based on the 2008 cruise ship schedules and the agreements in the Voluntary Waterway Guide – Marine Safety Task Force Southeast Alaska (2007). From October 1 through April 30, the berth is fully available for ore shipments.

Copper, lead, and zinc concentrates are shipped in bulk and would be a good market for the Port of Skagway. They are shipped in Handy (up to 38,000 dwt) or Handymax (up to 45,000) but in 5,000- to 15,000-tonne lots. Panamax (up to 77,000 dwt) are not used for copper, lead, or zinc since most of the receiving ports in Japan, Korea, and China are draft limited to Handymax (as is the Skagway ore terminal).

Gold, silver, and molybdenum are usually shipped in palletized drums or bulk bags and therefore are not a shiploader constraint but could be a storage or berth constraint.

Market Requirements

World-class coal and iron ore terminals load Panamax and Cape size ships at 4,000 to 5,000 tonnes per hour, a port cost of $4-$5 per tonne and handle 10 to 50million tonnes per year. Skagway's existing storage and handling system results in a cost of approximately $10 to $15 per tonne with throughput expectation of a few hundred thousand tonnes per year.

A $10.00 per tonne port charge is 10 percent of a $100/tonne coal shipment but less than ¼ of 1 percent of a $3.00/lb. copper concentrate shipment. Hence the marketing focus should be on base metals and not on lower value coal or iron ore tenants.

The economics of shipping coal require the use of Panamax and larger Cape Size vessels (greater than 120,000 dwt). Even if the Port of Skagway could accommodate the larger size ships, the available shipping window during the summer would not enable the larger ships to be fully loaded without interfering with the cruise ship schedule. It should be noted that the loading of coal using the existing shiploader would be at a much lower rate because coal is about one-third the density of concentrate. A completely new, freestanding coal port would be required. This report therefore assumes the port Skagway will be handling base metals only.

Ship size is dictated by loaded ship draft at the receiving port. The target ports in Japan, China and Korea for ore from the West Coast of North America are draft restricted to Handy size vessels of 42,000 tonnes or less. The shiploader at Skagway is already designed to handle Handymax vessels and there is no market demand to consider larger ships.

Project specific simulation will be required to assess each additional tenant, however the significant demurrage risk currently existing in Skagway will probably limit the capacity needs at port due to competition from other methods of shipment.

Port Shipping Limits

Berth Shipping Capacity is impacted by several factors. The first of these is the maximum Berth Availability. No berth will be available for the entire 365 days of any year due to site specific factors such as weather days, statutory holidays, and unplanned maintenance.

This maximum Berth Availability will be further reduced by marine delays such as:

- Travel from anchorage site
- Turning and positioning
- Time for berthing including tug arrival
- Inbound draft survey
- Documentation
- Positioning shiploader (at the start of loading and warping during loading)
- Remove and secure shiploader
- Departure draft survey
- Departure documentation
- Depart berth with tugs
- Clear next vessel

At Skagway, once cleared to access the loading dock, ships (with pilots and tug assist) must first stop at the concrete apron at the south end of the pier in order to load the trimming loader. The condition of the balance of the existing pier is such that the loader could not be safely handled on the wooden deck. The vessel must then be repositioned to the loader area, again secured to the dock, and be cleared by the surveyor for loading. Loading then takes place at an average rate of 750 tph (including warping time) before outgoing survey and cast off. These non-loading times vary with the port facilities, ship details, trimming needs and the skill of the trained crews. For efficient ports these non-loading times will typically range from 4 to 7 hours per vessel depending upon vessel size and local conditions. The shiploader is designed for Handymax vessels and for Handy size requires manual standoff to enable central loading.

In addition, theoretical conveyor rates are reduced by operating delays such as:

- Removing and replacing hatch covers
- Stopping while relocating to next hatch
- Breakdown delays
- Repositioning luffing boom and spout to clear ship's rigging when loading
- Delays in pile reclaim

Seasonal Issues

The terminal originally handled an annual throughput of approximately 550,000 tonnes (600,000 tons) of concentrates with 365 day availability. Capacity is now limited by the priority needs of cruise ships to 18 consecutive hours two times per week during cruise season (from May 1 through September 30) for a total of 36 hours per week. With the 18-hour window, a 5-hour non-loading time, and 750 tph, the maximum shipload will be 10,000 tonnes. The rest of the week has only a 6-hour berth availability window per day leaving only one or two hours to top off a shipment that would otherwise sail underloaded.

Most mining operations, and their customers, operate on a continuous 12-month–per-year basis. A theoretical financial option which warrants comment is to inventory ore during the cruise ship season and ship instead during the winter months. This is a model that has been used (in reverse – that is, ship in summer) in a very few far northern mines, incurring significant costs for storage that have to be made up by cost savings in transport costs, port costs, grade premiums, processing costs, etc.

Aside from the purely financial cost to the port of such "inventory", customers of most mines require a steady flow of raw material and would also want significant price reductions to offset the cost of handling seasonal shipments. The mines would in turn look to the port or transport costs to recover such costs.

The inventory model presents a serious competitive disadvantage compared to ports with freer access.

Demurrage Cost Issues

Unlike cruise ships, which have firmly scheduled arrival and departure times known prior to the beginning of the season, most ore carriers have mixed loads to pick up and discharge at two or three different ports, are exposed to more weather risk and require flexible scheduling. Ship scheduling is booked through agents for the ship lines approximately 35 days prior to planned shipping dates. Arrival of ships at Skagway is then committed within a 10-day window. With the preference given to cruise ships, this 10-day window suggests that the maximum port capacity is thirty six ships (windows) per year or 360,000 tonnes per year for regular periodic shipments. Once the carrier arrives at the port, the demurrage free loading clock starts to run. Normal shipping contracts for Handymax vessels are based on a 4,000 to 5,000 tonnes per day loading rate or 2.5 days for a 10,000-tonne shipment.

Normal de-rating of berth time to minimize demurrage costs would reduce the maximum 360,000 tonne per year capacity to 200,000 tonne per annum. However, the conflict between the 10-day scheduling window, and the 36 hours of free access to avoid demurrage suggests the probability of a significant demurrage charge must be accepted by any potential tenants. This risk will likely cap demand well below the 200,000 tonnes per annum level. Skagway's 18-hour shipping window is a significant constraint to any effort to become a world class shipping port.

5.2 Short term

Some reduction in turn around time can be made by minor improvements such as the modification of the discharge chute to facilitate trimming, construction of improved standoff

equipment for handling smaller beam (Handy) ships and improving the pier structurally to enable access by the trimming dozer to avoid the additional loading and unloading step at the concrete apron. These changes will have an impact by reducing loading cost and loading time but will not increase the annual loading capacity due to the cruise ship driven berth constraint. They are still considered warranted in the short term as the short-term goal should be to enable a 30 percent increase in capacity to load 13,000-tonne shipping lots but are not costed into the business plan as they are more operating expense related than capital cost related.

Use of an additional feeder would enable an increase in peak shipping rate from the 1,100-tph feeder limit to the approximately 1,350-tph belt conveyor system limit and slightly reduce average ship loading time. It may also be possible to speed up the system slightly to achieve a higher capacity.

The construction of additional bays for the building and installation of the remaining feeders would also partially address the first constraint of storage by adding an additional 40,000 tonnes of storage and serve two or three additional tenants.

5.3 Medium term

Some additional capacity increase over the next 10 years could occur by replacing the existing shiploader with a higher capacity unit that would be able to load vessels without the time delay of warping. The incremental cost of this step is significant and does not make sense unless the conflict with the cruise ships is resolved.

The storage constraint in the medium term could be addressed with the addition of a second storage building adjacent to the existing building. This may require partial relocation of the existing tank farm.

5.4 Long term

In the simplest terms, the long term option would require resolution of the high demurrage risk inherent in a shared dock facility with cruise ship lines. This will require a new dedicated dock facility enabling 365-day-per-year operation. At this point the capacity constraint is expected to become one of market rather than berth time.

Some consideration has also been given to the addition of off-site storage through construction of a separate storage building, complete with unloading and reclaim facility. This would be connected to the ore dock by a 2,000-tph belt conveyor arranged to enable direct hit shiploading rather than feeding into the existing ore storage building. Direct hit shiploading would be necessary because double handling of materials would make the port non-competitive. There is no significant cost savings from use of the conveyor instead of trucks due to the relatively short distance involved in comparison with the long haul from the mine to the Skagway area.

Due to the large capital cost of building the off-site storage facility and conveyor, it is not likely viable for loading when living under the constraint of 36 hours per week loading

time. It is not expected that this option will be viable, at least until a dedicated dock is available.

6 Description of Preferred Options

The options described in this section are organized to build upon each other in a logical manner that allows incremental investment in the port facilities. The projects would be constructed in step with the goals of the study as follows:

- Short term projects that can be constructed in the next 5 years
- Medium term projects that can be in the next 15 years
- Long term projects beyond 15 years

Details on the capital cost estimates for each of these concepts is provided in Appendix A.

6.1 Short Term Projects

6.1.1 Concept A

This concept is shown in Figure 6-1 and increases capacity at the ore terminal by constructing new storage sheds and associated conveyors over the existing foundation at the ore terminal. This option would allow for the expansion of the current operations with an additional 80,000 tonnes/year for a total of 140,000 tonnes/year for 2 to 3 customers. The principal advantages and disadvantages are listed below:

Advantages

- Allows for stepwise expansion
- Uses the existing ore terminal foundation to minimize cost
- Uses the existing shiploader to minimize cost
- Does not require dock improvements

Disadvantages

- Does not provide a dedicated berth for ore ships and is subject to demurrage cost risk
- Capacity limited to 140,000 tonnes

6.1.2 Concept B-1

This concept is shown in Figure 6-2 and allows for the potential to double the size of Concept A. This would be achieved by constructing new storage sheds adjacent to the existing foundations at the ore terminal. This concept would allow for an additional 160,000 tonnes/year for a total of 300,000 tonnes /year. The principal advantages and disadvantages are listed below:

Advantages

- Allows for additional stepwise expansion
- Maintains proximity to shiploader to minimize conveyance costs
- Uses the existing shiploader to minimize cost
- Throughput increases can be made without dock improvements

Disadvantages

- Does not provide a dedicated berth for ore ships and is subject to demurrage cost risk

6.2 Medium-Term Projects

6.2.1 Concept B-2

This concept is shown in Figure 6-3 and would involve adding a new berth south of the Ore Terminal. The addition of the berth would remove the cruise ship conflict from the existing Ore Terminal berth. A new conveyor and ship loader would be needed to load the ore ships. The advantages and disadvantages are listed below:

Advantages

- Provides a dedicated Ore Ship/general cargo berth for future demands
- Removes demurrage risks

Disadvantages

- TEMSCO would require relocation
- Requires dredging mouth of Skagway river
- Needs a major mine under contract to justify expenditure

6.2.2 Concept C

This concept is shown in Figure 6-4. Concept C provides a new cruise berth by extending the existing railway dock approximately 1,100 linear feet to the south. Construction would be similar to the second phase of the Railroad dock. The structure would be pile supported with rock anchors needed for the piling. Sufficient water depth is available so that dredging would not be required.

Advantages

- Uses the existing shiploader to minimize cost

Disadvantages

- Ore ships will be at risk of demurrage costs when cruise ships are at the Broadway Dock

6.2.3 Concept D-1

This concept is shown in Figure 6-5. Concept D-1 provides a new Ore Ship berth southwest of the Ore Terminal. This concept would also involve construction of a new radial ship loader. The ship loader could feed from the Ore sheds constructed in either Concepts A or B. This option would be the first phase of the long term option D-2 described in the next section.

Advantages

- Dedicated berth for Ore ships
- Removes demurrage risks

Disadvantages

- Potentially environmentally challenging in river construction
- Needs a major mine under contract to justify expenditure

6.3 Long-Term Projects

6.3.1 Concept D-2

This concept is shown in Figure 6-6. Concept D-2 expands the uplands to incorporate the new berth described in Concept D-1 above. The existing Ore Dock would be extended to accommodate two 1,000-foot cruise ships. The existing barge loading facility would be shifted to the end of the existing ore terminal and use the west side of the cruise terminal apron for loading barges. The uplands would be expanded to provide rail access and additional laydown area as needed. Appendix B provides conceptual rail and street grade separation plan and profiles.

Advantages

- Dedicated berth for Ore ship
- Two dedicated cruise ship berths
- Dedicated barge berth

Disadvantages

- Needs major mine under contract to justify expenditure
- Some environmentally challenging construction

6.3.2 Alternative Development Concept

The Yukon Port Access Strategy Study included a development concept that could also be considered. This has been presented as Figure 6-7. This concept is based on the use of a truck or rail dump facility north of the townsite and a buried conveyor to move the product to the Ore Terminal. This concept could be integrated with one of the other concepts described above.

The key difference from the other concepts is the relocation of the ferry terminal to the south end of the Ore Dock and the creation of a new cruise ship dock in place of the existing ferry terminal. This would potentially require a land swap and the approval of several parties (WPYR, AMHS, and MOS).

Advantages

- Less truck traffic through Skagway
- New dedicated cruise ship berth
- Smaller requirement for on-dock storage
- Less environmental impact than other new berth proposals

Disadvantages

- Needs major mine under contract to justify expenditure
- Needs approval of other parties and land swap

6.4 Growth Options Analysis

Table 6-1, projected shipping growth, identifies several constraints as the number of tenants at the Skagway Ore Terminal increases. It assumes that Skagway should focus on base

metals only and ignore coal and iron ore shipments as long as it remains a cruise ship port of call. The growth options follow the decision pattern in Figure 6-8.

TABLE 6-1
Skagway Ore Handling Constraints

Annual Tonnes Shipped	Typical Shipping Lot Size	Number of Ships per Year	Minimum Tonnes Stored	Number of 120-foot Storage Bays	Number of 50-tonne Trucks per Year	Number of 50-tonne Trucks per Day 250 d/yr	Number of 50-tonne Trucks per Day 150 d/yr
60,000[1]	13,000	4.6	20,000	2.7	1,200	5	8
100,000[2]	13,000	7.7	40,000	5.5	2,000	8	13
140,000[3]	13,000	10.9	60,000	8.2	2,800	11	19
180,000[4]	13,000	13.6	80,000	10.9	3,600	15	24
220,000[4]	13,000	16.9	100,000	13.6	4,400	18	30
260,000[5]	13,000	20.0	120,000	16.4	5,200	21	35
300,000[6]	13,000	23.1	140,000	19.1	6,000	24	40
300,000+	13,000						

Notes: Assumes average shipment: 13,000 tonnes, storage 20,000 tonnes, and density of 160 pounds per cubic foot.
1 truck per 15 minutes at 16 hours per day maximum = 64 trucks per day.
Yukon study allowed 350 trucks per day for highway.
Sherwood 180-foot bay stores 13,000 tonnes with heavy dozing but more cost effective at 11,000 tonnes.
Capacity of 120-foot bay = 7,333 tonnes.
Striped area indicates possible demurrage constraint.

[1] Existing Sherwood Minto.
[2] Extended building to end of pad (720-foot length).
[3] Extended building to north on new foundation.
[4] Add new building beside existing (relocate service station).
[5] Extend second building (relocate tank farm).
[6] Consider off-site storage.

By focusing on base metals there will not likely be any shipping constraint on the basis of highway capacity as the South Klondike Highway is only lightly used and has significant capacity for growth of freight traffic. Similarly, no constraint is likely based on community concerns since the maximum number of trucks per day will be less than one truck (each way) every 15 minutes.

There is a currently recognized constraint related to the size of storage available, but at least one and perhaps two additional tenants can be readily accommodated by extending the existing building.

The primary constraint is a berth occupancy constraint due to the presence of cruise ships. Resulting demurrage costs would be significant even if attempts were made to increase capacity through more on-site or off-site storage without establishing a dedicated pier. The funding, construction, and management of a new pier and related facility is a significant challenge.

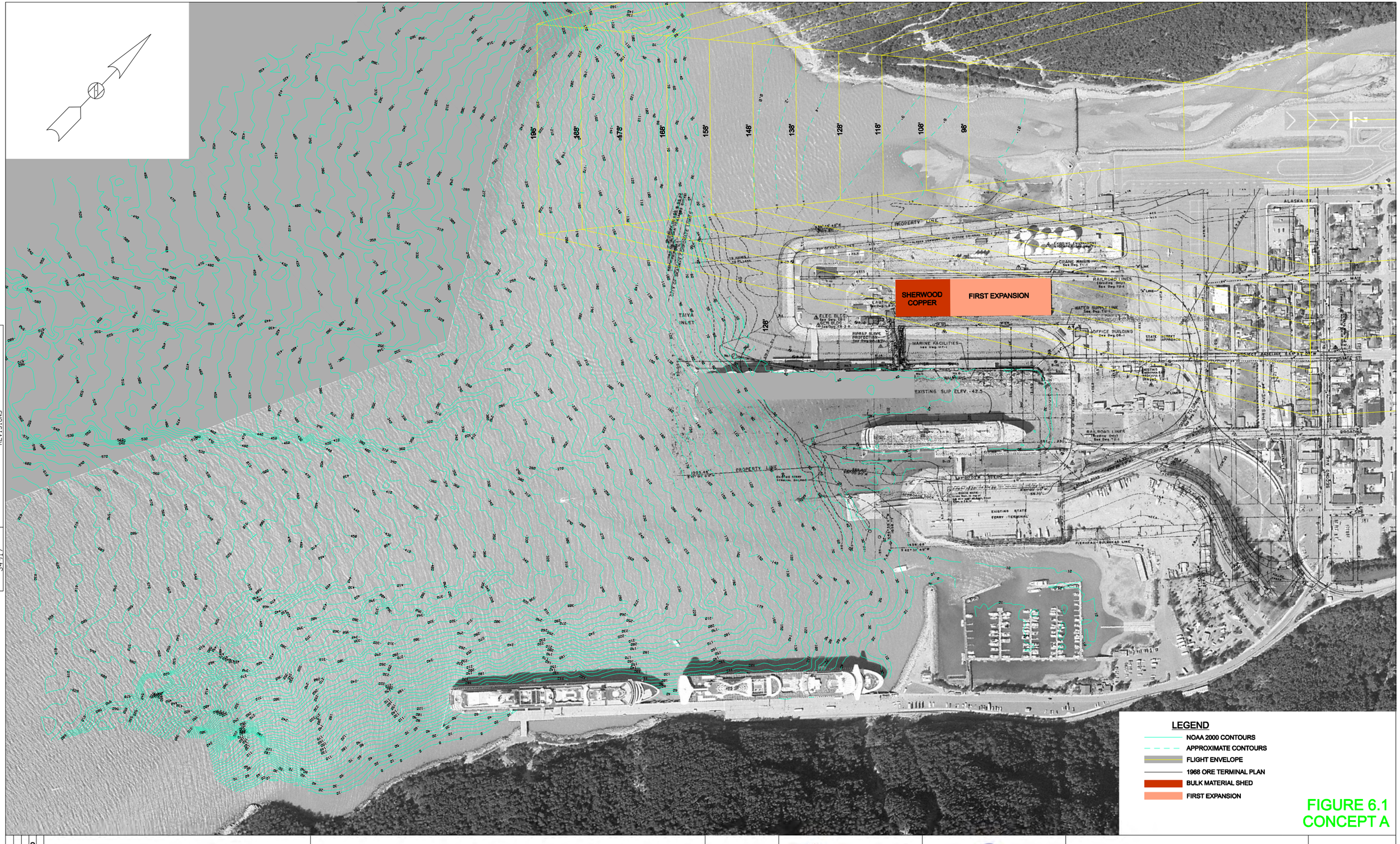


FIGURE 6.1
CONCEPT A

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D
34917						

VAULT SERIAL NO	MARK	REVISIONS	DATE	MADE	CHK'D	REV'D	DESCRIPTION
376528							

CONCEPTUAL PLANS

200 100 0 200 400
SCALE IN FEET

Municipality of Skagway

CH2MHILL

SKAGWAY PORT DEVELOPMENT

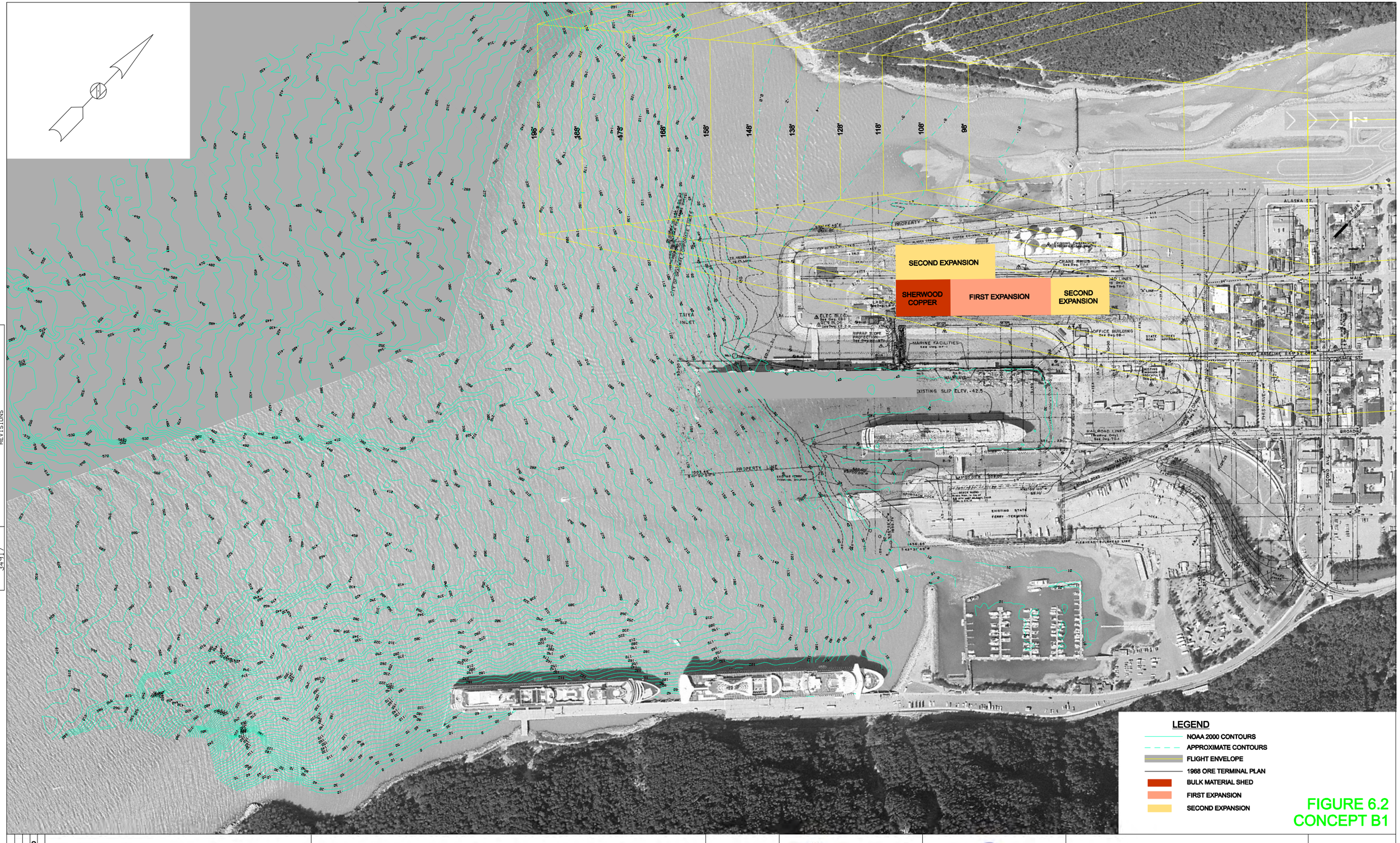


FIGURE 6.2
CONCEPT B1

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D
34917						

VAULT SERIAL NO.	MARK	DATE	DESCRIPTION	MADE	CHK'D	REV'D
376528						

CONCEPTUAL PLANS

200 100 0 200 400
SCALE IN FEET

Municipality of Skagway

CH2MHILL

SKAGWAY PORT DEVELOPMENT

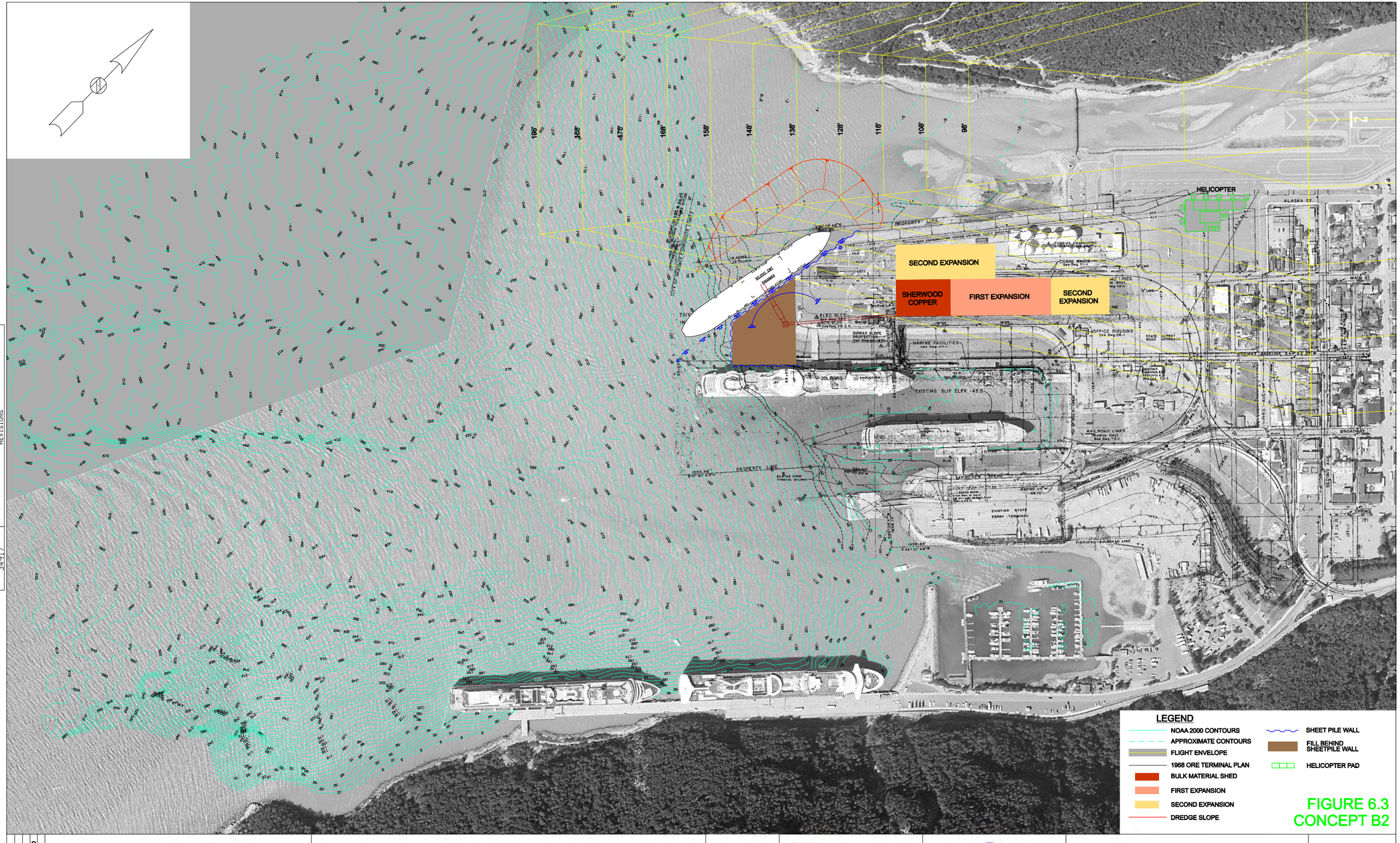


FIGURE 6.3
CONCEPT B2

VAULT SERIAL NO.	DATE	MARK	NATURE REVISIONS	MADE	CHK'D	REV'D
34917						

VAULT SERIAL NO	MARK	REVISIONS	DATE	MADE	CHK'D	REV'D	DESCRIPTION
376528							

CONCEPTUAL PLANS

200 100 0 200 400
SCALE IN FEET

Municipality of Skagway

CH2MHILL

SKAGWAY PORT DEVELOPMENT

VAULT SERIAL NO.	DATE	MARK	REVISIONS
34917			NATURE
			MADE CHK'D REV'D

SECOND EXPANSION

SHERWOOD COPPER | FIRST EXPANSION | SECOND EXPANSION

TAIYA INLET

EXISTING SLIP ELEV. -42.5

PROPERTY LINE

ALASKA ST.

MAIN

STATE ST.

BROADWAY

SECOND AVE.

CORINTH

PIER HEAD RAILROAD LINE

EXISTING STATE FERRY TERMINAL

MARINE FACILITIES

OFFICE BUILDING

RAIL ROAD LINES

GRAND PRINCESS CLASS

LEGEND

- NOAA 2000 CONTOURS
- APPROXIMATE CONTOURS
- FLIGHT ENVELOPE
- 1968 ORE TERMINAL PLAN
- BULK MATERIAL SHED
- FIRST EXPANSION
- SECOND EXPANSION
- CRUISE BERTH

FIGURE 6.4
CONCEPT C

VAULT SERIAL NO.	MARK	DATE	CHK'D	REV'D	DESCRIPTION
376528			MADE		

CONCEPTUAL PLANS

200 100 0 200 400
SCALE IN FEET

Municipality of Skagway

CH2MHILL

SKAGWAY PORT DEVELOPMENT

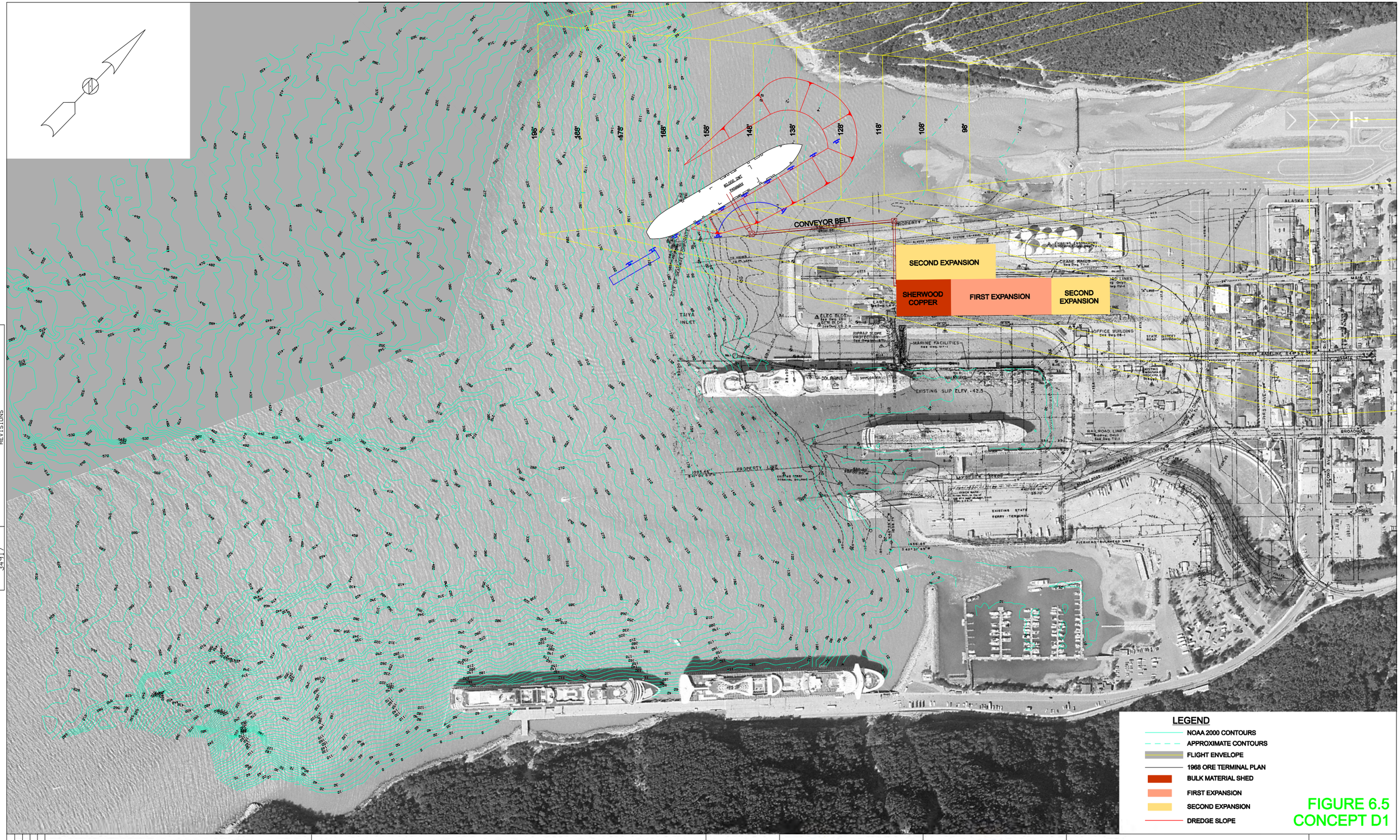


FIGURE 6.5
CONCEPT D1

VAULT SERIAL NO.	DATE	MARK	NATURE
34917			REVISIONS
			MADE CHK'D REV'D

VAULT SERIAL NO.	MARK	REVISIONS	DATE	MADE	CHK'D	REV'D	DESCRIPTION
376528							

CONCEPTUAL PLANS

200 100 0 200 400
SCALE IN FEET

Municipality of Skagway

CH2MHILL

SKAGWAY PORT DEVELOPMENT

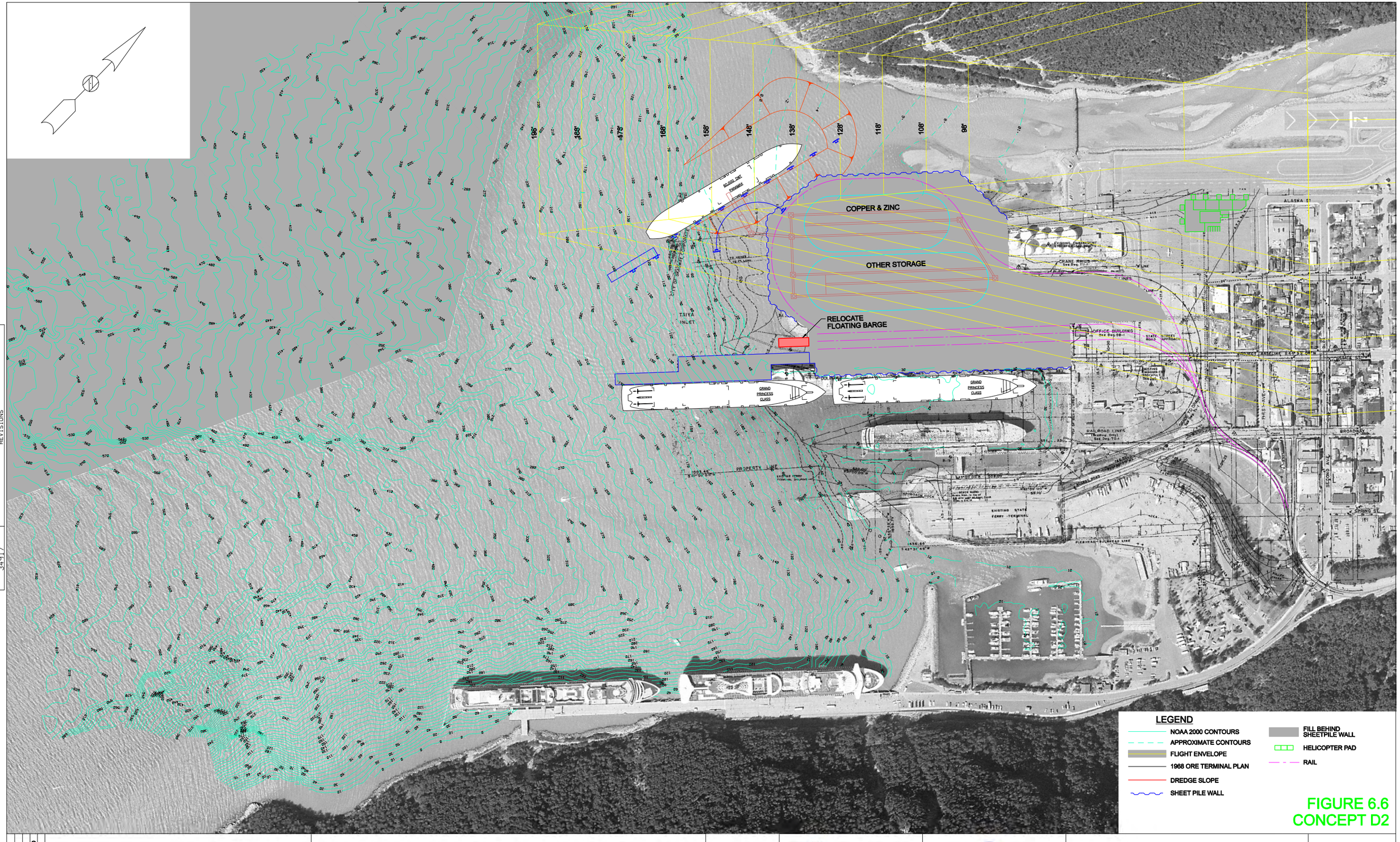


FIGURE 6.6
CONCEPT D2

VAULT SERIAL NO. 34917 | DATE | MARK | REVISIONS | NATURE | MADE | CHK'D | REV'D

VAULT SERIAL NO 376528 | REVISIONS | MARK | DATE | MADE | CHK'D | REV'D | DESCRIPTION

CONCEPTUAL PLANS

200 100 0 200 400
SCALE IN FEET

Municipality of Skagway

CH2MHILL

SKAGWAY PORT DEVELOPMENT

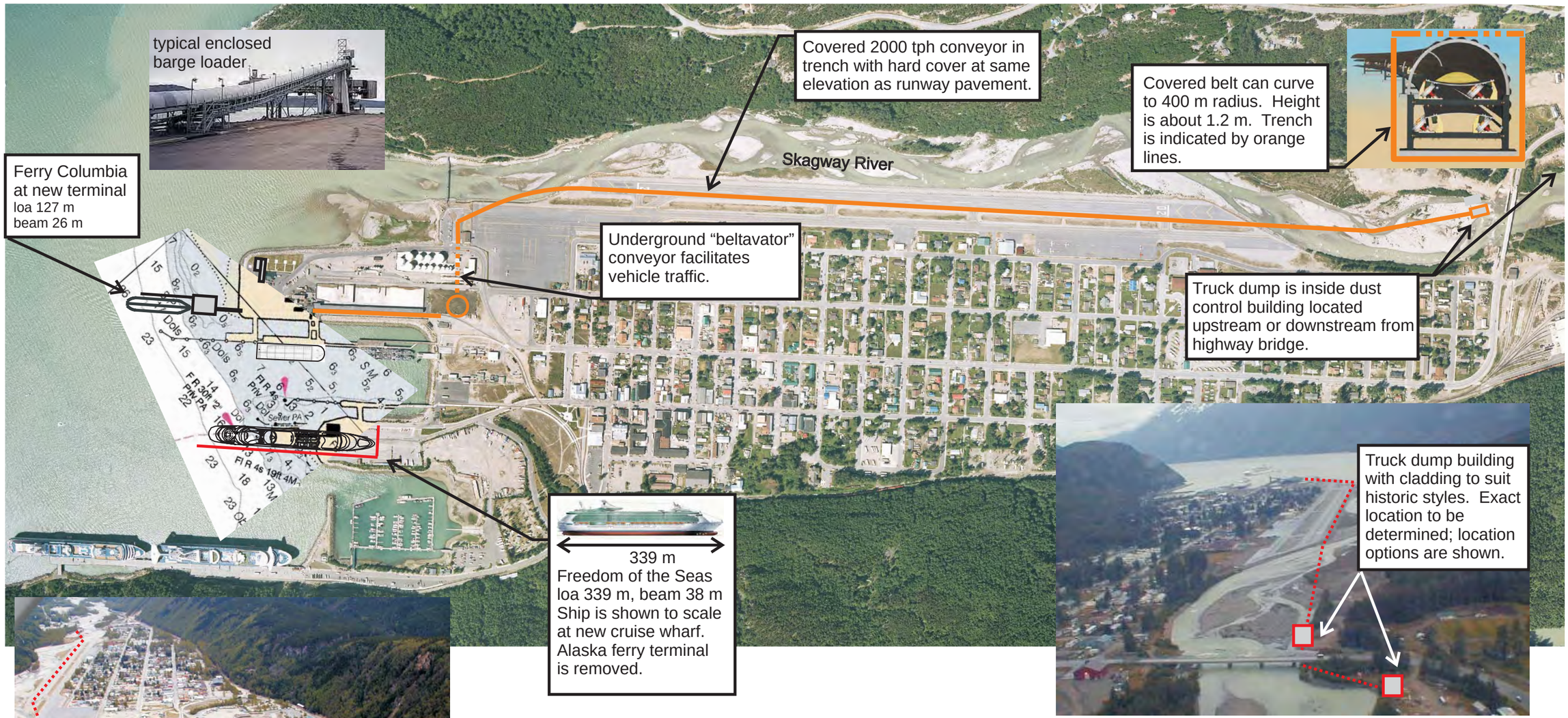


FIGURE 6.7
BULK SHIPPING CONCEPT

CONCEPTUAL PLANS

Municipality of Skagway

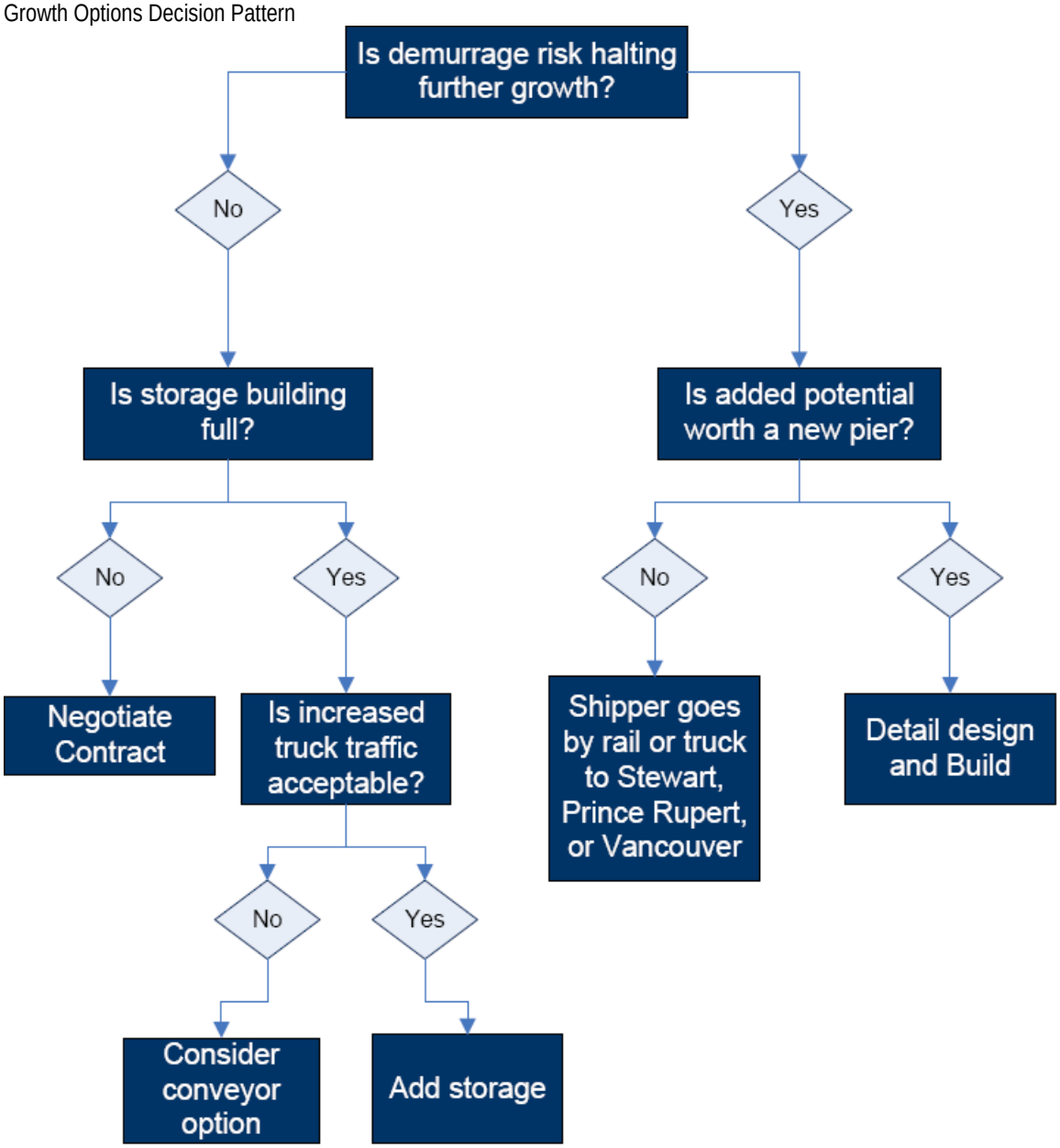
Source:
Yukon Ports Access Strategy, KPMG

SKAGWAY PORT DEVELOPMENT

NATURE | REVISIONS | MADE | CHK'D | REV'D | MARK | DATE | VAULT SERIAL NO. 34917

VAULT SERIAL NO. 376528
REVISIONS | MARK | DATE | MADE | CHK'D | REV'D | DESCRIPTION

FIGURE 6-8
Growth Options Decision Pattern



7 Analysis of Options

This chapter focuses on the financial analysis of the options for redevelopment of the Skagway waterfront. It also contains a subjective assessment of some of the other issues that must be considered in choosing an option for development.

7.1 Financial Model

A financial model has been developed to assess the potential commercial viability of each of the scenarios for port development in Skagway. A copy of the model is contained in Appendix C of this report.

The key outputs of the model are as follows:

- Cash flow – on an annual basis
- Net income – on an annual basis
- Internal Rate of Return – over a 30-year period

The internal rate of return (IRR) has been used as a proxy for determining project viability. Typically, a project of this nature will require an IRR of at least 10 to 12 percent to be commercially viable. This can be equated to a weighted average cost of capital (WACC). Thus if any scenario achieves an IRR of say 12 percent, it would be able to afford the required amount of capital expenditure with a WACC of 12 percent.

This is an appropriate level of financial analysis for this study for a number of reasons:

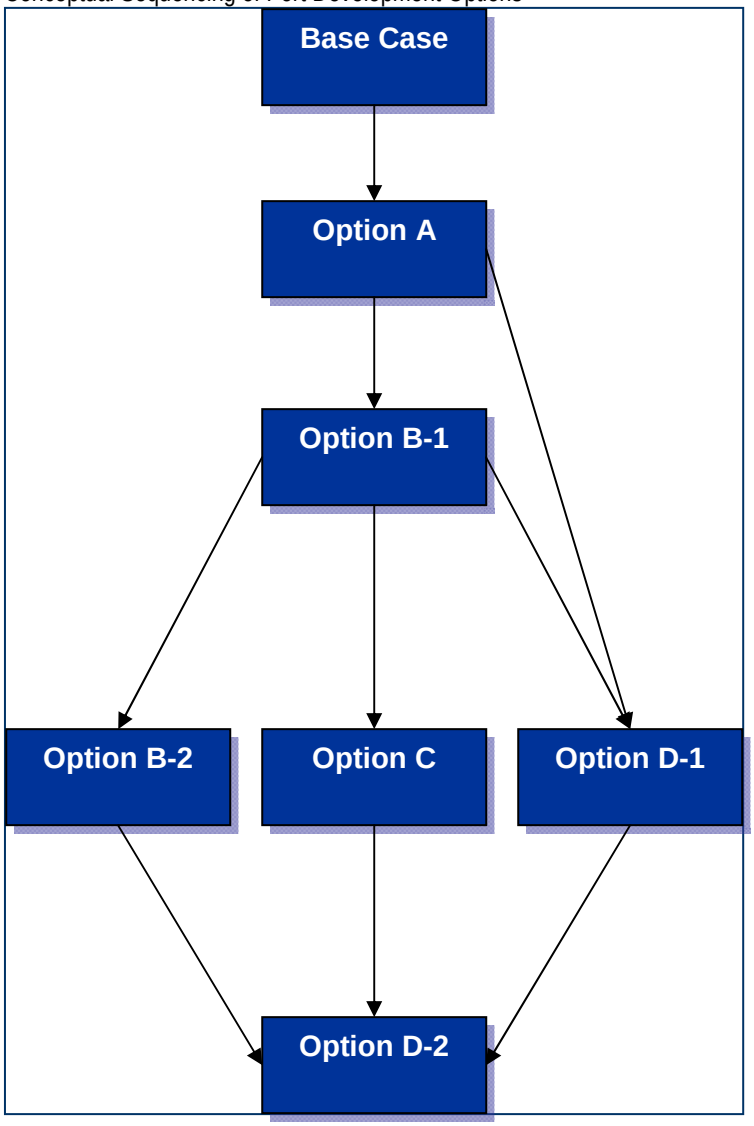
- The estimates of capital costs are based on very conceptual development plans.
- Some of the development concepts need to be reviewed by regulatory and other agencies for acceptability before more detailed cost estimates can be prepared.
- The timing of mine development is impossible to predict, hence the revenue stream is very uncertain.
- Detailed operating costs need to be developed in conjunction with a more fulsome design on the terminal and assessment of its requirements for staffing, utilities, etc.

7.1.1 Sequence of Options

As described earlier in this report, a series of options have been developed for the development of the port. These options generally build upon each other, such that early port infrastructure is incorporated into later phase developments within the port. This minimizes the amount of infrastructure that is orphaned at a later date.

Figure 7-1 illustrates the potential sequencing of development that has been considered in this report.

FIGURE 7-1
Conceptual Sequencing of Port Development Options



7.1.2 Model Assumptions and Inputs

The following describes each of the model inputs and the assumptions behind those inputs. All revenues and costs are expressed in terms of 2008 United States dollars (USD). The exchange rate is assumed to be $1 U.S. = $1 CAN.

7.1.2.1 Capital Costs

Table 7-1 provides a summary of the amount of capital expenditures for each option.

TABLE 7-1
Capital Cost Assumptions (USD 2008)

Option	Description	Capital Cost ($x million)
A	Extend existing shed to full footprint	$15.0M
B-1	Option A plus construction of a new shed of a similar size to the existing shed	$42.3M
B-2	Two sub-options exist: a. Option B-1 plus new ore ship berth and radial loader b. Option B-1 plus new ore ship berth and radial loader and a third shed	 $108M $135M
C	B-1 plus construction of new cruise ship berth at Railway Dock	$85M
D-1	Two sub-options exist: a. New ore ship berth west of existing facility with new shed and expansion of existing shed b. New ore ship berth west of existing facility with new shed and expansion of existing shed and a third shed	 $103M $130M
D-2	D-1a plus new cruise berth at Ore Dock and larger storage facilities with potential rail access	$151M

7.1.2.2 Traffic

Table 7-2 provides a summary of the volume and timing of traffic development for each option. The only commodities being considered are concentrates. It should be noted that Options B-1 though D-1 assume slow growth of about 40,000 tonnes per year, but increasing each year to the capacity allowed by each of the options – equivalent to the production of one small to medium size mine per year. Option D-2 assumes the development of a major mine.

While timing has been attached to the increase in volumes, this timing is only illustrative and is necessary for the purpose of the financial analyses. Traffic could develop in a much different pattern than that presented below. The benefit of the suggested approach to port development is that it is based on modules that can be added when traffic warrants. It is a milestone basis for port development.

TABLE 7-2
Traffic Assumptions

Option	Volume
A	40,000 tonnes in 2008 and 60,000 tonnes in 2009 and thereafter
B-1	Increasing from 60,000 tonnes in 2009 to 140,000 tonnes 2012 and thereafter
B-2	Increasing from 60,000 tonnes in 2009 to 300,000 tonnes in 2015 and thereafter If a third shed is added, traffic continues to increase to 460,000 tonnes in 2019
C	Increasing from 60,000 tonnes in 2009 to 300,000 in 2015 and thereafter
D-1	Increasing from 60,000 tonnes in 2009 to 300,000 tonnes in 2015 and thereafter If a third shed is added, traffic continues to increase to 460,000 tonnes in 2019
D-2	Increasing from 60,000 tonnes in 2009 to 1,000,000 tonnes by 2015. This option assumes development of a major mine such as the Selwyn Resources Project in the Howard's Pass area of the Yukon.

7.1.2.3 Operating Costs

Operating costs include general and administrative costs, utilities, operating and maintenance labor, purchased services, operating and maintenance supplies and other miscellaneous costs. Based on a review of bulk terminals in Anacortes, Los Angeles, Prince Rupert and Vancouver, these costs are estimated at being $6.00 per tonne.

7.1.2.4 Other

The other principal assumptions are as follows:

- Inflation – 2.0 percent per annum
- Depreciation – straight line over 30 years

7.2 Results of Analysis

The results of the analysis are presented in Table 7-3. The analysis is indicative only, and the results could vary significantly if any assumptions about capital costs, operating costs, mine output, long term traffic prospects and other matters are different than those contained in the model.

TABLE 7-3
Results of Financial Analysis

Option	Description	Revenue Per Tonne Required to Achieve IRR of 12%
A	Extend existing shed to full footprint	$16.30
B-1	Option A plus construction of a new shed of a similar size to the existing shed	$21.10
B-2	Two sub-options exist:	
	a. Option B-1 plus new ore ship berth and radial loader	$44.20
	b. Option B-1 plus new ore ship berth and radial loader and a third shed	$41.20
C	B-1 plus construction of new cruise ship berth at Railway Dock	$36.20
D-1	Two sub-options exist:	
	a. New ore ship berth west of existing facility with new shed and expansion of existing shed	$42.50
	b. New ore ship berth west of existing facility with new shed, expansion of existing shed and a third shed	$39.30
D-2	D-1a plus new cruise berth at Ore Dock and larger storage facilities with potential rail access	$29.30

As demonstrated in Table 7-3:

- Option A has the lowest required revenue per tonne ($16.03 per tonne) to achieve the necessary 12 percent IRR. This rate is believed to be consistent with the rate currently charged to Sherwood Copper at the existing ore terminal.
- The addition of a second ore shed (Option B-1) increases the required rate to just over $20 per tonne. While this is a significant increase, it is necessary to fund the existing bulk materials handling systems and storage space associated with a new building.
- Option B-2 adds a new dedicated ore berth and radial ship loader at the southern end of the Ore Dock. This is a significant improvement in materials handling, but it comes at a price. Depending on throughput, the rate would need to increase to $41 to $44 per tonne.
- Option C involves the development of a new cruise ship berth at the Railway Dock on top of the increased storage capacity for concentrates at the Ore Dock. This is similar to Option B-1 but with a new cruise ship berth. The required revenue goes up to about $36 per tonne without any improved throughput capacity beyond that achieved through Option B-1.

- Option D-1 involves the development of a new dedicated ore berth, storage and a radial ship loader west of the existing Ore Dock. While materials handling is improved, like Option B-1, it comes at a price. The required revenue is near $40 per tonne, about the same as Option B-2, which provides similar functional benefits.
- Option D-2, the high volume option, involves extensive redevelopment of the Ore Terminal, building off either Option B-2 or D-1. The required revenue is about $29 per tonne, reflecting the spreading of capital costs over a significantly larger traffic base.

Given the transportation cost differential between shipping concentrates by truck to Skagway or Stewart (see Table 4-2), the potential rates indicated above are still below the "Skagway Advantage" for most mines. For mines closer to Watson Lake, the advantage is smaller and the choice of port would depend on the port development option being considered.

7.2.1 Options to Improve Financial Viability

Financial viability for all of the options could be improved through either a contribution to fund a portion of the construction costs or an annual operating cost contribution. Such an infrastructure investment provides benefits to a wide number of parties beyond those involved in the operation of the Ore Dock; hence it could be argued that the contribution would be provided on the basis of the benefits to these other parties.

For example, movement of the cruise ship dock would improve security in the port, provide a more defined and attractive entrance to the commercial area of Skagway for cruise ship passengers and provide operational efficiencies to operators of both the Ore Dock and the cruise ship facilities.

Similarly movement of the concentrate loading facility to the southern end or western side of the existing Ore Dock would have a similar beneficial impact on cruise traffic through better separation of activities and removal of the existing ore loader.

As an example of the potential impact, consider that for Option B-2 (new ship loader and 300,000 tonnes capacity), a contribution could:

- Reduce the required revenue by $1.80 per tonne if a one time contribution (grant) of $5 million was provided.
- Reduce the required revenue by $3.80 per tonne if an annual contribution (grant) of $1 million was provided.

7.2.2 Risks to Financial Viability

The principal risks to financial viability include the following:

- **Error in the capital cost estimates** –further detailed design work would help reduce the risk around these numbers.
- **Error in the operating costs –** once a detailed design is completed a more robust assessment of the operating costs should be undertaken.

- **The private sector operator/developer expects a higher rate of return –** depending on the risk tolerance of the operator/developer, the condition of financial markets and expectations for traffic, a higher WACC may be required.
- **Volumes are not achieved –** this is perhaps the biggest risk and may require a significantly higher hurdle rate if the private sector is to take an interest in the project.

A sensitivity analysis has been conducted on Option B-2b to provide an indication of the degree of sensitivity to the assumptions. The results are contained in Table 7-4.

TABLE 7-4
Results of Sensitivity Analysis – Option B-2b

Description of Change to Assumptions	Revenue Per Tonne Required to Achieve IRR of 12%
Base Case	**$41.20**
WACC of 15%	$50.00
Capital Costs 10% Higher than Planned	$44.80
Traffic only Reaches 80% of Capacity	$45.90
Operating Costs 10% Higher than Planned	$41.80
All Four of the Above	$60.50

As indicated in this Table 7-4, the required revenue per tonne could vary significantly.

Given the magnitude of the capital costs and the uncertainty about volumes and the cost estimates, there are a number of considerations for the MOS:

- While Skagway may have the borrowing power to raise the funds necessary for some of the early options, this may not be a prudent risk for the Borough to take by itself.
- State/Federal grant funding or private sector partners could reduce the risk to Skagway in becoming involved in port development.
- Consideration could be given to working with the Yukon Government and shippers to access Gateway funding from Transport Canada to help fund the development of improved facilities at the Ore Dock.
- Skagway should seek capital contributions from the private sector for capacity expansions. This will reduce the financial risk to the community as well as involve the major shippers in the planning and financing for the terminal
- The potential return on investment for improvements to the Ore Dock is likely to be significantly smaller than those obtained from the cruise ship business.

- There is no need to pre-build a large facility for concentrate shipments. The plan that has been developed in this report provides a phased approach to port development that can provide the required infrastructure in a timely manner. Most mine development will be quite predictable, due to the processes that must be followed, including the raising of capital for mine construction. This provides the headstart necessary to respond to the industry's needs for port infrastructure.
- Skagway should consider pre-approvals for the proposed development plan such that the necessary permits can be obtained in the minimum amount of time.

7.3 Other Considerations

The development of additional capacity to handle the movement of concentrates must also be examined from a number of other angles such as:

- **The volume of truck traffic on the highway and through the Borough** – While there is no definitive measure of what level of truck traffic would be acceptable, 64 trucks per day (32 in each direction) might be the limit. This would result in one truck every 15 minutes for 16 hours per day, 250 days per year. Assuming an average load of 50 tonnes per truck, the system would be able to handle 400,000 tonnes per year.
- **The potential impact on airport operations –** some of the options will impinge on the protected air space around the airport, particularly Options D-1 and D-2. While it may be possible to obtain approval from the State for these options, the Skagway airport is significantly constrained by geography and it may not be prudent to consider these options as they could further constrain operations. There is also a possibility under these two scenarios that the lighting associated with the ship loading system could cause confusion for aircraft approaching from the south.
- **The potential environmental implications of development –** Options B-2, D-1, and D-2 all involve some construction in the delta of the Skagway River. Options D-1 and D-2 are particularly invasive in terms of dredging the river estuary and using some of the existing riparian zones for a new berth on the west side of the existing Ore Dock. Option B-2 will require some dredging of the estuary, but much less than the other two options, and will not require the use of the riparian zone along the west side of the Ore Dock to be developed. The potential environmental impacts of these options will need to be reviewed with the appropriate local, state and federal agencies for potential issues and solutions. Further discussion on environmental considerations can be found in Appendix D.
- **Relocation of TEMSCO's operation** – Options B-2, D-1, and D-2 all require that the helicopter base operated by TEMSCO be relocated to the apron in front of the passenger terminal at the airport. The apron is sufficiently large for this to be accommodated, but it may inconvenience TEMSCO and local residents.
- **Potential interference with or from cruise ships docked at the Broadway Dock** – During the course of this study, it was discovered that if a cruise ship is berthed at the Broadway Dock; concentrate loading at the Ore Dock cannot proceed, due to potential conflicts with the cruise ship if the ore ship needs to be warped along the

Ore Dock. There is limited room between the Ore Dock and the Broadway Dock, which is the cause of this concern.

Demurrage is typically charged if a vessel is unable to proceed to dock, is delayed during loading or is unable to deberth on time. For a Handymax ship (the typical sized ship used for the movement of concentrates), the demurrage charges could amount to $25,000 per day. This would be a significant penalty. Preliminary modeling suggests that if the Ore Dock is also used by cruise ships, the penalty could average about $6 to $7 per tonne during the cruise season. Demurrage would be lower if it only related to interference with cruise ships at the Broadway Dock.

No penalties would be incurred during the balance of the year. The potential for demurrage could also limit the interest of shipowners in sending their vessels to Skagway, as they could be more productively and profitably used elsewhere. This favors the development of new ore ship berths.

Table 7-5 provides a summary of the potential impact of these matters on the choice of options for development. These impacts have been provided a subjective rating based on a modified stop-light coloring scheme to aid interpretation.

TABLE 7-5
Summary of Factors Affecting Choice of Option

Option	Truck Traffic	Environment	Airport	TEMSCO	Vessel Interference /Demurrage	Port Capacity
A	Not an issue	Not an issue	Not an issue	Not an issue	Some potential interference already being encountered	Significant constraint
B-1	Not an issue	Not an issue	Not an issue	Not an issue	Probable interference with cruise vessels at Broadway Dock and Ore Dock	Potential constraint – little flexibility for future growth
B-2	May be at the maximum truck traffic level acceptable to residents	Potential impact due to dredging of the river estuary	Potential minimal impact	TEMSCO will need to be relocated	Not an issue	Significant capacity potential
C	Not an issue	Not an issue	Not an issue	Not an issue	Potential interference with Broadway dock	Potential constraint – little flexibility for future growth
D-1	May be at the maximum truck traffic level acceptable to residents	Potential major environmental impact due to dredging and impact on the riparian zone	Potential significant impact	TEMSCO will need to be relocated	Not an issue	Significant capacity potential
D-2	Truck traffic level is likely to be completely unacceptable	Potential major environmental impact due to dredging and impact on the riparian zone	Potential significant impact	TEMSCO will need to be relocated	Not an issue	Highest capacity option

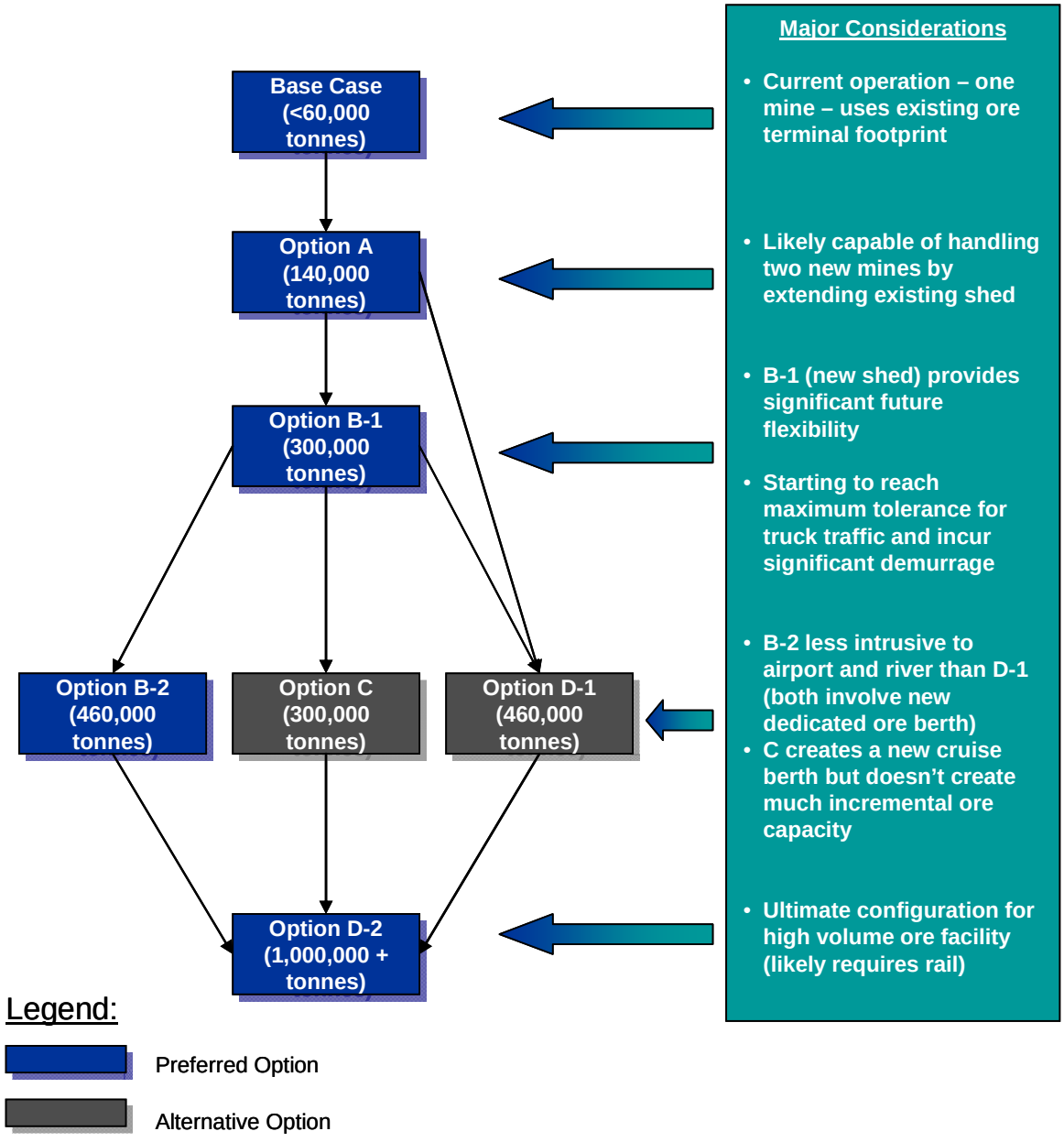
Key

	No issue
	Minor issue
	Moderate issue
	Difficult issue

7.4 Conclusions

Figure 7-2 provides a summary of the analysis of options undertaken in this chapter. As indicated in this figure, incremental development through Options A, B-1, B-2, and finally D-2 would appear to be the preferred sequence. Timing of development will be entirely dependent on the development of the mining industry in the Yukon.

FIGURE 7-2
Summary of Analysis



8 Port Governance

This chapter provides a summary of options for port governance and concludes with an assessment of the issues that need to be considered in developing a governance model that will work for the Port of Skagway.

8.1 Scope of Governance

Governance encompasses the safeguarding and appropriate use of financial and other resources; vesting of the ownership of assets and the degree of freedom available to modify or pledge the assets; the processes established for decision-making and for ratification of decisions; and limits established as to the scope of activities and operations to be undertaken. In a ports setting, the governance structure influences several important factors including the following aspects.

- Planning and approval processes: the types and number of stakeholders, including particular levels of government, involved in planning, consultation and approval; internal and external hurdles; timelines and timeliness of decisions especially with respect to new development
- Access to funding: different sources of funding are available depending on jurisdiction and governance model
- Representation on the Board of Directors: may include representatives of one or more levels of government (federal, provincial/state, local), port infrastructure operators, users of port facilities, and the general public
- Operations: scope of permissible or desirable operations varies depending on governance and jurisdiction, including the mix of marine versus non-marine activities and the balance sought between profitability and economic development; extent to which operations are privately controlled or available to multiple users
- Supply chain linkages: relations with other players in the supply chain, including sharing of information; partnerships with other supply chain participants for mutually beneficial projects; cross-ownership of facilities by shippers, shipping lines, etc.

Each of these factors is relevant in the development of the Yukon's port access strategy. Moreover, the list of ports that could play a role in future economic development for the Yukon covers several different governance types, particularly when considering the potential for longer term development. Therefore, various port governance frameworks bear consideration and are reviewed here.

8.2 Clarification of Role

Prior to proceeding to a survey of different governance models, it is worth clarifying the different roles that can be played by entities active within a port. Parties within a port can

have a number of roles; because the parties carrying out these roles can vary from port to port, it is important to distinguish who plays each of these roles at a particular port:

1. Responsibility for overall coordinated and safe actions, and for shared infrastructure and operations to the benefit of all port users.
2. Ownership of a particular marine terminal.
3. Operation of a particular marine terminal.

Coordination and shared operations (#1) refer to activities that are carried out for the benefit of all port actors, to ensure safe operations (for example harbor master duties such as directing vessel traffic and on-going security measures); to improve works shared by all users and providers (for example channel dredging); or to promote the common interests of the port through marketing activities.

The ownership of cargo handling facilities (#2) may be vested in the public sector or the private sector. Although there may be a single owner of facilities within a given port, it is more common to have multiple owners of various infrastructures within a given port.

The operator of a cargo handling facility (#3) may be the facility's owner, or the operator may be distinct from the owner. In the latter case, the operator typically provides lease payments to the owner in exchange for the right to operate the facility; the operator then has primary responsibility for attracting sufficient business at adequate prices to cover the costs of the lease, other operating costs, and generate a profit. Capital improvements to cargo handling facilities (for example repairing berth structures) and capital acquisitions (for example new cranes) may be undertaken by either party, depending on the terms of their mutual agreement.

Sometimes a single entity takes on all three roles. This usually occurs where the entity is a public sector agency (for example a public sector port agency responsible for directing vessel traffic, maintaining channel depths, etc. also owns and operates one or more terminals in the port, such as a "government wharf"). Occasionally all three roles can be adopted by one or more private sector companies, in the case of a private port. More commonly, an entity takes on roles #1 and #2 (for example a public sector port agency also owns, but does not operate, a container terminal); or an entity takes on roles #2 and #3 (for example a bulk commodity handling facility is operated by its private sector owner(s)). In the latter case, the terminal may be made available for the use of multiple shippers (for example Neptune Bulk Terminal and Vancouver Wharves in Vancouver), or it may be restricted largely or entirely for the use of a single user (for example Agricore United in Vancouver).

8.3 Port Governance Models in Canada

Historically, responsibility for ports in Canada rested with the federal government, for ports of virtually all sizes. The federal government's powers traditionally included the establishment of ports, setting of fees, close oversight of business plans, authorization for capital spending, direct employment of port personnel (at smaller ports), and nomination to boards of directors (at larger ports). In the 1980s, significant movement began to be made by governments in Canada and internationally to extricate themselves wholly or partly from

the provision of commercially-oriented infrastructure and services, and from numerous state-owned and state-run enterprises.

The government's close involvement in the operation of hundreds of ports came to be seen as counter to this major restructuring of the state economy and provision of services. Thus, in 1995 the Government of Canada announced the National Marine Policy, which outlined the federal government's intent to modernize and rationalize the Canadian marine transportation system. Over the past decade there has been marked progress towards devolution of the federal government's role and responsibilities with respect to ports. This has included efforts of the federal government to divest itself of responsibility for managing port operations and funding port infrastructure at smaller and mid-sized ports, and reducing the federal government's involvement in overseeing the business affairs at, and capital funding of, larger ports.

A vital element of the National Marine Policy's modernization strategy was the division of federal ports into three operational categories:

1. **Sites eligible for Canada Port Authority (CPA) status —** the largest ports that are financially self-sufficient and serve a diversified traffic base, and which will remain under the authority of the federal government.
2. **Sites designated as Regional/Local —** ports varying greatly in size, but which shared the common feature that they were slated for divestiture by the federal government.
3. **Sites designated as Remote —** ports that provide the only means of access to isolated communities, and which were intended to continue to be operated by Transport Canada unless local stakeholders express an interest in acquiring them.

The majority of Regional/Local ports have been removed from the authority of the federal government, although some have not yet been transferred or otherwise removed from federal responsibility. Thus, Regional/Local ports really encompass two groups from a governance perspective: those that are under the authority of local interests, and those which continue to be directly managed by Transport Canada. Although these ports may include considerable private sector ownership and operation in terms of their infrastructure, each of the above-mentioned types of ports can be considered "public" in the sense that they include at least some facilities for the use of, and are required to provide services at published rates for, any qualified vessel operators and shippers. By way of contrast, a few ports in Canada are "private" ports which have no such requirement.

The Port of Skagway probably best resembles the Canadian Regional/Local port model.

8.4 Port Governance in the U.S.

The two greatest distinguishing governance features of U.S. ports, compared to the Canadian experience, are (1) the drastically reduced role of the federal government at even the largest ports, and (2) a very different mix of sources of funds.

Although Canada's major ports have gone through a period of commercialization, their assets remain vested with the federal government. The federal government continues to exert important influence on port operations and leadership, through such means as the

setting of borrowing limits, restrictions on allowable activities as defined in the Letters Patent, and the appointment of the majority of CPA's Boards of Directors (including those meant to represent the interests of users). This level of federal involvement is nowhere to be seen in the U.S. This general absence can be traced to the provisions of the U.S. Constitution[15].

The U.S. has never had a national port plan or strategy, and no commercial port or group of ports has ever been under the complete control of the federal government. The port industry, historically, has been decentralized. The U.S. Constitution granted to the Congress power to tax goods crossing the borders of individual states. The Constitution limited discrimination among states, stating: "no preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another..." Thus, U.S. federal governments upheld the policy that the exercise of governmental policy affecting ports was to be free from competitive or discriminatory bias among ports (and hence among states).

Although some port facilities were developed originally by private sector interests such as the railways, it is fair to say that, for over a century, the vast majority of ports in the U.S. are agents of local, regional or state governments. (A few private ports do exist, such as for the export of bulk petroleum products from the Mississippi Delta, but they are rare exceptions.) The federal government does play several roles related to ports, but in general exercises little authority. The roles that it does play (in addition to operating departments such as Customs and the Coast Guard) include: constructing and maintaining channels and harbors through the United States Army Corps of Engineers (USACE), and data collection and some policy development through the U.S. Maritime Administration (MARAD). MARAD's role is not comparable to Transport Canada, in that it does not have ownership of the assets for, nor exercise oversight of, the large ports. MARAD formerly undertook various initiatives to promote ports (in general, without favouring particular ports), and port-related research activities; these have been largely delegated to the industry associations that act as a collective voice for U.S. ports.

In important operational respects, most U.S. ports of any size are similar to larger Canadian ports, in that they operate largely as "landlord" ports, owning land, structures and facilities, while most terminal operations are carried out by private sector companies on the basis of lease arrangements with the port authority.

8.4.1 Key Governance Features of U.S. Port Authorities

Some observers have identified as many as eleven different port governance models in the U.S. Such micro analyses are not particularly helpful at understanding the basics of U.S. port governance; however, depending on how many variables one chooses to consider, one could consider scores of models. Instead, we focus here on their key features, as noted before: ports' role as agents of state or local governments, and their funding sources. In terms of relationship to their respective government authority, the following models are among the most common or most important in the U.S.:

- A single port with its own enabling legislation, owned by a state government (for example Virginia Ports Authority [VPA]; in addition to this characterization, VPA is a

[15] "North American Port Reform: The Canadian and American Experience," Michael C. Ircha, *International Journal of Maritime Economics*, Vol. 3, 2001, pp. 198–220.

good example of a port authority that has established quasi-private operating subsidiaries, such as Virginia International Terminals Inc.)

- A single port that is jointly owned by more than one state government (for example Port Authority of New York-New Jersey: while the bi-state model is not at all common, the sheer size of the port of New York-New Jersey warrants inclusion of this model)
- Multiple ports with a common piece of enabling legislation and common reporting relationship to a state government: (for example Harbors Division, Department of Transportation, State of Hawaii with authority over ten ports including Honolulu)
- A port that is under the authority of a municipality (for example from very small ports such as Haines, Alaska, to very large ports, such as the Port of Los Angeles—a department of the City of Los Angeles, often referred to as the Los Angeles Harbor Department).

Various governance parameters can vary significantly among U.S. ports: for example, open versus closed meeting requirements, audit reports, financial reporting relations and restrictions, borrowing authority limits, taxing authority (if any), access to local or state loans or grants, employee hiring practices[16]. Consideration of the functioning of Boards of Directors gives an indication of the wide variety of treatments at U.S. ports for this single aspect of governance:

- Whether or not the Port has a Board (most do, but some do not).
- Whether the Board is appointed or elected.
- If appointed, whether by the mayor, Borough manager, governor, or two governors; and whether approval is required by state legislatures or municipal councils.
- Whether board positions are explicitly reserved for specific stakeholder groups (users, labour, geographic regions).
- If elected, whether by district or at-large.

8.4.2 Funding and Financing Sources

Sources of Canadian port financing consist of: borrowings from banks and the issuance of commercial bonds; income from investments; and cash generated from operations.
U.S. ports have a greater variety of sources of capital, in general. In addition to the sources noted for Canadian ports, the following sources are available at times at U.S. ports (not all sources are available at every port):

- The right to issue tax-exempt Revenue Bonds. The interest on these bonds, like the interest on U.S. Municipal Bonds, is not subject to income tax, and therefore, the interest rates associated with those bonds are lower than other commercial interest rates (as the bondholders are willing to accept the lower tax-free rates).

16 Ibid.

- The right to issue General Obligation Bonds. Like Revenue Bonds, these are tax exempt; rather than being secured by the revenues of the port authority, they are secured by the collection of municipal taxes.
- Direct participation in municipal tax revenues in some states (such as Washington State).
- A dedicated share of transportation-related taxes levied in some states (such as Virginia).
- A variety of government grants. Although numerous grant programs exist, their total impact is relatively small when compared with the other sources of financing, at least at large, financially-stable ports.
- Cross-subsidies from other Port Authority operations, including airports, bridges, tunnels, logistics services, and real estate. More profitable, non-marine activities are particularly important at some large urban ports, including New York-New Jersey and Tacoma. Canadian ports are highly restricted from engaging in non-marine transport activities.
- In the case of New York-New Jersey, insurance proceeds as an exceptional item relating to the events of September 11, 2001.

TABLE 8-1
U.S. Public Port Financing Methods

Year	Port Revenues	GO Bonds	Revenue Bonds	Loans	Grants	Other
2002	38.3%	23.4%	13.2%	4.2%	7.7%	13.1%
10-year average, 1993–2002	40.3%	10.3%	28.4%	3.1%	7.4%	10.4%

Source: "Port Development Expenditures," U.S. Department of Transportation, Maritime Administration, May 2004.

Note: "Other" funding includes State transportation trust funds, State and local appropriations, property tax and sales tax revenues.

The governance structures of ports in both countries guide them to operate as economic drivers for the community as not-for-profit organizations. Consequently, ports are generally satisfied with relatively low returns on equity from operations. U.S. ports view their major role as regional economic engines stimulating development and jobs[17]. The U.S. emphasis on economic development often leads to reduced port prices coupled with enhanced levels of service[18]. Such price and service competition among ports reduces port net revenues leading to a greater reliance on state and local government funds to cover financial shortfalls.

[17] Op cit.

[18] "Reduced port prices" refers to port authority user charges assessed at lower rates than they would be in the absence of access to other sources of funds: it does not imply that U.S. port charges are generally lower than at comparable Canadian ports.

8.4.3 Pros and Cons of U.S. Port Governance

It is difficult to generalize about the advantages and disadvantages of U.S. port governance models because of their wide variety. Certainly one of the greatest advantages for U.S. ports is the level of direct and indirect financial support available from governments or through government actions, including in some cases taxation authority, and more generally through the avenues of direct appropriations, public bond market issues backed by government, and tax-exempt bond issues at attractively low interest rates. This extent of government financial support is a fundamental difference between public ports in Canada and the U.S.

Not coincidentally in light of the extent of government financial support, U.S. port authorities consistently view economic development as an important part of their mandate, with an emphasis on being "economic engines" in their respective regions. In spite of this emphasis, U.S. ports consistently manage to operate at good levels of productivity and are well-managed enterprises.

8.5 Port Governance in Alaska

Port governance in Alaska typically takes a variety of forms, but all derive from powers granted to the municipalities through their Municipal Codes. Many communities operate their ports as a separate department of the municipality, while others, such as Skagway, operate it within the overall administrative structure of the municipality.

Overall governance is provided by either an Advisory Board or a Port Commission/Harbors Board. Examples of each are as shown in Table 8-2.

TABLE 8-2
Style of Governance at Alaskan Ports

Advisory Boards	Commissions/Harbors Board
Skagway (current)	Anchorage
Seward	Wrangell
Ketchikan	Valdez
	Juneau

Advisory Boards are usually instituted to provide input from the general public, business community and port users on issues related to port planning, development and operation. A typical mandate for such a body would be as defined by the Seward Port and Commerce Advisory Board:

"It is the responsibility of the board to:

1. *Report annually to the City Council at the first Council meeting of the new fiscal year and at any other time as may be requested by the Council;*

2. *Make recommendations to the City Council concerning the design and coordination of projects to promote and develop domestic and international transportation and trade links through the port of Seward;*

3. *Provide input to the City Council on matters involving the establishment of industry related to the movement of fish resources and bulk commodities such as coal, grainy timber, minerals and other resources from Alaska through the port of Seward;*

4. *Advise the City Council on matters involving the establishment of support services pertaining to the port of Seward; and*

5. *Perform other duties as requested by the City Council."*

Port Commissions or Harbors Boards typically have much broader mandates as well as powers to operate, plan, develop, regulate and finance port facilities. A typical statement of powers for such a body would be as defined by the City and Borough of Juneau Docks and Harbors Board.

"Subject to state laws and City and Borough ordinances, the City and Borough Docks and Harbors Board shall generally exercise all powers necessary and incidental to operation of all port and harbor facilities in the public interest and in a sound business manner. In particular, and without limitation on the foregoing, the board shall:

1. *Be responsible for the operation, development and marketing of municipally owned and operated port and harbors, including such facilities as boat harbors, docks, ferry terminals, boat launching ramps, and related facilities except as designated by the Assembly by resolution.*

2. *Adopt pursuant to CBJ 01.60 and enforce regulations necessary for the administration of the facilities under its management.*

3. *Prescribe the terms under which persons and vessels may use the facilities and shall establish and enforce standards of operation.*

4. *(A) Within the docks and harbors appropriation and in conformity with the rates of pay established for municipal positions of similar responsibility, establish, and may amend, the pay plan for harbor employees.*

   (B) The Docks and Harbors Department shall conform to the City and Borough Personnel Management Code, the City and Borough Personnel Rules, Personnel Classification Plan, and the Manager's policies relating to personnel. The Docks and Harbors Department shall utilize the services of the Personnel Department when hiring or terminating any employee, when responding to grievances, in labor agreement negotiation, and in substantial disciplinary matters. The City and Borough Personnel Director shall annually certify that the Harbor Department Classification Plan conforms to that utilized for employees of the Manager.

5. *Administer and dispose of City and Borough tideland, submerged land, and other land as provided by the Assembly by resolution as subject to Docks and Harbors Board Administration…*

6. *Shall administer the design and construction of all capital improvements on lands managed by the docks and harbors board unless otherwise specified by the Assembly by resolution. The board may propose capital improvement projects to and apply for funding from state and federal agencies; provided, that such requests shall be subject to prioritization by the Assembly with other municipal capital improvement funding requests prior to application for funds. The board shall, no later than November 30 each year, advise the assembly of its*

recommendations for capital improvements to be included in the six-year capital improvement plan prepared by the manager.

7. *Shall enter into memoranda of understanding and similar agreements with public agencies for port or harbor purposes."*

8.6 Governance Issues for Consideration

The appropriate governance model for the Port of Skagway is largely defined by the issues and opportunities that have been discussed in this report. Table 8-3 notes the key factors and their implications for an appropriate governance model.

TABLE 8-3
Port Governance Considerations

Factor	Governance Consideration
The port is the major economic generator within the MOS and its ongoing viability is critical to the economic health of the Borough.	This suggests that the management of the port needs to be elevated in terms of importance and governance within the MOS. The creation of a Port Commission, Harbor Authority, or a similar organization with management, planning, development and operating capabilities needs to be implemented. The Borough also needs to have ultimate control over the port to ensure that the economic benefits are achieved. Overall port management or planning should not be left to the private sector by default. One individual, with experience in managing ports, should be hired to oversee operation, planning and marketing of the port. This will ensure that the port is seen as being professionally managed – providing a level of credibility to the Borough's efforts.
The MOS has a vested interest in the operation of the port. The Borough receives significant revenues from passenger tariff taxes and the new Alaska Cruise Ship Cruise Tax.	The Borough, through a ports department (with a Port Commission, Harbors Board or similar organization) needs to be able to manage and plan the future of the port and not leave this important responsibility to other parties with different interests.
The economic justification for using the Port of Skagway (versus competing ports) requires careful messaging about competitiveness and future development plans. The Port of Skagway also needs to be seen as proactive and professionally managed.	This suggests that a formal Port Commission, Harbor Authority or similar organization needs to be created. The mandate of this new organization needs to include: – Marketing the port – Development of a long term plan – Working closely with potential port users
The Yukon is expected to be the source of the large majority of both inbound and outbound industrial traffic using the port of Skagway. The Government of the Yukon has a significant interest in the development of port infrastructure to serve their future needs	Create an advisory role through either an Advisory Board or through an Advisor member to a formal Harbors Board/Port Commission. This position would have no voting privileges but would be useful for provision of feedback on plans and as a means of representing other interests in the Yukon.

TABLE 8-3
Port Governance Considerations

Factor	Governance Consideration
The MOS is unlikely to have sufficient financial capacity to take on development of the port as contemplated in this report.	While the Borough may be able to fund development of some of the short term improvements, some of the longer term developments are likely to be beyond the risk tolerance and financial capacity of the Borough to undertake on its own accord. A new port organization with the ability to raise funds, utilize port revenues for port related matters and partner with the private sector is required.
Both the cruise and mining industries have significant and perhaps competing interests in how the port is developed.	If the Borough chooses to create a Port Commission, Harbors Board or similar organization, consideration should be given to structuring memberships on the Board or Commission such that the appropriate stakeholder groups are represented. This is typical requirement of such organizations.
The MOS currently has little control over how waterfront property is developed or used due to existing long term leases to other parties.	The Port of Skagway must be able to at least influence if not manage the lands necessary for efficient operation of the port. The Port should be proactive in terms of land management, including ensuring that the Borough's interests are protected by ensuring that terms of existing leases are being followed and that where changes would be beneficial, negotiating with appropriate parties for those changes. The Borough should investigate the interest of AIDEA in divesting its interest in the sub-lease of the Ore Terminal and the terms and conditions under which such a divestiture might be considered.
The MOS has limited lands suitable for port activities or to be operated in support of port activities.	The Port of Skagway should be developing a long term land-use strategy for port and associated lands. This should guide the Port, Borough and users of waterfront lands on appropriate uses, future development and public interest matters.
The Borough receives very little revenue directly from its ownership of waterfront lands.	The creation of a new governance structure provides the opportunity to play a more significant role in future development and diversify revenue sources.

The MOS has already started on the process of formalizing a more fulsome role in the management of the Port. Appendix E of this report contains a preliminary draft of a revision to the Skagway Municipal Code that deals with the port. This document touches on many of the issues that have been outlined above. The mandate and proposed powers for the new entity proposed for Skagway includes, in part:

> *"The department shall endeavor to manage a thriving, competitive intermodal port providing maximum benefit to the citizens of the borough by means of entrepreneurial capitalistic management practices in concert with private industry, other government entities and by the department's own means on a self sustaining basis. Specifically the department shall:*
>
> 1. *Confer with any similar body or any other state or country for the purpose of adopting a comprehensive plan for future development and improvement of the port;*
>
> 2. *Consider and adopt detailed and comprehensive plans for future development and improvement of the port and coordinate its plans with the borough and the state and other political jurisdictions;*

3. *Either jointly with a similar body, or separately, recommend to the proper departments of the government of the United States, or any state or other political jurisdictions the carrying out of any public improvement for the benefit of the port;*

4. *Represent the port before all federal, state agencies and other political jurisdictions;*

5. *Cooperate with other public agencies and with industry, business, and labor in port district improvement matters;*

6. *Enter into any agreement with other states, agencies, authorities, commissions, municipalities, persons, corporations, United States, or other political jurisdictions to affect any of the provisions contained here;*

7. *Approve construction of all wharves, piers, bulkheads, jetties, or other structures;*

8. *Prevent or remove, or cause to be removed, obstructions in harbor areas, including the removal of wrecks, wharves, piers, bulkheads, derelicts, jetties or other structures endangering the health and general welfare of the port; in case of the sinking of a facility from any cause, such facility or vessel shall be removed from the harbor at the expense of its owner or agent so that it shall not obstruct the harbor; cause the relocation, change or removal of dock lines and shore or harbor lines;*

9. *Acquire, manage, and operate projects as the department considers necessary or appropriate to serve the departments' purpose.*

10. *Acquire, own, construct, redevelop, lease, maintain, and conduct land reclamation and resource recovery with respect to unimproved land, residential developments, commercial developments, intermodal, mixed-use developments, recreational facilities, industrial parks, industrial facilities, and terminals, terminal facilities, warehouse, municipal terminal railroad and any other type port facility;*

11. *Acquire, own lease, sell or otherwise dispose of interest in and to real property and improvements situate thereon and in personal property necessary to fulfill the purpose of the port department;*

12. *Regulate land use within the boundaries and lots of the department by acquiring rights-of-way and property of any kind or nature within its port districts necessary for its purposes. The port department shall have the right and power to acquire the same by purchase, negotiation, or by condemnation, and should it elect to exercise the right of eminent domain, condemnation proceeding shall maintained by and in the name of the port department, and it may proceed in the manner provided by the laws of Alaska or the Skagway Borough. The power of eminent domain shall not apply to property actively being used in relation to or in conjunction with harbor trade or commerce, unless such use is by a port department lease in which event the power of eminent domain shall apply."*

9 Implementation Considerations

This chapter discusses the potential implementation plan for the port development plan. The implementation plan covers three phases of activity:

- Short term (1 to 5 years).
- Medium term (6 to 15 years)
- Long term (beyond 15 years)

More detail is provided for the short term, as it is clearer what the requirements will be during this period.

9.1 Short Term Actions

The MOS has already embarked upon some of the short term actions suggested in the Yukon Ports Access Strategy prepared in 2006. The creation of a Port Steering Committee reflects the commitment of the MOS to move forward with further port development that meets the needs of potential users and the community. The following actions represent those that are needed to give port development some momentum and prepare the MOS and the port for longer term actions.

1. **Governance –** The MOS has taken the first step in developing a governance structure for the port, as discussed in the previous chapter. We recommend that the MOS continue with implementation of a governance structure based on the principles discussed in the previous chapter including:

    a. Representation on the agency that is put in place to govern the port.

    b. Determine the powers required to effectively manage the port (regulations, land ownership – both on-dock and off-dock, financing, etc.).

    c. Ensure that one individual (either a new hire or a current MOS staff member) has full time responsibility for the management of the port.

    d. Acquire the capability to manage port projects.

    e. Reinforce relationships with key stakeholders/groups.

2. **Create the Skagway Advantage –** Earlier in this report, we discussed the concept of the Skagway Advantage. The Borough and the Port need to take this concept and develop an appropriate marketing/branding strategy that:

    a. Notes that the port is open for business.

    b. Highlights the MOS's commitment to port development, as evidenced by the creation of a new port organization.

c. The port wants to partner with the private sector (mines, motor carriers, marine carriers, terminal operators and others) to ensure that the port reaches its potential.

d. Identifies the advantages to using the port compared to other alternatives for moving freight to and from the Yukon.

e. Proactively targets potential sources of traffic (mines, major projects, etc.).

3. **Engage the Community –** It is clear that redevelopment of the port will have an affect on the community. These changes can be both positive and negative. It is important to engage the community to:

   a. Determine their concerns.

   b. Seek ideas.

   c. Showcase the plans and develop buy-in.

   d. Discuss the need for port redevelopment and what it will do for the community in both the short and longer term.

4. **Engage Key Port Stakeholders –** The success of any port development plan depends on the buy-in from key port stakeholders including the cruise ship industry, key port tenants or leaseholders and AIDEA. Each has a different perspective on port operation, different needs and decision processes. It is important that the MOS and the Port understand these matters such that ongoing plans can involve these stakeholders and determine how they can best contribute to the future success of the port. These stakeholders could have ideas and or funding that will assist in the further development of the port.

5. **Work with AIDEA regarding the existing facility**. In the short term, most needs of the mining industry can probably be handled through expansion of the existing ore shed and perhaps creation of a second shed if required. AIDEA appears to have this process well in hand. AIDEA should be consulted to determine their future (longer term) plans regarding their role in port facility ownership and operation. This could be the first step in devolution of these responsibilities to the MOS and the Port on a sustainable basis.

6. **Engage Regulatory Agencies –** The port development plans that are proposed in this report will have potential impacts on the environment, the community and the airport. As with any major development initiative it is import to meet with the regulatory agencies on an informal basis to discuss the nature of the project and seek guidance/advice/comments on development and the permitting processes/issues. Key agencies to be contacted include:

   a. Federal Aviation Authority – Impact of any of the options on airport operations/safety and construction restrictions.

   b. USACE – Concerns over the construction of new facilities that will impact waterways.

c. Department of Natural Resources – Concerns over the construction and operation of the new facilities on local habitat.

d. Department of Environmental Conservation – Concerns over the construction and operation of the new facilities on the environment.

e. Department of Homeland Security/Canadian Border Agencies – Implication of changes in the port on security/safety. Implications of additional truck traffic on the ability to clear traffic at the existing border crossings on the Klondike Highway.

7. **Environmental Baseline** – Identify and undertake the appropriate environmental baseline studies that will facilitate future permitting/approval processes for the program or particular elements of the program. Discussions with regulatory agencies should provide an indication of the appropriate timing of such work and how long it will be valid if a particular development is delayed for a period of time.

   A significant issue to be examined is the physical and legal nature of the existing concentrate contamination on the seabed adjacent to the Ore Dock. Questions to be considered include:

   a. How big an issue is this? How extensive is the contamination (amount and over what area)?

   b. What is the extent of legal liability (who and quantum)?

   c. How does this impact further development on the Ore Dock, including matters such as dock rehabilitation?

   d. What sorts of indemnifications are possible or practical?

   e. How does this affect shippers?

   f. How does this affect project finance ability (especially private sector)?

Many of these questions have been dealt with (at least in part) as a result of the re-opening of the Ore Terminal for the movement of Sherwood Copper's concentrate. Discussions with Sherwood Copper and AIDEA could provide significant information.

Other potential areas of examination include:

a. Air quality monitoring and modeling
b. Water quality monitoring
c. Habitat assessments
d. Archaeological/heritage impact assessments

8. **Funding Availability** – The MOS now has a source of funding that was not present two years ago, that being the Borough's share of the head tax on cruise ship passengers. This is a good start at providing funding for new initiatives that will enhance the port.

   Private sector funding will become more viable once the MOS has established a new port organization and is seeing as effectively managing the port. This has been the case

at other west coast ports, where significant investments of time and resources have been put into marketing the port and its particular advantages (for example, Prince Rupert Port Authority). Private sector port operators and users are loath to invest in ports where the local government is not closely identified with the port and is actively seeking proposals for improving service or facilities.

There are a number of programs that may have the ability to provide funding for portions of the proposed program. The review should focus on identifying:

a. The nature and sources of available funding

b. The degree of fit of the program (or individual elements of the program such as the cruise ship dock) with the objectives of the funding programs

c. The level of discussion required for application for funding. What does the business case look like for each funding agency? What information is required?

d. The application process (timing, submitting party, decision-making process, etc.)

e. The regulatory/policy implications of accepting funding from a particular source (what are the implications for timing, review, flexibility, etc.)

9.2 Medium Term Actions

The medium term is likely to be the period in which most change will occur within the port. Some of the mining projects that are currently in the planning and development stage could be coming to fruition, requiring significant investments and changes to the ore handling facilities in the port. In addition, some of the proposed major projects may be in their implementation stages. This will require significant financing, planning and permitting efforts. Whereas the first 5-year period will be focused on gaining capabilities and profile, the medium term is likely to be focused on significant developments, beyond just simple expansions of storage sheds.

The key activities are likely to include:

1. **Development of detailed engineering plans –** Detailed engineering plans will be required for each new project for financing, permitting and development purposes.

2. **Applications for environmental permits and approvals where required –** The application process should be started for improvements where specific permits or approvals are required. Some of the processes may be time-consuming.

3. **Land acquisition –** Where land is required for a particular development, appropriate arrangements to acquire the land should be initiated. Outright purchase, land swaps, land-use bylaws, and options could be considered as some of the key property management and acquisition tools.

4. **Funding applications for relevant pieces of infrastructure –** Once it is clear that new infrastructure is required for which funding may be available from government programs, the applications should be completed and submitted.
5. **Planning for major projects –** The construction of a major project such as one of the pipelines provides an opportunity for the MOS to consider a number of issues:
    a. Can new port infrastructure be justified (or funded by the project proponent) that will provide lasting benefits to the Port?
    b. What land-use decisions need to be made that will facilitate this traffic?
    c. How will the port stakeholders need to work together to deal with this traffic?

9.3 Long Term Actions

Fifteen years from now will see the end of the current lease with WPYR for the waterfront lands. If nothing else, this will provide the MOS with an opportunity to build on what has worked up to that point and new ideas for organization, ownership and operation of the waterfront.

Beyond this, the Port or the MOS will be monitoring performance and responding to new opportunities as they arise.