

Container Port Development: Revising the Port Alberni Trans- Shipment Hub (PATH) Proposal

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MASTER'S THESIS

*Container Port Development:
Revising the Port Alberni Trans-Shipments Hub
(PATH) Proposal*

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List of Acronyms / Abbreviations

AGV	Automated Guided Vehicle
BC	British Columbia
C\$	Canadian Dollar
CBSA	Canada Border Services Agency
CEF	Container Examination Facility
KM	Kilometer
NM	Nautical Mile
PAPA	Port Alberni Port Authority
PATH	Port Alberni Trans-Shipment Hub
T2	Port of Vancouver, Roberts Bay Terminal 2
TEU	Twenty-foot Equivalent Unit
ULCS	Ultra-Large Container Ship
US(A)	United States (of America)

1. Introduction

1.1. Discussion of the Problem

In 2014, a port authority with approximately C\$5 Million in annual revenue¹ located in a small town with a declining population² on the West Coast of Canada that had recently been named the worst place to live in Canada³ and that furthermore had no history of handling containerized cargo⁴ proposed the creation of a C\$1.6 Billion container port development known as the Port Alberni Trans-Shipments Hub.⁵

The Port Alberni Trans-Shipments Hub (PATH) proposal is a container port development proposal being promoted by the Port Alberni Port Authority (PAPA). The need for a facility like PATH can best be understood within the greater context of the movement of consumer goods via container from Asia to the West Coast of North America. Container traffic is expected to increase from 55.8 million TEUs in 2015 to 75.7 million TEUs in 2025 and 116.3 million TEUs by 2050.⁶ While trade tensions between the U.S. and China may add uncertainty to these projections,⁷ quantifying those uncertainties is beyond the scope of this report, and it will be assumed that all else being equal, volumes will trend upwards over time.

One reason why Port Alberni is well-placed to become a trans-shipments hub between Asia and North America is the relatively short distance from Asia to Port Alberni vs. other major West Coast ports. A map showing the distances from Shanghai to major container port destinations on the West Coast of North America is shown below as Figure 1. Note the shorter distance to ports in Canada or the Pacific Northwestern United States vs. Los Angeles.

¹Dickson Dusanj & Wirk, "Port Alberni Port Authority Financial Statements Year Ended December 31, 2017."

²Statistics Canada, "Port Alberni 2016 Census."

³The Huffington Post B.C., "Canada's Worst Place to Live Is Port Alberni."

⁴Operations Economics Inc., "Port Alberni Port Authority Economic Impact Study 2016."

⁵CPCS, "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study."

⁶Penfold, Davison, and Verschuere, "Container Traffic Forecast Study – Port of Vancouver, 2016."

⁷Tan and Tianqiong, "Trans-Pacific Shipping To Drop 10% If U.S. Imposes More Tariffs on China Imports, COSCO Says."



Figure 1. Source: www.safeshippingbc.ca

Due to frequent congestion at the West Coast's busiest ports, Los Angeles and Long Beach (see Appendix A), other West Coast ports have grown their container-handling capacity to meet the increased demand. For example, the Ports of Manzanillo and Lazaro Cardenas in Mexico (which are in close proximity to each other; only Lazaro Cardenas is shown in Figure 1) are designed to move containers quickly via rail to Mexico City and onwards to Texas, where they are then distributed throughout the U.S.⁸

The information above provides context for the Port Alberni Trans-shipment Hub (PATH) proposal. The Ports of Seattle / Tacoma and Vancouver are the third and fourth busiest West Coast container ports, respectively, handling a combined 6.9 million TEUs in 2017. (See Appendix A) However, navigation from the Pacific Ocean inland to these ports is difficult and time-consuming. The PATH project seeks to add value by development of a 5 million TEU container terminal on the West Coast of Vancouver Island in easy proximity to the Pacific Ocean,⁹ as shown below in Figure 2, which illustrates both the proposed route a container ship would take into and out of

⁸"New Rail Services Connect Lazaro Cardenas with US."

⁹Norbury, "Vancouver Island Transshipment Hub Proponents Court Investors."

the PATH terminal as well as the navigational steps that traffic going to Vancouver or Seattle must take to reach those destinations:

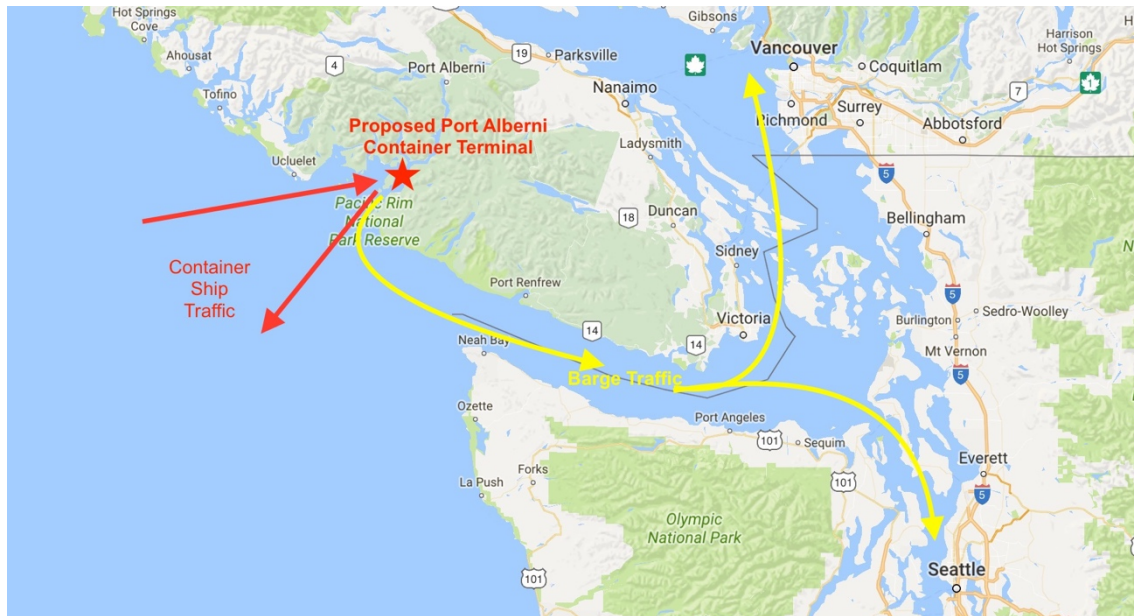


Figure 2. Source: maps.google.com

Under the PATH proposal, container ships, rather than taking the 3 to 4 days necessary for trips to Vancouver or Seattle / Tacoma¹⁰ would instead offload their cargo at Port Alberni and then go back out to sea. Under a multiple-port-of-call scenario the container ships would then proceed to their next destination, possibly Oakland or Los Angeles. Under a single-port-of-call scenario the container ships would then return to Asia fully loaded with export containers. In either scenario, the containers that had been off-loaded at PATH would be loaded onto smaller barges at Port Alberni which would then proceed to their final destinations, either Vancouver, Seattle / Tacoma or any of the many smaller ports in the area where larger container ships could not normally offload.¹¹

The primary issue that the Port Alberni Port Authority has grappled with in regards to the PATH proposal is the scope and cost. A 250-acre (approximately 1 square kilometer) yard with 43 automated stacking cranes, 8 automated gate cranes, 135 automated guided vehicles for in-yard container movement, and 20 ship-to-shore cranes calls for an up-front investment of between C\$1.6 Billion and C\$2 Billion.¹²

¹⁰Port Alberni Port Authority, "PATH Pre Feasibility Study Project Brief."

¹¹Norbury, "Vancouver Island Transshipment Hub Proponents Court Investors."

¹²CPCS, "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study."

This document is being approached as a consulting report to the Port Alberni Port Authority in which the Port Alberni Trans-Shipments Hub proposal will be analyzed, critiqued, and changes will be proposed. The desired result of this report is a recommendation to the “client” to make the PATH proposal more attractive to potential investors, both from the public and private sectors.

1.2. Executive Summary of the Thesis

Section 1 of this Thesis introduces the topic to be discussed. In Section 2, consulting processes and approaches are discussed, and an appropriate consulting approach is settled on. In Section 3, the current condition of the Port Alberni Port Authority is analyzed. In Section 4, stakeholder objectives relative to the Port Alberni Trans-Shipments Hub are reviewed. In Section 5, other recent container port projects from around the world are discussed. In Section 6, the 2014 PATH proposal is analyzed. In Section 7, recommendations for updating the PATH proposal and revising PAPA’s approach to marketing the proposal are made. Section 8 summarizes the Thesis and provides a conclusion.

2. Consulting Process and Approach

2.1. An Overview of Consulting Processes and Approaches

As this project is to be approached as a consulting project, it is important to determine in advance what processes and approaches to consulting will be used.

In its most basic form, consulting is a service that is designed to create value for its customer.¹³ A successful consulting project should not only meet the expectations of the customer¹⁴ but it should also result in an increase in the satisfaction of the customer’s employees, their shareholders, or their customers.¹⁵ A successful consulting project should also inform the customer of opportunities for improvement outside their specific project. In short, good consulting points out opportunities and how those opportunities can be used.¹⁶

¹³Priese, *Logistics Management Consulting, Part One*.

¹⁴Ibid.

¹⁵Ibid.

¹⁶Ibid.

The aim and the role of the consultant are to provide the client organization and its management with advice and support in the realization of their objectives. Beside exploring and solving the problems, it should involve the exploration of new opportunities.¹⁷

A consulting project begins with the identification and structuring of a problem, expands to search for underlying causes to that problem, and results in proposed solutions to the problem. The ultimate responsibility for solution implementation lies with the customer.¹⁸ A depiction of this process is shown below as Figure 3:

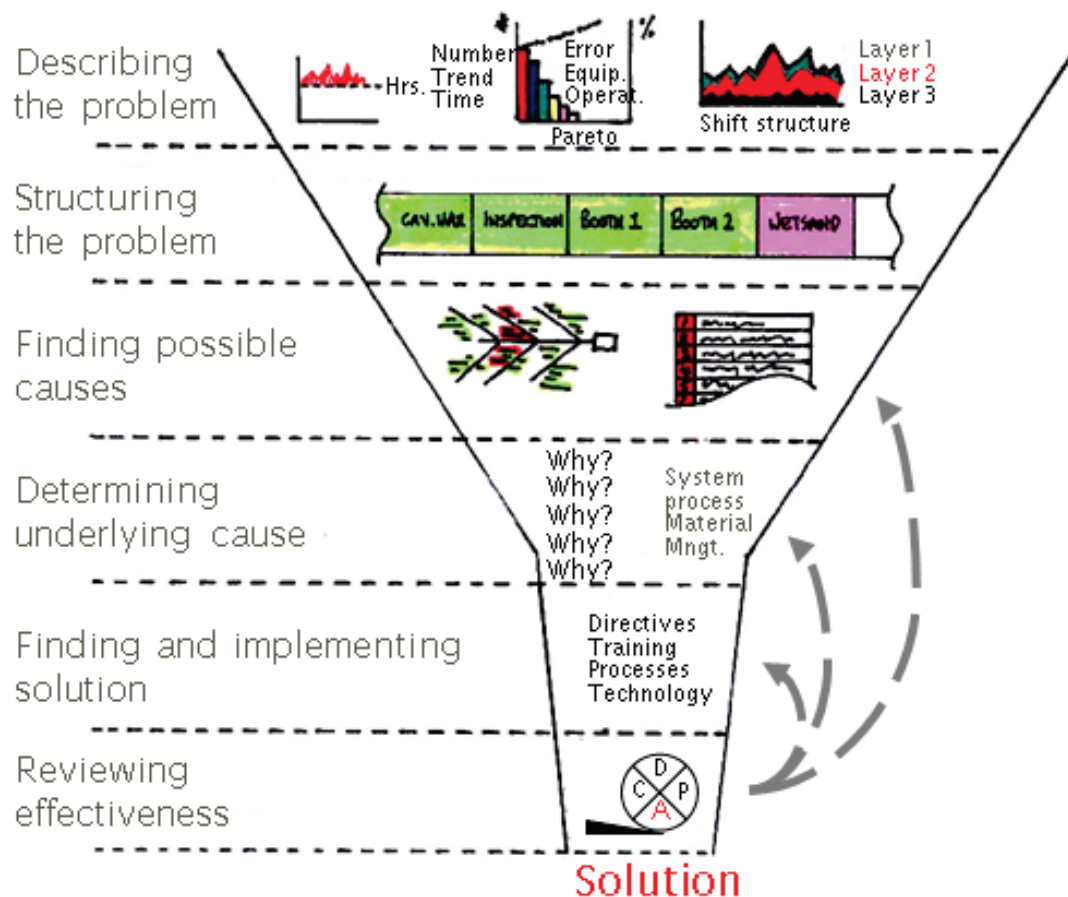


Figure 3. Source: *Logistics Consulting, Part One*

In the initial identification of the problem, it is important that the consultant understand and articulate the customer's initial or current situation. This will give the customer faith that the consultant is competent. This faith will make the customer

¹⁷CSAPÓ, POÓR, and ZSIGRI, "Change of Consulting Methods and Approaches in Hungary."

¹⁸Priese, *Logistics Management Consulting, Part One*.

comfortable with either specifying objectives for the consulting project or developing those objectives jointly with the consultant.¹⁹

Defining problems is one of the most crucial steps in the process. Generally, not enough work goes into this phase. It is rather easy for a manager or an inexperienced consultant to mistake symptoms for central causes of problems. It is important that consultants pay close attention to their diagnostic approaches, avoiding adherence to the first “problem definitions” which arise out of the initial chaos of information. Experience repeatedly demonstrates that problems are rarely as simple and recognizable as they may seem to be. “Problem definitions” must be reviewed throughout the consultation process; the consultants and clients should either reaffirm the validity of the definitions or redefine the problems.²⁰

The causes of the use of expert advice in the form of employment of consultants are: the recognition and the identification of problems and opportunities emerging within the organization, and the development of responses to the problems by application of "best practices" within the industry. Therefore, the most important task of consulting is the exact problem definition. Per the classic literature, the advisor takes the role of an expert who has special knowledge and experience which helps the client. The advisor collects information, plans new systems, proposes solutions and convinces the customer of their correctness and if necessary, helps with its implementation.²¹

Although the consultant is the expert in the consulting project, consultants should feel free to ask potentially dumb questions, and make potentially dumb suggestions to their clients. This is because if those questions or suggestions ultimately help their client, it is worth the potential embarrassment to the consultant.²²

¹⁹ Ibid.

²⁰ Bruckman and Iman, “Consulting with Small Business: A Process Model.”

²¹ CSAPÓ, POÓR, and ZSIGRI, “Change of Consulting Methods and Approaches in Hungary.”

²² Lencioni, “Getting Naked.”

Once the problem has been identified, it is consultant's job to find a solution. A simplified model for doing so is shown below as Figure 4:



Figure 4. Source: *Logistics Consulting, Part One*

As has been discussed previously, the ultimate responsibility for implementation lies with the customer. It is therefore the responsibility of the consultant to conduct the 'Analysis' and 'Finding Solutions' steps. A model for analysis is shown below as Figure 5:



Figure 5. Source: *Logistics Consulting, Part One*

The appropriate use of information is the basis for any successful consulting project. Sometimes this involves reviewing existing data, and sometimes primary collection of data must occur. This can include both personal observations on the part of the consultant as well as interviews.²³

Document and procedural review is an essential early assessment step in many projects. Basic data about constraints and key problem areas will emerge from this review. Key questions can also be developed from this material.²⁴

Regardless of when the data-gathering process occurs or what data are gathered, is it essential that good data are used to define the problem and to determine the selection of an intervention(s) for solving the problem. The literature is clear that one of the best predictors of a successful consultation outcome is to have an accurate problem definition that both the consultant and the consultee agree on.²⁵

²³Schröder, *Logistics Management Consulting, Part Two*.

²⁴Bruckman and Iman, "Consulting with Small Business: A Process Model."

²⁵Kurpius, Fuqua, and Rozecki, "The Consulting Process: A Multidimensional Approach."

Once collected, the assessment and evaluation of data occurs. This can take many forms, including benchmarking, which can be defined as the “standardized, comparative analysis of costs, products, qualities, processes, organizations, etc.”²⁶

The traditional statement about good data is that they should be valid and reliable. In consulting this usually requires both qualitative data (participant observation and in-depth interviewing) and quantitative data (things that can be measured or counted). That is, are we measuring what we say we are measuring (valid data), and are we measuring it accurately and consistently (reliable data)? Essentially, we want the data that we gather to be useful and dependable.²⁷

Once data has been collected and analyzed, the consultant must then find solutions. A model for finding solutions is shown below as Figure 6:



Figure 6. Source: *Logistics Consulting, Part One*

The task of the advisor is problem solving. The consultant follows his professional knowledge and transmits good practices to the client, where the expert – with a medical analogy – plays the role of the “doctor”.²⁸ The comparison of the consultant with that of a doctor is exemplified in the consulting approach known as the “Doctor-Patient Model”. With the doctor-patient model, the consultant usually diagnoses what the client’s problem is and proposes a solution with minimal involvement of the client or work group.²⁹

2.2. Determination of Consulting Process or Approach to Use

The Doctor-Patient Model has the following underlying assumptions: the consultant is hired to identify the problem, diagnose it, and recommend a solution; the consultant is not expected by management to train the client in diagnostic and problem-solving skills; the client expects the consultant to solve the problem in a

²⁶Schröder, *Logistics Management Consulting, Part Two*.

²⁷Kurpius, Fuqua, and Rozecki, “The Consulting Process: A Multidimensional Approach.”

²⁸CSAPÓ, POÓR, and ZSIGRI, “Change of Consulting Methods and Approaches in Hungary.”

²⁹Cash and Minter, “Consulting Approaches: Two Basic Styles.”

relatively short period with minimal disruption and involvement of the client's work force.³⁰ These criteria would seem to fit the proposed goal of this project, and will therefore be the approach used going forward.

3. Current Condition of the Port Alberni Port Authority

3.1. Governance

Port Authorities in Canada are creations of the Federal government. The Canada Marine Act established Port Authorities as agents of Her Majesty in right of Canada (Queen Elizabeth II as of this writing) for the purposes of engaging in port activities.³¹ Canada's Minister of Transport has the authority to incorporate a Port Authority by issuing letters patent; these were issued for the Port Alberni Port Authority in 1999.³² Port Authorities are designed to be self-sufficient, and receive no ongoing funding from the Federal government, including no funds for maintenance.³³

The Port is governed by a Board of Directors consisting of seven members. One member each is appointed by the Federal, Provincial, and Municipal governments, respectively, and the remaining four members are appointed directly by the Minister of Transport with input from a local nominating committee. The Board is responsible for the management of the Port, and hires a Port Manager / CEO to manage the Port's day-to-day operations.³⁴

The Port's vision statement is "To be a thriving and diversified international port."³⁵

3.2. Land Use and Infrastructure

The Port Authority is responsible for both the day-to-day operations of the harbor and the long-term development and improvement of the waterfront facilities.³⁶ One of the Port's goals is to be competitive with other ports in terms of facilities for

³⁰Ibid.

³¹Government of Canada, Canada Marine Act.

³²Government of Canada, "Port Alberni Port Authority Letters Patent."

³³McCormick, "Dollars for Docks."

³⁴Port Alberni Port Authority, "Governance | Port Alberni Port Authority."

³⁵Port Alberni Port Authority, "Vision Statement | Port Alberni Port Authority."

³⁶Port Alberni Port Authority, "Overview | Port Alberni Port Authority."

efficient and competitive cargo handling systems, allowing for the flow of goods through the port and elsewhere across the country.³⁷

The Port Alberni Harbor is located on the west coast of Vancouver Island at the head of the Alberni Inlet. The Inlet is a large fjord measuring approximately 40 km in length with an average width of 1 km. The Port is ice-free year-round, and there are no bridges or other structures that prohibit vessel passage.³⁸ See illustration 1, below:



Illustration 1. Source: marinas.com

Port Alberni is one of the best deep sea harbors in North America. As previously discussed, it is also one of the closest North American deep sea ports to Asia. Given its large size, vessels up to and including Panamax-size cargo ships can easily navigate the Alberni Inlet.³⁹

The Port operates three berths, four warehouses, four marinas and a campground.⁴⁰ The Port Alberni Terminals area covers 17 acres.⁴¹ Unlike other Canadian Port Authorities, the Port Alberni Port Authority does not contract out its

³⁷ Port Alberni Port Authority, "The Port Alberni Shoreline Master Plan Review."

³⁸ Port Alberni Port Authority, "Geography | Port Alberni Port Authority."

³⁹ Operations Economics Inc., "Port Alberni Port Authority Economic Impact Study 2016."

⁴⁰ Ibid.

⁴¹ Port Alberni Port Authority, "Port Alberni Terminals | Port Alberni Port Authority."

terminal operations.⁴² The Port manages over 100 lease and land exchange agreements, which generate approximately C\$500,000 in annual revenues.⁴³

Under the Port Authority's Master Plan, five planning principles are identified:

1. Resource Sustainability. There are limits to development and resource use in the Inlet beyond which the quality of environment and resource abundance and diversity will decline; the ability to sustain these attributes will be considered in all aspects of the Plan.

2. Environmental Significance. As certain areas of the Inlet are particularly significant or sensitive from a biological, recreational, historical or cultural perspective, these areas will receive a high degree of protection from development.

3. Development Suitability. Land and resource development -will occur in the Inlet such that development is directed to sites where it is physically and environmentally suited and compatible with the surrounding uses and landscape character.

4. Community Involvement. Public consultation and involvement in the planning of land use and the management of resources and environmental quality are a central component in the preparation and implementation of this Plan.

5. Inter-Agency Cooperation. The Port Authority is committed to a cooperative process that endeavors to establish consensus and consistent policies amongst the partnering agencies to the greatest degree possible.⁴⁴

At present, the Port Alberni Port Authority needs C\$15 Million to revitalize its facilities. Its current structures, built in 1964, are dilapidated and approaching the end of their useful life. Finding the funds available for this refurbishment is made difficult due to the strict borrowing limits imposed on Canadian Port Authorities by the Canadian Federal government. In the case of the Port Alberni Port Authority, its borrowing limit is only C\$1 Million. Additionally, Port Authorities may not use their assets as collateral for borrowing.⁴⁵

⁴²Port Alberni Port Authority, "Overview | Port Alberni Port Authority."

⁴³Port Alberni Port Authority, "Lease Portfolio | Port Alberni Port Authority."

⁴⁴Port Alberni Port Authority, "Port Authority Master Plan."

⁴⁵McCormick, "Dollars for Docks."

Typically, Port Authority projects are funded through a combination of internal financial resources available to the Port, bank loans, as well as grants and loans and other financial arrangements it can make with other government and private partners.⁴⁶ Public / Private Partnerships between governments, port authorities, and private companies are on the increase, and are given governmental limitations placed on Canadian Port Authorities, are widely considered to be the new model for how infrastructure investment happens.⁴⁷

While limiting the government's financial deficit by involving private investors is often the initial motivation for creating Public / Private Partnerships, they are growing in popularity due to interdependencies increasingly being recognized between private and public parties. Individual organizations often possess insufficient expertise or resources to deliver the services demanded of them.⁴⁸

For public parties the reason to initiate such partnerships is the opportunity to create projects with a surplus value in relation to public projects. For private parties, Public / Private Partnerships offer new investment opportunities and opens new markets. Among the risks for the public parties are that they will be eclipsed by the superior expertise of the private parties. For the private parties the risks include insufficient cash flow and the oppressive conditions of their long-term investments.⁴⁹

While the Canadian Federal government does provide infrastructure funding for projects around the country, Port Authorities compete for funding with other projects.⁵⁰ Nationwide, C\$5.8 Billion in capital investment is needed in Ports to meet growing demand. Of that amount, C\$1.9 Billion is related to the rehabilitation of existing assets.⁵¹

⁴⁶Binkley, "Canadian Ports Recap 2017."

⁴⁷McCormick, "Dollars for Docks."

⁴⁸van Ham and Koppenjan, "Building Public-Private Partnerships: Assessing and Managing Risks in Port Development."

⁴⁹Ibid.

⁵⁰McCormick, "Dollars for Docks."

⁵¹Association of Canadian Port Authorities, "Investment in Canada's National Port System Supports Increased Canadian Trade."

3.3. Volume Statistics

Operations at the Port Alberni Port Authority include breakbulk cargo movements of forest products, forestry-related manufacturing, commercial fishing, marine maintenance, and recreation.⁵² A summary of cargo volumes moved through the Port in 2015 is shown below in Figure 7 (all figures in metric tonnes):

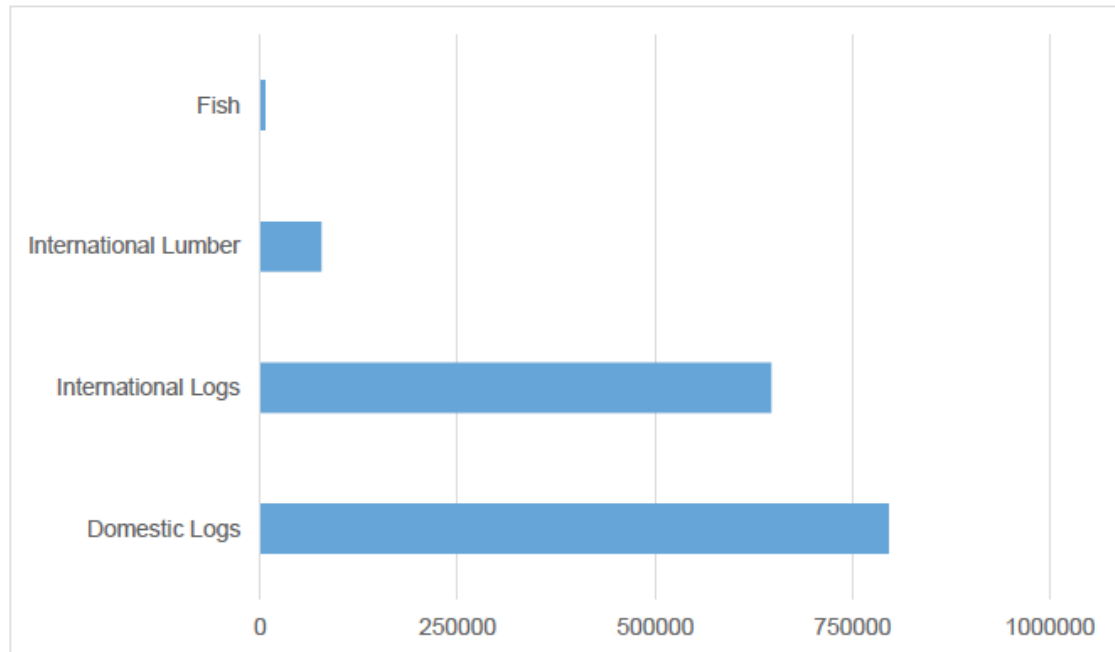


Figure 7. Source: “Port Alberni Port Authority Economic Impact Study 2016”

Freighter movements at Port Alberni primarily move forestry exports from Port Alberni to international markets, mainly in Asia. Coastal cargo movements that stay on the West Coast of Vancouver Island generate the most vessel movements.⁵³ A summary of vessel movements through the Port in 2015 is shown below as Figure 8:

⁵² Operations Economics Inc., “Port Alberni Port Authority Economic Impact Study 2016.”

⁵³ Ibid.

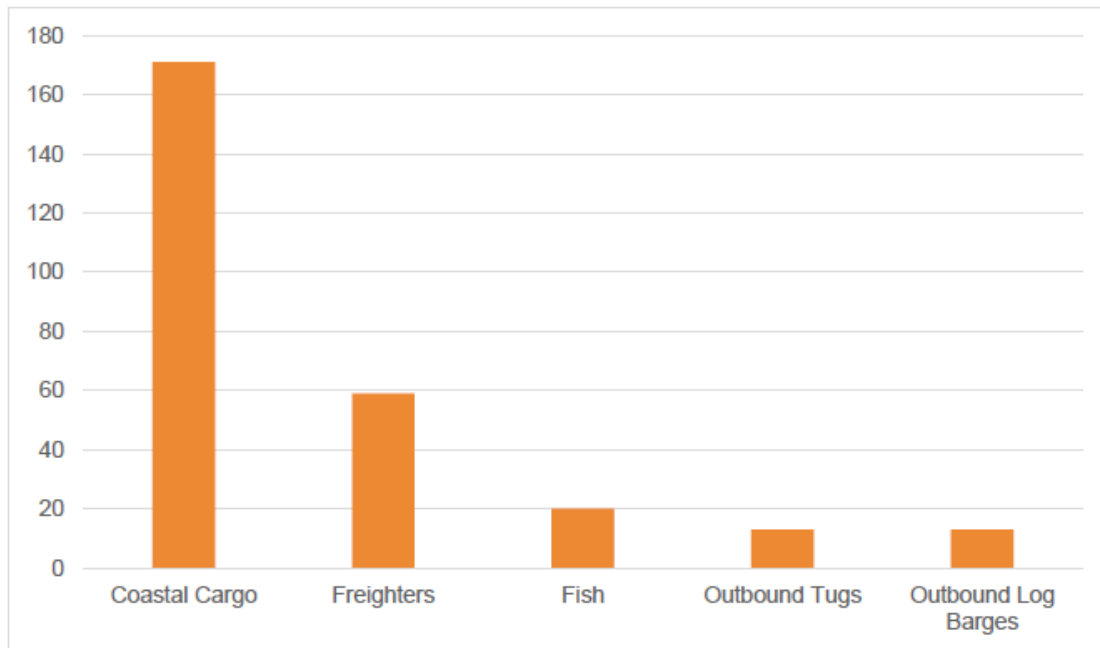


Figure 8. Source: "Port Alberni Port Authority Economic Impact Study 2016"

Compared to other Canadian Port Authorities, it was relatively expensive to move a tonne of cargo through Port Alberni in 2016, as shown below in Figure 9:

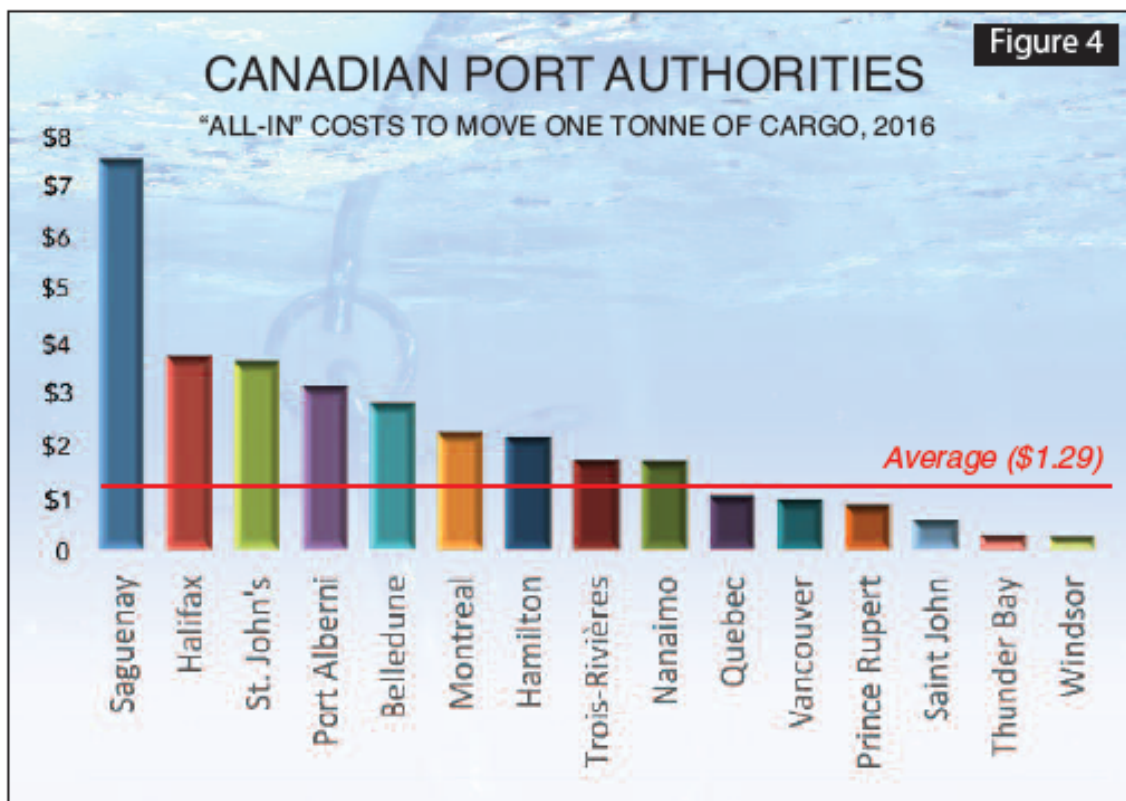


Figure 9. Source: "Canadian Ports Recap 2017"

However, on a positive note, from 2011-2016 Port Alberni decreased their all-in costs to move one tonne of cargo, as shown below in Figure 10:

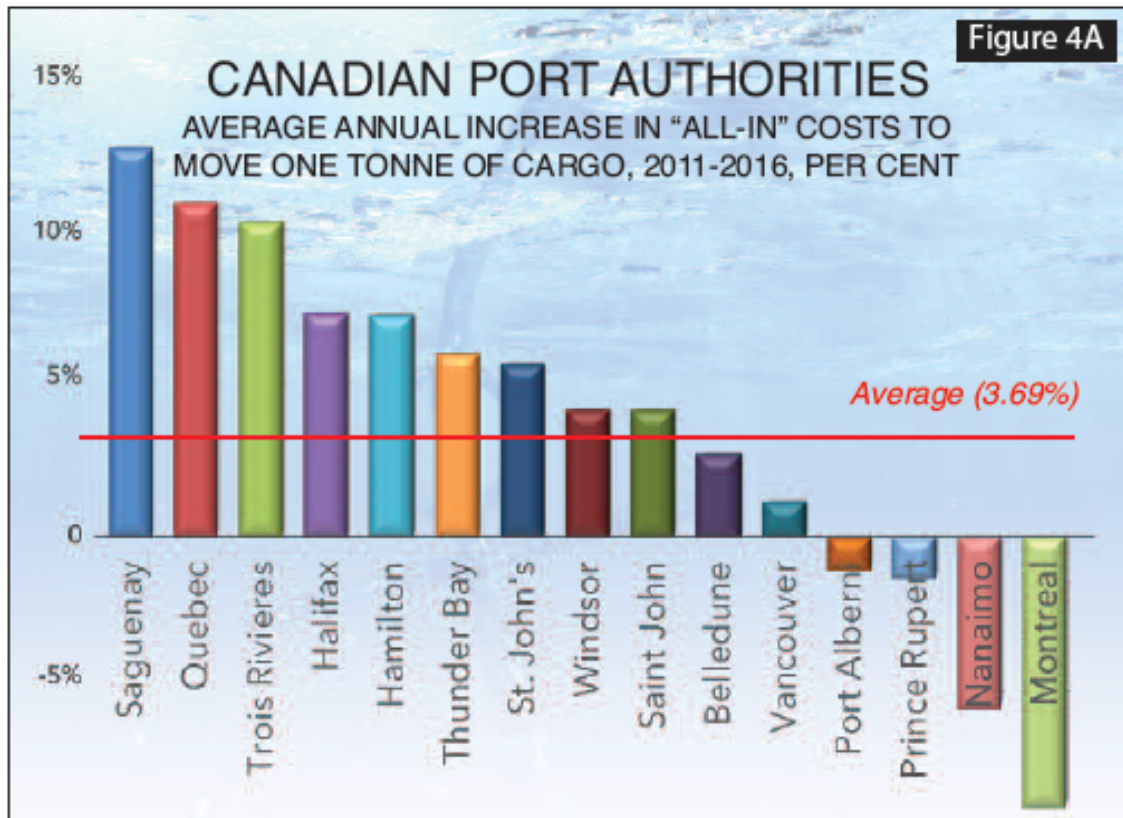


Figure 10. Source: "Canadian Ports Recap 2017"

Port Alberni was one of only four Canadian Port Authorities to decrease their all-in costs to move cargo from 2011 to 2016.

Among the Canadian Port Authorities, in 2016, Port Alberni had the lowest total number of assets required to earn C\$1,000 in revenue, as shown below in Figure 11. While this can be an indicator of efficiency, it could also reflect the depreciating value of the Port Alberni Port Authority's facilities.

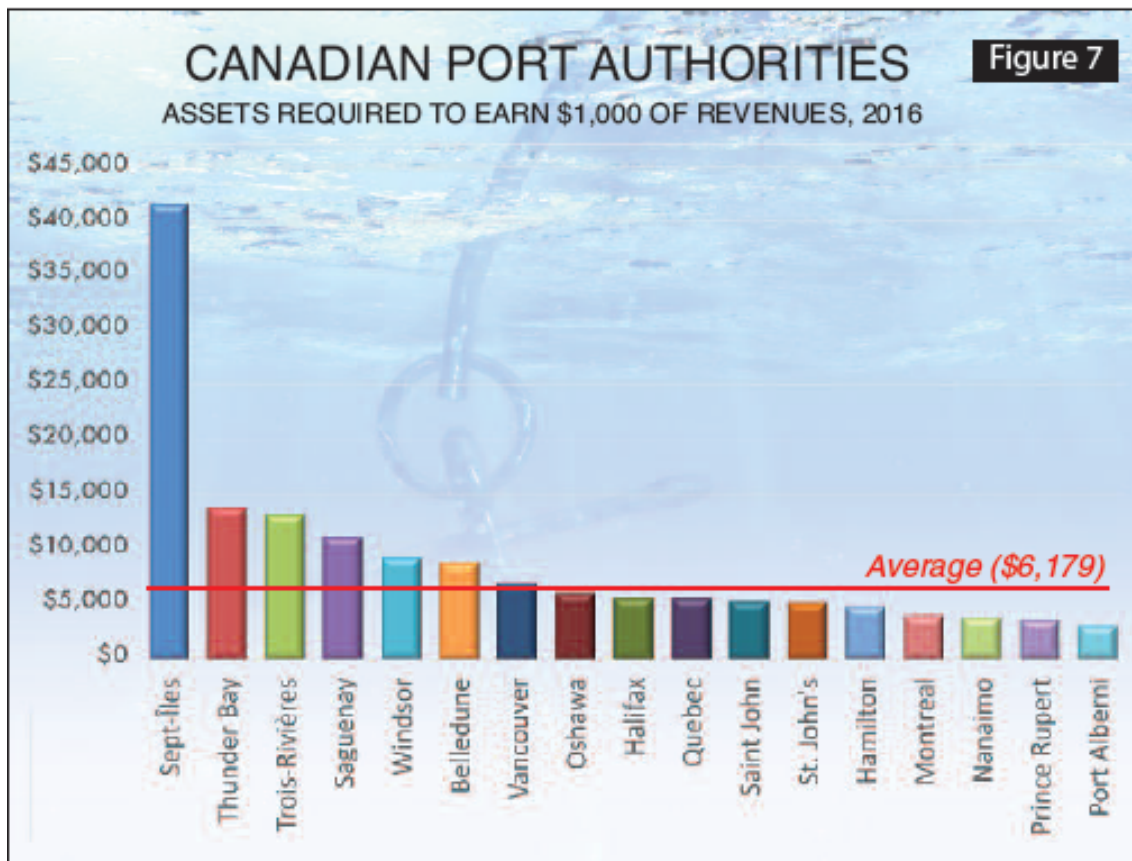


Figure 11. Source: "Canadian Ports Recap 2017"

Port Alberni is an industry-based area that was settled and built by the forest industry. This contrasts with Vancouver, where tourism is also a huge economic factor. As the Port of Vancouver thrives in volatile economic times, other potential marine industry areas in British Columbia are analyzing opportunities to alleviate the congestion created by Canada's biggest and busiest harbor, Vancouver.⁵⁴

82 non-coastal cargo ship movements were registered at Port Alberni in 2017, consisting of 40 separate vessels. 30.5% of the activity involved frozen at sea fish, 46.3% involved sending logs to foreign ports, 14.6% involved sending processed lumber to foreign ports, and 8.5% involved maintenance work as shown below in Tables 1-1, 1-2 and 1-3.

⁵⁴Striegler, "Looking for Solutions to Vancouver's Congestion and Lack of Industrial Land Port Alberni Puts Forth a Novel Idea."

Vessel Name	Berth	Arrival	Departure	Cargo Activity
African Goshawk	Berth 3	4-Jan	6-Jan	Logs to foreign ports
Raw Spirit	Berth 1	21-Jan	7-Feb	Maintenance
Kai Xuan	Berth 3	25-Jan	27-Jan	Lumber to foreign ports
Ipanema Beach	Berth 3	28-Jan	1-Feb	Logs to foreign ports
Lodestar Princess	Berth 3	4-Feb	11-Feb	Logs to foreign ports
Santa Serena	Berth 2	5-Feb	9-Feb	Logs to foreign ports
Andalucian Zephyr	Berth 3	14-Feb	15-Feb	Logs to foreign ports
Longview Logger	Berth 3	18-Feb	24-Feb	Logs to foreign ports
Daiwan Justice	Berth 2	20-Feb	23-Feb	Logs to foreign ports
Star Minerva	Berth 3	24-Feb	26-Feb	Lumber to foreign ports
Raw Spirit	Berth 1	9-Mar	11-Mar	Frozen at sea fish
Island Spirit	Berth 3	17-Mar	20-Mar	Logs to foreign ports
Global Discovery	Berth 2	18-Mar	24-Mar	Logs to foreign ports
Raw Spirit	Berth 1	25-Mar	28-Mar	Frozen at sea fish
Star Fuji	Berth 3	26-Mar	28-Mar	Lumber to foreign ports
Daiwan Dolphin	Berth 3	2-Apr	7-Apr	Logs to foreign ports
Raw Spirit	Berth 1	7-Apr	9-Apr	Frozen at sea fish
Knight Dragon	Berth 1	10-Apr	10-Apr	Maintenance
Santa Serena	Berth 3	15-Apr	19-Apr	Logs to foreign ports
Raw Spirit	Berth 1	17-Apr	18-Apr	Frozen at sea fish
Kai Xuan	Berth 3	22-Apr	24-Apr	Lumber to foreign ports
African Dove	Berth 2	23-Apr	26-Apr	Logs to foreign ports
Raw Spirit	Berth 1	28-Apr	29-Apr	Frozen at sea fish
Raw Spirit	Berth 1	2-May	2-May	Net Change
Nanaimo Bay	Berth 3	3-May	8-May	Logs to foreign ports
Ocean King	Berth 1	3-May	3-May	Maintenance
Raw Spirit	Berth 1	9-May	11-May	Frozen at sea fish
Global Discovery	Berth 3	13-May	17-May	Logs to foreign ports

Table 1-1. Source: Port Alberni Port Authority

Vessel Name	Berth	Arrival	Departure	Cargo Activity
Raw Spirit	Berth 1	19-May	20-May	Frozen at sea fish
Olive Bay	Berth 3	22-May	23-May	Logs to foreign ports
Northern Alliance	Berth 1	23-May	24-May	Frozen at sea fish
Raw Spirit	Berth 1	24-May	27-May	Frozen at sea fish
Star Fuji	Berth 3	25-May	26-May	Lumber to foreign ports
African Weaver	Berth 3	30-May	2-Jun	Logs to foreign ports
Raw Spirit	Berth 1	4-Jun	6-Jun	Frozen at sea fish
American Bulker	Berth 3	9-Jun	13-Jun	Logs to foreign ports
Raw Spirit	Berth 1	13-Jun	15-Jun	Frozen at sea fish
Global Garland	Berth 2	16-Jun	25-Jun	Logs to foreign ports
Santa Serena	Berth 3	17-Jun	23-Jun	Logs to foreign ports
Raw Spirit	Berth 1	22-Jun	24-Jun	Frozen at sea fish
Lodestar Princess	Berth 2	27-Jun	2-Jul	Logs to foreign ports
Pelican Arrow	Berth 3	29-Jun	30-Jun	Lumber to foreign ports
Raw Spirit	Berth 1	2-Jul	4-Jul	Frozen at sea fish
Nanaimo Bay	Berth 3	4-Jul	7-Jul	Logs to foreign ports
Star Loen	Berth 3	4-Aug	5-Aug	Lumber to foreign ports
Global Discovery	Berth 3	6-Aug	15-Aug	Logs to foreign ports
Raw Spirit	Berth 1	7-Aug	9-Aug	Frozen at sea fish
Santa Serena	Berth 2	12-Aug	19-Aug	Logs to foreign ports
Raw Spirit	Berth 1	15-Aug	19-Aug	Frozen at sea fish
Daiwan Champion	Berth 3	18-Aug	21-Aug	Logs to foreign ports
Andalucian Zephyr	Berth 2	20-Aug	27-Aug	Logs to foreign ports
Raw Spirit	Berth 1	27-Aug	29-Aug	Frozen at sea fish
Eagle Arrow	Berth 3	30-Aug	31-Aug	Lumber to foreign ports
Yochow	Berth 3	4-Sep	10-Sep	Logs to foreign ports
Raw Spirit	Berth 1	5-Sep	8-Sep	Frozen at sea fish

Table 1-2. Source: Port Alberni Port Authority

Vessel Name	Berth	Arrival	Departure	Cargo Activity
Raw Spirit	Berth 1	15-Sep	17-Sep	Frozen at sea fish
Erisort	Berth 2	19-Sep	25-Sep	Logs to foreign ports
Global Gold	At Anchor	19-Sep	24-Sep	Logs to foreign ports
Star Lygra	Berth 3	22-Sep	24-Sep	Lumber to foreign ports
Raw Spirit	Berth 1	23-Sep	25-Sep	Frozen at sea fish
Olive Bay	Berth 3	25-Sep	29-Sep	Logs to foreign ports
Santa Serena	Berth 3	14-Oct	17-Oct	Logs to foreign ports
Raw Spirit	Berth 1	15-Oct	20-Oct	Frozen at sea fish
Pacific Spray	Berth 1	23-Oct	25-Oct	Maintenance
Kultus Cove	Berth 2	24-Oct	31-Oct	Logs to foreign ports
Acer Arrow	Berth 3	26-Oct	29-Oct	Lumber to foreign ports
Raw Spirit	Berth 1	27-Oct	28-Oct	Frozen at sea fish
Raw Spirit	Berth 1	5-Nov	9-Nov	Frozen at sea fish
Raw Spirit	Berth 1	13-Nov	14-Nov	Maintenance
Raw Spirit	Berth 1	16-Nov	5-Dec	Frozen at sea fish
Raw Spirit	Berth 1	16-Nov	25-Nov	Frozen at sea fish
Lodestar Princess	Berth 3	21-Nov	22-Nov	Logs to foreign ports
Oyster Bay	Berth 2	23-Nov	28-Nov	Logs to foreign ports
Star Lindesnes	Berth 3	24-Nov	25-Nov	Lumber to foreign ports
Global Mermaid	Berth 3	25-Nov	1-Dec	Logs to foreign ports
Pegasus Ocean	Berth 3	9-Dec	15-Dec	Logs to foreign ports
Saldanha Bay	Berth 2	13-Dec	16-Dec	Logs to foreign ports
Raw Spirit	Berth 1	14-Dec	4-Jan	Frozen at sea fish
Raw Spirit	Berth 1	15-Dec	3-Feb	Maintenance
Andalucian Zephyr	Berth 3	20-Dec	2-Jan	Logs to foreign ports
Star Lofoten	Berth 3	20-Dec	22-Dec	Lumber to foreign ports
Santa Serena	Berth 2	28-Dec	4-Jan	Logs to foreign ports

Table 1-3. Source: Port Alberni Port Authority

Only 3 out of 18 Canadian Port Authorities lost cargo tonnage volume from 2016 to 2017, with Port Alberni handling 1.34 million tonnes of freight in 2017 and showing the largest percentage year-over-year decrease at -18.4%. Despite this loss, Port Alberni still showed a 4.7% compounded annual growth rate from 2010 to 2017.⁵⁵

3.4. Economic Impact

As of December 31, 2017, the Port Alberni Port Authority had approximately C\$16.3 Million in total assets. In 2017 it received C\$5 Million in operations revenue.⁵⁶ A summary of the economic impacts of the Port Alberni Port Authority in 2016 are shown below in Figure 12:

Total Port Alberni Port Authority Economic Impacts

	Employment (Jobs)	Income (\$ millions)	GDP (\$ millions)	Output (\$ millions)
Direct	1090	87.7	135.5	383.0
Indirect	1217	76.1	120.0	252.4
Induced	571	26.8	63.5	97.0
TOTAL	2878	190.6	319.0	732.4

Figure 12. Source: “Port Alberni Port Authority Economic Impact Study 2016”

In 2016 the Port supported 1,090 jobs, which were the equivalent of 992 full-time equivalent jobs. These included 353 Port & Federal Property jobs.⁵⁷ Most port-related jobs are generated by forestry-related manufacturing jobs at mills.⁵⁸ The success of the local forest sector is a key factor in the revenue streams of the Port Alberni Terminals.⁵⁹

The share of Port-related employment by sector is shown below in Figure 13:

⁵⁵Binkley, “Canadian Ports Recap 2017.”

⁵⁶Dickson Dusanj & Wirk, “Port Alberni Port Authority Financial Statements Year Ended December 31, 2017.”

⁵⁷Operations Economics Inc., “2016 Port Alberni Port Authority Economic Impact.”

⁵⁸Operations Economics Inc., “Port Alberni Port Authority Economic Impact Study 2016.”

⁵⁹Port Alberni Port Authority, “Forest Industry | Port Alberni Port Authority.”

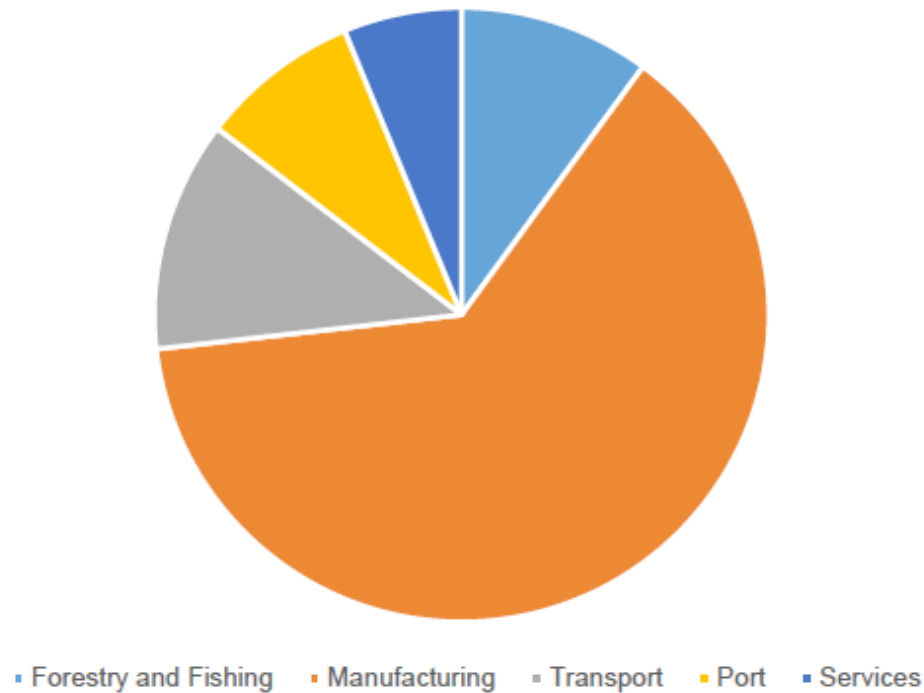


Figure 13. Source: “Port Alberni Port Authority Economic Impact Study 2016”

Port operations generated C\$13.5 Million in taxes for the Federal, Provincial, and Municipal governments.⁶⁰

4. Stakeholder Objectives

4.1. Port Alberni Port Authority

The Port Alberni Port Authority is responsible for the long-term development and improvement of Port Alberni’s waterfront, including the recreational marinas and secondary industries. As a part of its mission, the Port Authority is committed to building a thriving and diversified port and contributing to the economic diversification of the community. The proposed PATH project will be a major milestone in fulfilling this diversification mandate.⁶¹

As an agency of the Canadian Federal government, the Port Alberni Port Authority has a legal obligation to consult impacted Aboriginal Peoples’ (which in the case of British Columbia would be First Nations) on issues related to their traditional lands.⁶² As will be shown below in Sections 4.3 and 6, the Huu-ay-aht First Nations,

⁶⁰ Operations Economics Inc., “2016 Port Alberni Port Authority Economic Impact.”

⁶¹ CPCS, “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

⁶² British Columbia Ministry of Aboriginal Relations and Reconciliation, “A Path Forward.”

whose traditional lands lie in close proximity to the proposed PATH project site, are proponents of the proposed Port Alberni Trans-Shipment Hub.

4.2. Community Impact

In 2007, the Canadian Federal government (in cooperation with the Provincial governments of British Columbia, Alberta, Saskatchewan and Manitoba) developed an ambitious infrastructure program known as the Asia Pacific Gateway Canada Initiative. The goal was to focus development of so-called “Gateway” corridors in British Columbia that would transport cargo to inland supply chains.⁶³

The Initiative aimed to boost Canada’s commerce with the Asia-Pacific region, improve the share of Asia to North America traffic that moved through the Gateway, and improve the efficiency and reliability of the Gateway for exports.⁶⁴

From 2007 to 2017, governmental investments of C\$3.5 billion and private investments of C\$14 billion were made in Gateway corridors. The initiative was widely considered to be a success, although in reviewing the initiative in 2017, the container terminal congestion caused by increased traffic at British Columbia ports meant that, adversely, the very success of the initiative could cause the area to lose its favorability as a shipping destination.⁶⁵

To that end, the British Columbia Chamber of Commerce recommended in 2017 that additional key strategic infrastructure investments related to multimodal hubs be prioritized by the governments of Canada and British Columbia, specifically calling out the Port Alberni Trans-Shipment Hub as a model for future growth.⁶⁶

4.3. First Nations

British Columbia is home to approximately 1/3 of all First Nations in Canada. First Nations is the preferred term for the majority of the indigenous or aboriginal communities of Canada south of the Arctic Circle, as opposed to the Inuit, the indigenous peoples of the Arctic, or the Métis, a distinct group of persons throughout

⁶³British Columbia Chamber of Commerce, “Supporting New Investment in Infrastructure to Enhance Canada’s Asia Pacific Gateway Initiative.”

⁶⁴Ibid.

⁶⁵Ibid.

⁶⁶Ibid.

Canada of historically mixed indigenous and European heritage. First Nations governments are a component of the Canadian Federal system of government.⁶⁷

As part of the Maa-Nulth Treaty of 2007, several First Nations on Vancouver Island agreed to join their respective Regional Districts (a governmental division below the Provincial level and above the municipal level). This was designed to promote inter-agency cooperation between Districts, municipalities, and First Nations. The Huu-ay-aht First Nations, whose lands would be most impacted by the proposed Port Alberni Trans-Shipments Hub development, joined the Alberni-Clayoquot Regional District on April 1, 2012.⁶⁸ A map of the traditional lands of the First Nations who are party to the Maa-Nulth Treaty is shown below as Figure 14:

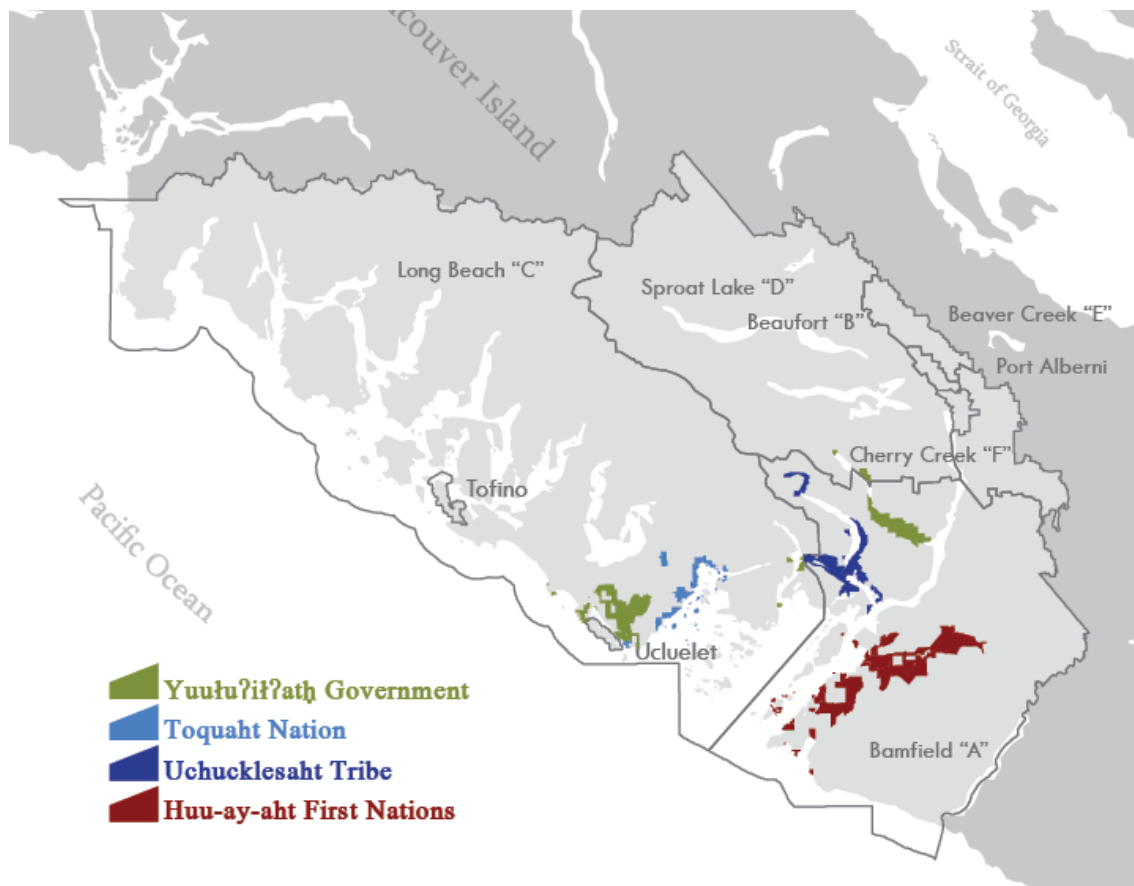


Figure 14. Source: "The Maa-Nulth Treaty"

The desired economic development plan of the Huu-ay-aht First Nations is to enhance the quality of life for their citizens through economic means, regardless of

⁶⁷ British Columbia Ministry of Aboriginal Relations and Reconciliation, "A Path Forward."

⁶⁸ Alberni-Clayoquot Regional District, "The Maa-Nulth Treaty."

geographic location. They will do this by providing economic opportunities and social, cultural and recreational programs for all Huu-ay-aht.⁶⁹

The Huu-ay-aht First Nations wishes to develop diverse, sustainable, and profitable businesses for their citizens that enhances their quality of life while valuing all people, the environment, the home, and ensuring a bright future for children. Huu-ay-aht enterprises strive to follow the model of “triple sustainability” in that they should be consistent with the traditions of their people, their traditional territory, and the environment.⁷⁰

The Huu-ay-aht First Nations views a potential container transshipment port as an opportunity for bringing unprecedented growth and opportunity to the region at large and to Huu-ay-aht citizens specifically.⁷¹

5. Container Port Projects

5.1. Port of Prince Rupert

One of the most notable recent developments in West Coast container port development has been in Prince Rupert, British Columbia, Canada. Once a failing breakbulk terminal, in 2007 it debuted a state-of-the-art container terminal with a singular premise: moving containerized cargo quickly to inland areas of North America via rail.⁷² A photograph of the Prince Rupert container terminal is shown below as Illustration 2:

⁶⁹Standley, “Huu-Ay-Aht First Nations Economic Development Plan.”

⁷⁰Ibid.

⁷¹Ibid.

⁷²Dibenedetto, “Prince Rupert Takes Giant Step.”



Illustration 2. Source: cbc.ca

Prince Rupert had many ingrained advantages, including being the deepest natural harbor in North America⁷³, being ice-free year-round, and being one of the safest West Coast ports in terms of navigational risk factors. Seeing the increasing future demand for container-handling facilities on the West Coast, the Port worked with Maher Terminals and CN Railway to develop the infrastructure necessary to handle containers and move them quickly inland.⁷⁴

A container loaded onto a train at Prince Rupert can expect to reach Chicago in 100 hours.⁷⁵ This service is so efficient that some companies have found it quicker to ship containerized cargo bound for Los Angeles via rail from Prince Rupert to Chicago to Los Angeles rather than waiting to unload at LA / Long Beach.⁷⁶ In 2017 Prince Rupert handled just under 1 million TEUs. While this is only a small fraction of the total containerized cargo volume accepted at West Coast ports, its high year-over-year growth (25.8% in 2017) (See Appendix A) has attracted the attention of other small ports looking to boost their container-handling abilities.

⁷³Striegler, "Looking for Solutions to Vancouver's Congestion and Lack of Industrial Land Port Alberni Puts Forth a Novel Idea."

⁷⁴Leach, "Prince Rupert: Evolution from Remote Fishing Port into Critical Container Shipping Link."

⁷⁵Szakonyl, "Expansion Crowns Prince Rupert."

⁷⁶Leach, "Prince Rupert: Evolution from Remote Fishing Port into Critical Container Shipping Link."

5.2. Hamad Port

The new Hamad Port in Qatar was built to supplement the existing and overcrowded Doha Port. Doha Port was built in 1971 as Qatar's only commercial maritime gateway.⁷⁷ Hamad Port opened in 2016 with the arrival of a 14,000 TEU vessel.⁷⁸ One of the Port's goals is to help Qatar achieve food security and economic diversification.⁷⁹

In June 2017, Saudi Arabia, the United Arab Emirates, Bahrain and Egypt began an effective blockade of Qatar by land (Qatar's only land border is with Saudi Arabia), air and sea.⁸⁰ Qatar is heavily dependent on imports, and the shipping blockade by its neighbors initially raised the specter of food shortages. But shortly after the blockade began, Qatar launched new direct shipping routes to resume many of its imports, including routes from India and Oman. Ships from Shanghai, which normally called at Dubai's Jebel Ali port before reaching Qatar, are instead being re-routed via Iraq, adding seven days to what is normally a 20-day voyage.⁸¹

Hamad Port Phase 1 offers an initial cargo handling capacity of 2 million TEUs and 2 million tonnes of general cargo per year.⁸² In the first 6 months of 2018, 803 ships called on Hamad Port. It handled 644,824 TEU of containerized goods in that period.⁸³

The port handled its first 1 million TEU of containerized goods in March 2018 after having been open for less than 14 months. It is expected to handle another 1 million TEU of containerized goods by the end of 2018.⁸⁴

Hamad Port will, when fully built out by 2030, cover over 26 square kilometers (over 6,400 acres) and consist of three container terminals with a combined annual capacity in excess of 6 million TEU. An aerial of the Port as of April 2017 is shown below as Illustration 3:

⁷⁷Oxford Business Group, "Qatar Strengthens Port Facilities , Capacity and Transport Links."

⁷⁸Mathew, "Hamad Port Steadily Growing."

⁷⁹Elshayyal, "Qatar's Emir Officially Inaugurates Hamad Port."

⁸⁰Ziadah, "Constructing a Logistics Space: Perspectives from the Gulf Cooperation Council."

⁸¹Davison, "Gulf Crisis a 'Blessing in Disguise' for Qatar Seaport."

⁸²Oxford Business Group, "Qatar Strengthens Port Facilities , Capacity and Transport Links."

⁸³Kumar, "803 Ships Called at Hamad Port in 6 Months."

⁸⁴Ibid.



Illustration 3. Source: www.npp.com.qa

The port will also handle general cargo traffic, imports of vehicles, livestock and grain, and support Qatari Navy and Coast Guard units.⁸⁵ Hamad Port is also looking at opportunities to act as a trans-shipment hub in the region, similar to the Port of Salalah in Oman.⁸⁶

Qatar identified expansion of ports and associated logistics infrastructure as a key strategic priority, largely associated with the country being scheduled to host the 2022 World Cup. The New Hamad Port project is among the largest of Qatar's infrastructure developments. The total cost of the port is estimated at US \$7.4 billion.⁸⁷

5.3. Port of Rotterdam

In 2017 the Port of Rotterdam was the busiest container port in Europe and the 10th busiest container port in the world, having handled 7.1 million TEU of incoming

⁸⁵ Qatar Ministry of Transport and Communications, "Investing in Qatar's Future."

⁸⁶ Kumar, "Hamad Port Gears up to Become Transshipment Hub."

⁸⁷ Ziadah, "Constructing a Logistics Space: Perspectives from the Gulf Cooperation Council."

containers and 6.6 million TEU of outgoing containers.⁸⁸ An overview map of the Port of Rotterdam is shown below as Figure 15:

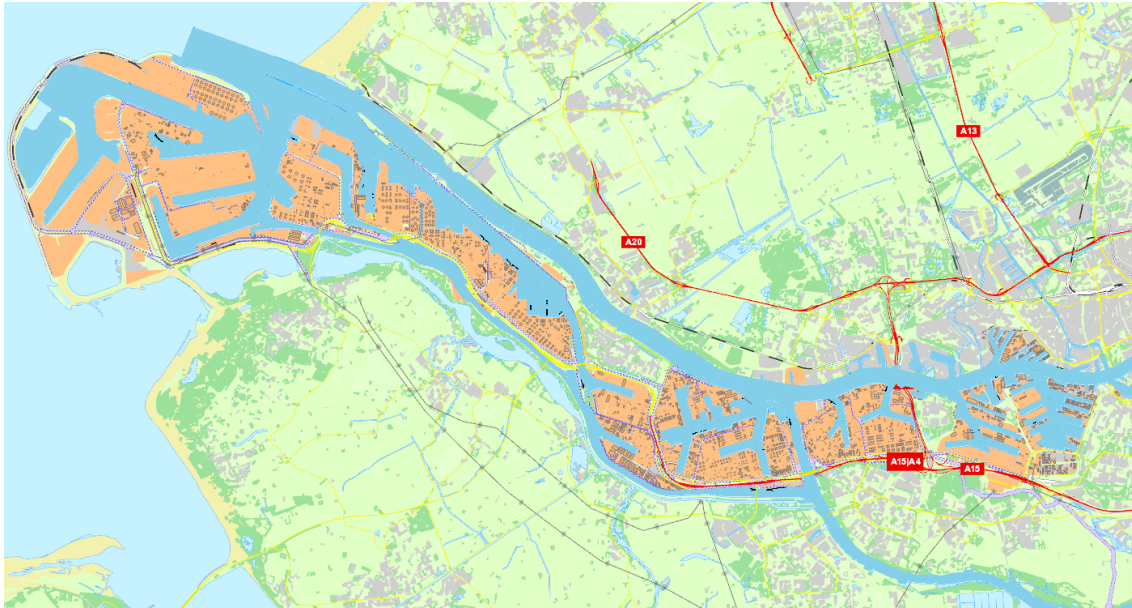


Figure 15. Source: portofrotterdam.com

During 2017 the Port of Rotterdam's overall cargo volume decreased despite increases in container traffic volume. The decreases primarily came from crude oil and coal volume reductions.⁸⁹

To ensure a fast transshipment process at large terminals, control for efficiency and a high degree of coordination is necessary. These can be obtained by using, among other things, information technology and automated control technology.⁹⁰ Container operations at the Port of Rotterdam are noted for their extensive use of automation, including Automated Guided Vehicles (AGVs). When a ship arrives at the port, the containers are removed by quay cranes and placed on AGVs. The AGV moves the container to its assigned stack, where it is removed by an Automated Stacking Crane and placed in its stack. The primary use of the AGV, therefore, is for internal transportation of containers from ship to stack and vice versa.⁹¹

The front and back of an AGV are fitted with infrared sensors, which detect obstacles. Further, the area is subdivided into what are called "claim areas". While

⁸⁸Port of Rotterdam, "Facts and Figures - The Port of Rotterdam."

⁸⁹Port of Rotterdam, "Sustained Growth in Container Throughput Did Not Fully Offset Declining Throughput in Other Sectors."

⁹⁰Vis and De Koster, "Transshipment of Containers at a Container Terminal: An Overview."

⁹¹Vis et al., "Determination of the Number of AGVs Required at a Semi-Automated Container Terminal."

driving, the AGV claims a claim area and consequently no other AGV can enter the area. This helps avoid collisions. If an AGV hits an obstacle, bumpers on the front and back immediately switch off the motor.⁹² While AGV systems are candidates for improving a terminal's efficiency due to performance improvements and the repetitive nature of operations in container terminals, deployment of AGVs may not be as effective as expected if the container terminal suffers from a poor layout.⁹³ Additionally, AGVs are only practical in ports with high labor costs because of the high initial capital costs. In ports with low labor costs, the system of manned vehicles is preferable.⁹⁴

6. 2014 Port Alberni Trans-Shipment Hub Proposal

6.1. Scope

6.1.1. Overview

The Port Alberni Trans-Shipment Hub is envisioned to become a modern, fully automated container terminal, able to handle vessels up to 22,000 TEU. This would create one of the largest container terminals in Canada.⁹⁵ The project's potential service area has a population of over 8 million people from Tacoma, Washington, USA to Squamish, British Columbia, Canada⁹⁶ as shown below in Figure 16:

⁹²Vis and De Koster, "Transshipment of Containers at a Container Terminal: An Overview."

⁹³Liu et al., "Automated Guided Vehicle System for Two Container Yard Layouts."

⁹⁴Vis and De Koster, "Transshipment of Containers at a Container Terminal: An Overview."

⁹⁵Port Alberni Port Authority, "PATH Pre Feasibility Study Project Brief."

⁹⁶Port Alberni Port Authority, "Port Alberni Transshipment Hub (PATH): Business Plan Synopsis."

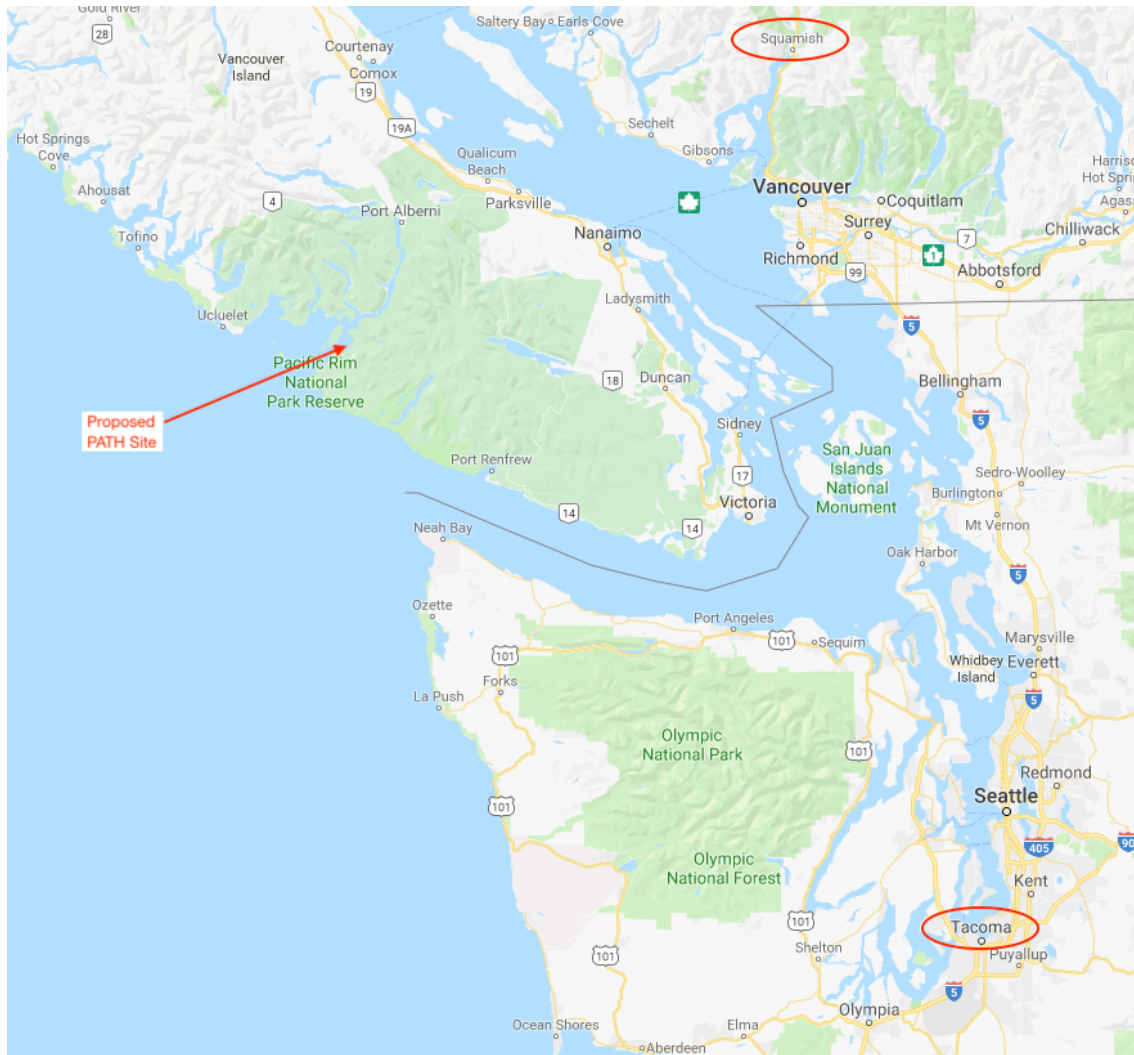


Figure 16. Source: maps.google.com

PATH is premised on a hub and spoke container trans-shipment model. The focus of PATH as the “hub” is to service the “spokes”, the container handling facilities in the Salish Sea area (lower mainland BC and Puget Sound, Washington area) using dedicated barges. The barges will deliver pre-sorted cargo at the closest point to the end destination. PATH would also service Vancouver Island’s growing business and population base.⁹⁷

Dropping containers at PATH rather than servicing Vancouver and Seattle would mean a reduction of 480 NM of sailing. This is a potential reduction of 3 to 4 days of ship time, generating an estimated net savings for the shipper of C\$540,000 (time and fuel) for each vessel.⁹⁸

⁹⁷ Port Alberni Port Authority, “PATH Pre Feasibility Study Project Brief.”

⁹⁸ Ibid.

PATH is also estimated to have considerable energy consumption and emissions benefits. This is primarily related to the change in marine movements from container vessels to more fuel-efficient barges, but within Metro Vancouver there is a sizable benefit associated with reduced trucking trips and reduced traffic congestion.⁹⁹

The initial forecast scenario for PATH assumes a weekly service by a 14,000 TEU container ship when the facility opens, and ramping up throughput to 1.5 million TEU / year four years after opening.¹⁰⁰ A long-term forecast is shown below as Figure 17:

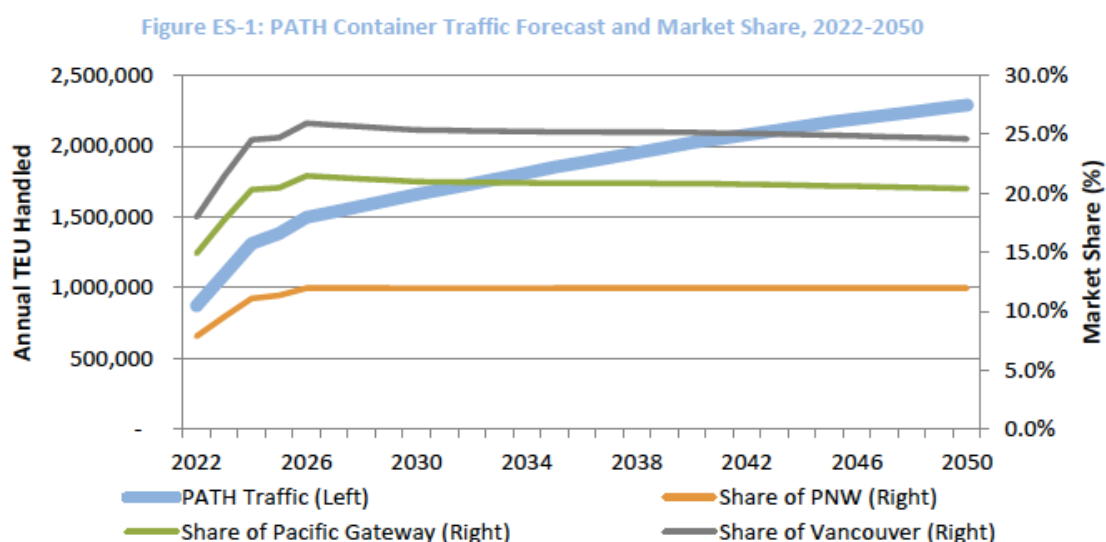


Figure 17. Source: “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study”

6.1.2. Site Selection

The Alberni Inlet is a long narrow inlet stretching from the Pacific Ocean at Barclay Sound on the west coast of Vancouver Island, about 40 km inland terminating at Port Alberni. For the most part, the inlet averages approximately 1 km wide along its length. The inlet is an extremely deep channel, making it suitable for the largest of current and forecasted container vessels.¹⁰¹

Both sides of the inlet are characterized by steep sided, tree-lined rocky slopes, extending up to 300-400 meters in some areas. Save for the occasional remote coastal home, a log sorting facility at Sarita Bay, and some small-scale logging operations, the area is undeveloped.¹⁰² Due to natural physical advantages (water and air draft), PATH

⁹⁹SNC-Lavalin, “Emissions Analysis for Port Alberni Transshipment Hub (PATH).”

¹⁰⁰CPCS, “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

¹⁰¹Dillon Consulting Limited, “Port Alberni Transshipment Hub (PATH) Proposal.”

¹⁰²Ibid.

will be able to accommodate ultra-large container ships. While this may give it an initial advantage due to limited ULCS-handling ability at Vancouver, Seattle and Tacoma, it will not be a long-term relative advantage due to those ports' likely continued investment in infrastructure and equipment.¹⁰³

Land ownership along the inlet consists of a combination of Crown Lands (owned by the Canadian Federal government) and First Nation Treaty Lands managed by the Huu-ay-aht First Nation. Figure 18 below shows the sites along the inlet that were investigated for placement of the PATH project, and their relative position between the Pacific Ocean and the City of Port Alberni.¹⁰⁴

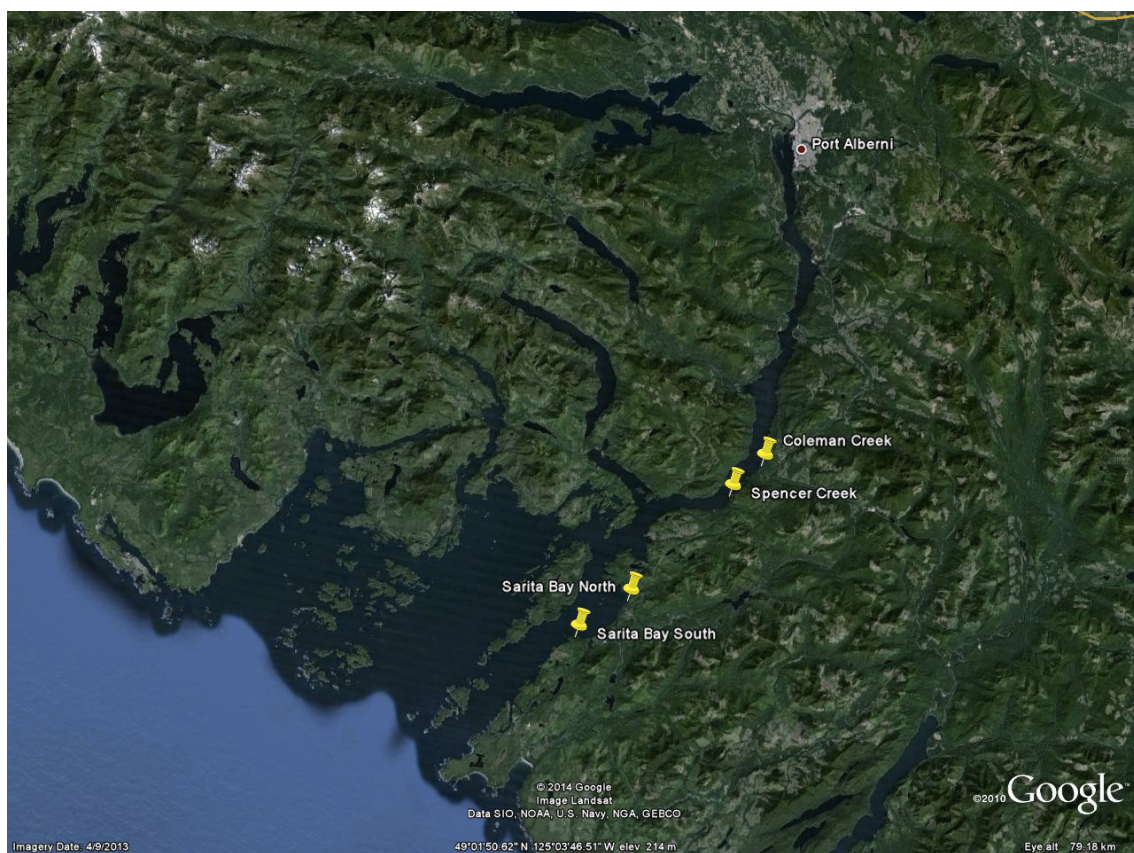


Figure 18. Source: "Port Alberni Transshipment Hub (PATH) Proposal"

The sites all possess similar characteristics in terms of advantages and limitations for development as a container port. Therefore, it was determined that the earthwork (site preparation) requirements would be the main variable in determining site preference. Order-of magnitude estimates were made of the net volume of earth

¹⁰³ CPCS, "Port Alberni Trans-shipment Hub (PATH) Feasibility Study."

¹⁰⁴ Dillon Consulting Limited, "Port Alberni Transshipment Hub (PATH) Proposal."

to be moved using two proposed facility layout options, as shown below in Figure 19¹⁰⁵:

OPTION A ORDER-OF-MAGNITUDE EARTHWORKS				
		Total Volumes, m ³		
Site Name	Site Area, m ²	Fill	Cut	Net Volume, m ³
Sarita Bay South	885,550	687,000	39,634,000	38,947,000
Sarita Bay North	885,550	3,500,000	8,372,000	4,872,000
San Mateo Bay	885,550	557,000	51,817,000	51,260,000
Spencer Creek	885,550	63,000	114,727,000	114,664,000
Coleman Creek	885,550	81,000	48,951,000	48,870,000

OPTION B ORDER-OF-MAGNITUDE EARTHWORKS				
		Total Volumes, m ³		
Site Name	Site Area, m ²	Fill	Cut	Net Volume, m ³
Sarita Bay South	1,240,730	7,953,000	18,349,000	10,396,000
Sarita Bay North	1,240,730	4,127,000	15,229,000	11,102,000
San Mateo Bay	1,240,730	1,921,000	48,976,000	47,055,000
Spencer Creek	1,240,730	755,000	133,950,000	133,195,000
Coleman Creek	1,240,730	825,000	72,421,000	71,596,000

Figure 19. Source: "Port Alberni Transshipment Hub (PATH) Proposal"

This exercise demonstrated that the earthwork cut quantities at the two Sarita Bay sites are considerably lower than at the other sites. As such, the focus of the development project turned to Sarita Bay. The two sites there are shown below as Figure 20¹⁰⁶:

¹⁰⁵Ibid.

¹⁰⁶Ibid.

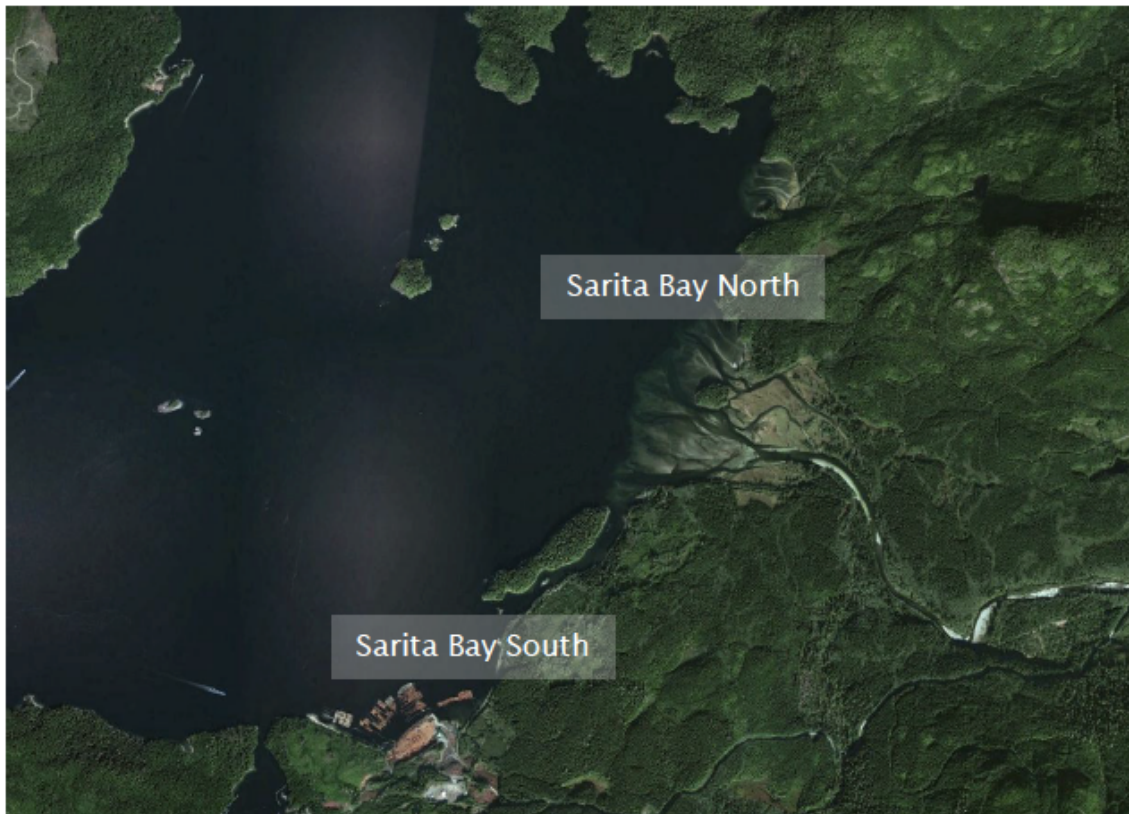


Figure 20. Source: “Port Alberni Transshipment Hub (PATH) Proposal”

After additional study, Sarita Bay South was determined to be the best construction site in terms of overall cost, which will be discussed in Section 6.2.¹⁰⁷

6.1.3. Facility Layout

Two general layout concepts, Option A and Option B, were developed for the PATH facility as shown below in Figure 21:

¹⁰⁷ Ibid.

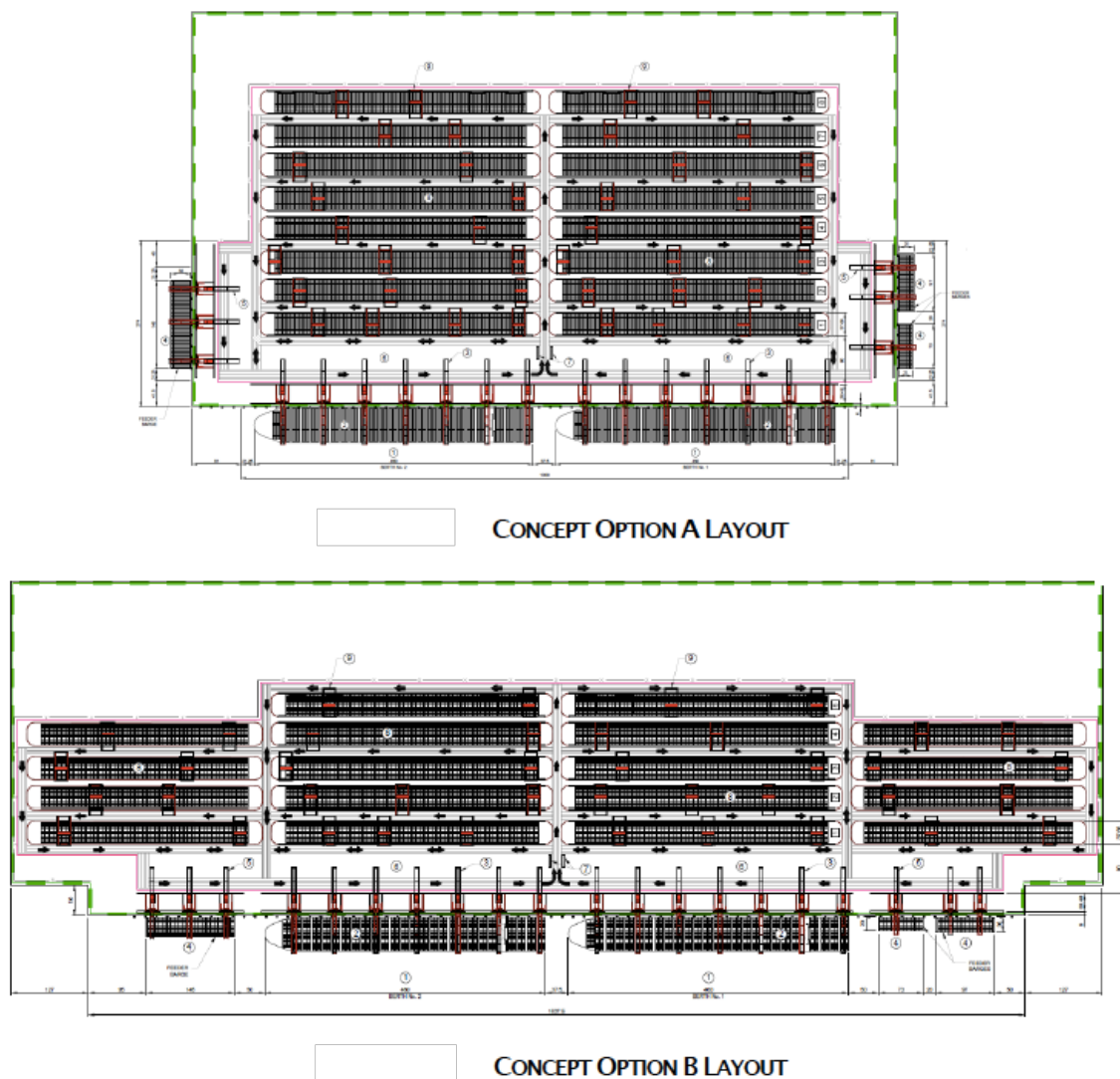


Figure 21. Source: “Port Alberni Transshipment Hub (PATH) Proposal”

The ability to berth at least two container ships at the same time is ideal.¹⁰⁸ Proposed berth length of 1800 meters will be able to accommodate two 22,000 TEU vessels at the same time, plus 3 barge berths.¹⁰⁹

Based on the selection of Sarita Bay South as the best location for the PATH facility, a modified version of the Option A layout was determined to be ideal for the preliminary site plan, as shown below in Figure 22:

¹⁰⁸CPCS, “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

¹⁰⁹Port Alberni Port Authority, “Port Alberni Transshipment Hub (PATH): Business Plan Synopsis.”

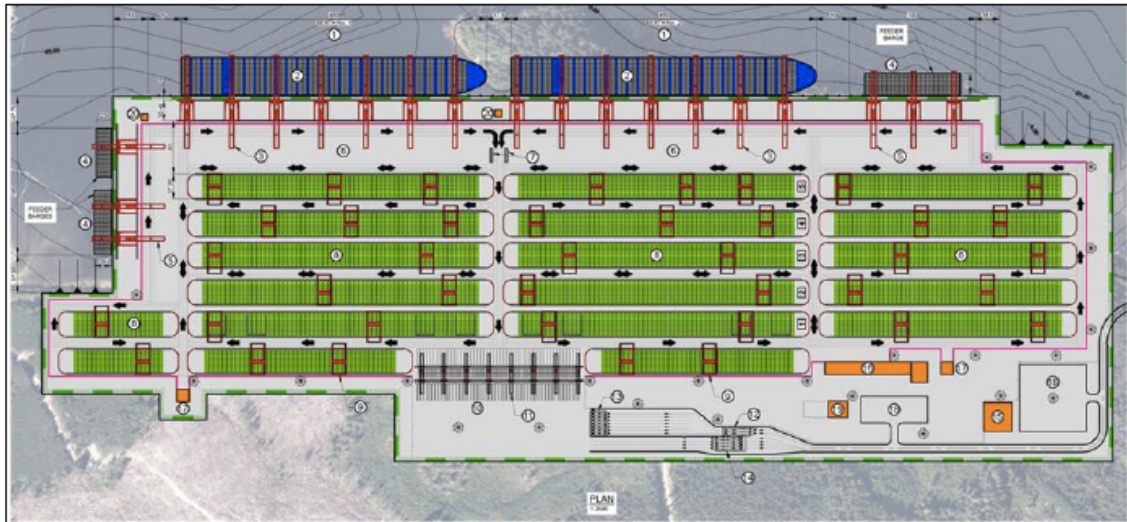


Figure 22. Source: “Port Alberni Trans-Shipment Hub (PATH) Feasibility Study.”

6.1.4. Operations

6.1.4.1. Automated Loading / Unloading of Container Ships

The PATH yard would have 43 automated stacking cranes, 8 automated gate cranes, and 135 automated guided vehicles. Berth side operation would have 20 ship-to-shore cranes with an expected productivity of 6,000 containers per 24 hours.¹¹⁰ For an 18,000 TEU container ship, it should take 3 days to unload and 3 days to load, for a 6-day ship’s dwell time. This means one or two ships will be docked at the terminal most of the time, resulting in continuous unloading and loading of ships and barges.¹¹¹

Because PATH is being planned as a fully-automated terminal, the largest cost item is the container-handling equipment.¹¹² PATH’s automated terminal activities are anticipated to be a major competitive advantage due to the efficiency with which an ULCS can be unloaded and loaded using such a system.¹¹³

Automated cargo handling could allow for approximately 40-45 container movements per hour, vs. the typical crane productivity at a West Coast terminal of 25-35 container movements per hour.¹¹⁴

¹¹⁰ Ibid.

¹¹¹ CPCS, “Port Alberni Trans-Shipment Hub (PATH) Feasibility Study.”

¹¹² CPCS, “Port Alberni Trans-Shipment Hub (PATH) Feasibility Study - Expected Economic Impacts of PATH Project.”

¹¹³ CPCS, “Port Alberni Trans-Shipment Hub (PATH) Feasibility Study.”

¹¹⁴ Ibid.

6.1.4.2. Use of Barges

Only an estimated 5% of cargo received at PATH will be destined for Vancouver Island; the remaining 95% will be barged elsewhere. Each barge unit would consist of a tug boat and two barges capable of carrying up to 580 containers each. Moving cargo by water as far as possible is efficient, cost-effective and environmentally friendly.¹¹⁵

The advantages of a tug and barge operation are:

- a) the ability to leave a barge at a terminal for unloading and loading and to use the tug for another barge or operation.
- b) savings on wages as a tug has a much smaller crew than a container ship.
- c) savings on fuel as a tug has a much smaller engine or engines than an ocean-going ship.
- d) more flexibility – a barge could easily be transferred to a smaller harbor tug or vice versa.
- e) draft – a tug and barge requires substantially less water and can transit rivers and harbors where depth of water would be an issue for a large container ship.¹¹⁶

The disadvantages of a tug and barge container operation are:

- a) speed – the average container ship travels at 24 to 27 knots, whereas tug and barge units will average 9 to 12 knots
- b) stability – whereas most container ships load a number of containers below deck to increase ship stability and reduce the possibility of capsizing, on barges all of the containers are loaded on or above the main deck of the barge, increasing the odds of capsizing if the barge is rolled by a large ocean wave
- c) wind – it is more difficult to correct for strong side winds on a barge than those on a container ship due to steering capabilities
- d) tow line – a sufficiently strong wave could separate the tug and the barge.¹¹⁷

The feeder-type barge or short sea shipping service model has been used successfully elsewhere in the world. For example, the Port of Hamburg serves as a hub

¹¹⁵Port Alberni Port Authority, "Port Alberni Transshipment Hub (PATH): Business Plan Synopsis."

¹¹⁶CPCS, "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study."

¹¹⁷Ibid.

for traffic destined for the Baltic. Gioia Tauro in Italy is primarily a trans-shipment hub, with less than 5% of their cargo destined for the immediate inland market.¹¹⁸

Due to cabotage regulations, the barge service may need to be set up as two separate entities, one Canadian-flagged (to serve Canadian ports) and one internationally-flagged (to serve US ports).¹¹⁹ Relevant US and Canadian cabotage regulations are described below in Figure 23:

Cabotage Regulations

Cabotage regulations prevent the movement of persons or cargo between two domestic points by foreign entities.

The Canadian Coasting Trade Act restricts the movement of cargo between any two Canadian ports to ships which are Canadian-flagged, owned and crewed. Similarly, in the US, the Jones Act restricts the movement of cargo between two US ports to ships which are US-flagged, US owned and crewed by US citizens or permanent residents.

In Canada, a temporary Coasting Trade license can be granted to allow the entry of a foreign –flagged vessel into Canadian cabotage trades, where it is determined that no Canadian-flagged vessel is suitable or available to perform the activity described in the application.¹⁹

Figure 23. Source: “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

There is currently a domestic US market for barging containers from Seattle to Anchorage, Alaska. PATH could also potentially serve Anchorage rather than requiring containers to make the longer trip to Seattle for offloading, loading to barges and then sailing to Anchorage.¹²⁰

To serve long-distance inland markets, barge service will need to be able to connect to a terminal with an on-dock rail service, preferably at a dock adjacent to a rail container terminal.¹²¹

The use of barge feeder service to take containers from PATH to coastal ports and river system terminals would have several advantages, including:

1. The use of nearly a dozen existing barge terminals, increasing system capacity without the need for additional infrastructure
2. Service to docks adjacent to the main rail yards in Thornton and Port Coquitlam, providing efficient intermodal handoffs
3. Direct service to some cargo owner facilities

¹¹⁸ Ibid.

¹¹⁹ Ibid.

¹²⁰ Ibid.

¹²¹ Ibid.

4. Service to nearby US ports¹²²

Barges could reach most destinations within 18-24 hours. Tugs would bring loaded barges from PATH to the coastal / river terminals and leave them there for unloading. Previously filled barges at the terminals would then be picked up by the tugs and brought back to PATH for handling. This leads to an overall dwell time for containers of approximately 2.5 to 3 days, which is competitive with the Port of Vancouver.¹²³

An overview of marine terminals in the lower mainland of British Columbia that can receive barged container traffic from PATH is shown below as Figure 24:

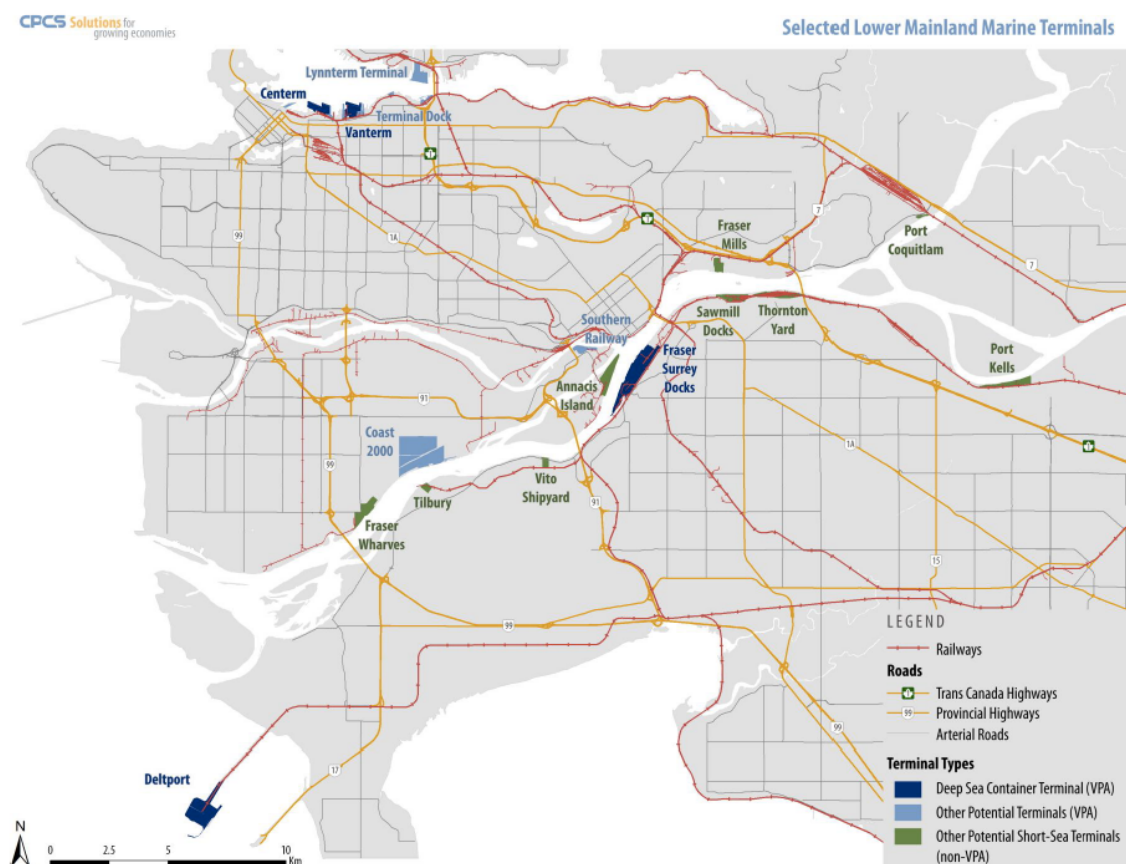


Figure 24. Source: "Port Alberni Trans-Shipment Hub (PATH) Feasibility Study."

Price of tugs is estimated to be C\$12 Million each, and the price of the custom-built barges would be C\$2 Million each.¹²⁴

¹²²Ibid.

¹²³Ibid.

¹²⁴Ibid.

6.1.4.3. Trucking

Currently, containers destined for Vancouver Island's growing population enter Canada via the Port of Vancouver container terminals, and must then be re-shipped to Vancouver Island via Nanaimo.¹²⁵ (Feasibility Study – Strategic Requirements)

Truck gates are included in the preliminary site design since some cargo received at PATH will be destined for Vancouver Island – potentially 200,000 TEU / year. The PATH container terminal will require three types of trucking services:

- Trucking of selected containers to and from the designated CBSA Container Examination Facility (CEF)
- Local trucking or drayage between PATH and the local container stuffing, storage and distribution facility established in the Port Alberni area
- Trucking of containers from the terminal to various warehouses and customer locations throughout Vancouver Island.¹²⁶

The estimated volume of truck movements is shown below in Figure 25:

Trucking Service	Estimated No. of Trips Each Way	Total No. of Truck-Trips	Average No. of Trips/Day	No. of Drivers Required
Between PATH and CEF (assume 1.5% of containers)	8,600	17,200	47	8-10
Between PATH and Local Container Distribution and Stuffing Centre (20% of 200,000 TEUs)	22,800	45,600	125	20-30
Between PATH and Other Vancouver Island Warehouses and Distribution Centres (80% of 200,000 TEUs)	91,400	182,800	501	380-400
Total	122,800	245,200	n/a	408-440

Figure 25. Source: "Port Alberni Trans-Shipment Hub (PATH) Feasibility Study."

6.1.4.4. Ancillary Industries

The development of the PATH project would almost certainly lead to the growth or creation of related industries in the area. With access to container-handling facilities, it is possible that some of the bulk and breakbulk cargo currently being exported from Port Alberni could be containerized, creating a potential market for containerized export goods.¹²⁷

¹²⁵ Ibid.

¹²⁶ Ibid.

¹²⁷ Ibid.

Additionally, Value-add opportunities at Port Alberni could include developing container stuffing / de-stuffing and transloading operations (e.g. loading content of 40' marine containers into 53' domestic containers and vice versa), as well as other value-added logistics activity (sorting, packaging, labelling, etc.), consolidating and containerizing scrap material for export, etc. Detailed potential services in this area include:

- Container stuffing for outbound cargo:
 - Cargo receiving facilities (truck and possibly barge)
 - Warehouse for container storage plus outdoor yard space for outdoor storage and container sorting
 - Blocking and bracing services
 - Load planning and cargo surveyor capabilities
 - Structured reporting on inventory management and throughput
 - Dray services (local transport of goods and containers).
- Trans-loading of inbound cargo:
 - Drayage (local trucking) services from ship or barge to warehouse
 - Palletizing, shrink wrapping, and re-packaging services, where needed
 - Trans-loading cargo from a container to domestic trailer, where required
 - Arranging forward shipment of goods through trucking partners.
- Warehousing and secured storage:
 - Receiving and unloading cargo at dock doors, yard or directly to warehouse floor
 - Moving containers within warehouse and yard
 - Providing security and climate control, as needed.
- Container cleaning and repair:
 - Provided on an as needed basis
 - Putting in liners/tote bags to handle break bulk products in containers.¹²⁸

¹²⁸Ibid.

Also, current marine-related businesses in Port Alberni that directly relate to the existing Port operation and will also be applicable to the new container trans-shipment terminal include:

- Tug and barge companies
- Ships' agents, freight forwarders and customs brokers
- Ship repair, welding and machine shops
- Trucking companies (line haul)
- Marine surveyors
- Fueling services (commercial/industrial)
- Waste management and environmental services
- Government services

These businesses and services already have in place significant infrastructure, facilities, expertise and skilled labor that will be required to support the PATH operation.¹²⁹

Additional Services that may be in demand by container ships berthing at the PATH terminal include:

- Ships chandler services (ship maintenance and provisioning)
- Refrigeration repair and inspection services for refrigerated containers ("reefers")
- Ship electronic navigation and communication systems servicing and repair.¹³⁰

Additional secondary requirements for servicing the PATH terminal itself include:

- Security services
- Information and communications technology (ICT) servicing
- Container terminal on-site equipment and vehicles servicing and repair.¹³¹

¹²⁹Ibid.

¹³⁰Ibid.

¹³¹Ibid.

PATH servicing needs that existing businesses in Port Alberni can handle are shown below in Figure 26:

Company/Organization	PATH Related Service Area	Capabilities
Canadian Alberni Engineering	• Ship, tug and barge repairs	• All types of structural, mechanical, engine and propeller repairs
Port Alberni Shipping Ltd.	• Ships agent services	• All aspects of ship's agent services, especially on-site presence as prime or sub-agent
Don Kimura, Marine Surveyor Blue Wave Marine Surveyors	<ul style="list-style-type: none"> • Possibly occasional surveys if a container ship, barge or tug incurs damage that has to be repaired while in Port Alberni • This requirement is anticipated to be infrequent so will not have a big impact on existing businesses 	<ul style="list-style-type: none"> • Vessel condition surveys • Damage and repair inspections • Hull inspections
Pacific Pilotage Authority	<ul style="list-style-type: none"> • Provision of pilotage services to container ships • The PATH terminal is located within the compulsory pilotage zone 	• Providing pilots for all vessels that require them

Figure 26. Source: "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study."

Gaps requiring the expansion of existing businesses and services are shown below in Figures 27-1 and 27-2:

Business/Service	PATH Phase I Requirements	Existing Businesses / Services	Gaps Identified
Tug and Barge Companies	<ul style="list-style-type: none"> For feeder barge services need fleet(s) with total of at least 20 new large (5,000 hp or greater) tugs Also need barge fleet(s) totalling 40 new large barges (600-1,200 TEUs) 	<ul style="list-style-type: none"> Pacific Towing Services Ltd. has 5 tugs based in Port Alberni, but all tugs too small; has no barges here A.B. Sea Towing 	<ul style="list-style-type: none"> Tug fleet(s) with total of at least 20 new large (5,000 hp or greater) tugs Need for fleet(s) totalling 40 new large barges (600-1,200 TEUs)
Trucking (local and long-haul)	<ul style="list-style-type: none"> Daily local trucking to/from Container Examination Facility, totalling 17,200 truck-trips per year Daily local trucking to/from local container distribution and stuffing facility, totalling 45,600 truck-trips per year Long haul trucking of containers to/from other destinations on Island totalling 182,800 truck-trips per year 	<ul style="list-style-type: none"> Dumas Trucking Ltd. Haggard Trucking Ltd. J W Berry Trucking Ltd. L C Trucking Ltd. 	<ul style="list-style-type: none"> Truck tractor and chassis fleet for short haul movements (drayage) between PATH terminal and CEF, local container distribution/stuffing facility Large truck tractor and chassis fleet for long haul movements throughout Vancouver Island
Commercial Fuelling Services	<ul style="list-style-type: none"> Need commercial card-lock for tugs, pilot boats and for trucks at or near PATH terminal Need enhanced ship refuelling capability 	<ul style="list-style-type: none"> Enex Fuels – already has commercial card-lock in Port Alberni, but not at port; also refuels and provides lubricants for ships 	<ul style="list-style-type: none"> Commercial card lock for tugs and pilot boats at PATH terminal Commercial card lock for trucks at or near PATH terminal Need enhanced ship refuelling capability

Figure 27-1. Source: “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

Business/Service	PATH Phase I Requirements	Existing Businesses / Services	Gaps Identified
Environmental and Waste Management Services	<ul style="list-style-type: none"> Significant incremental hazardous waste disposal from terminal and its on-site vehicles and equipment (used lubricants, etc.) Incremental fuel spill and clean-up capabilities based in Port Alberni 	<ul style="list-style-type: none"> Hetherington Industries Ltd. provide these services, but would need to invest in expanded capacity, as well as hiring additional staff Burrard Clean Operations has four containers plus a barge at Port with pollution control devices and supplies for containment of minor spills 	<ul style="list-style-type: none"> Requirement for additional hazardous waste removal and recycling Incremental garbage disposal and general waste recycling from container terminal, tugs and barges, trucking companies Additional containers and barge with incremental fuel spill and clean-up capabilities based at PATH terminal
Security Services	<ul style="list-style-type: none"> Electronic surveillance, security and alarm systems management, monitoring and maintenance for PATH terminal, CEF and container distribution/stuffing facility Security personnel 24/7 for PATH terminal, CEF and container distribution/stuffing facility Required to meet the International Ship and Port Facility Security (ISPS) code Also must meet IMO Code of Practice on Security in Ports 	<ul style="list-style-type: none"> Alberni Technology Solutions Inc. (electronic) Falcon Eye Systems (electronic) Quay Security (foot patrol) 	<ul style="list-style-type: none"> Need for additional electronic surveillance, security and alarm systems management, monitoring and maintenance staff at existing companies specializing in this Need for additional security personnel at existing company specializing in on-site security personnel

Figure 27-2. Source: "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study."

Gaps requiring the establishment of new businesses / services are shown below in Figures 28-1 and 28-2:

Business/Service	PATH Phase I Requirements	Existing Businesses / Services	Gaps Identified
Container Examination Facility	<ul style="list-style-type: none"> • CEF warehouse and facilities that can handle up to 8,600 containers per year for CBSA inspections (1.5% of total volume at PATH) • 25-30 containers per day on average • Custom-designed secure, bonded facility • Plenty of warehouse space for storage, sorting and unpacking/repacking of inspected containers 	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • Need for a full-fledged CBSA approved Container Examination Centre
Container Distribution and Stuffing Centre (local facility)	<ul style="list-style-type: none"> • Distribution/stuffing centre with large warehouse, truck docks, storage and sorting yard • Ancillary services including container repairs and cargo surveying 	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • Need for a regional distribution/stuffing centre near PATH
Tug and Barge Companies	<ul style="list-style-type: none"> • For feeder barge services need fleet(s) with total of at least 20 new large (5,000 hp or greater) tugs • Also need barge fleet(s) totalling 40 new large barges (600-1,200 TEUs) 	<ul style="list-style-type: none"> • Pacific Towing Services Ltd. has 10 tugs based in Port Alberni, but all tugs too small; has no barges here • A.B. Sea Towing 	<ul style="list-style-type: none"> • Tug fleet(s) with total of at least 20 new large (5,000 hp or greater) tugs • Need for fleet(s) totalling 40 new large barges (600-1,200 TEUs)
Trucking (local and long-haul)	<ul style="list-style-type: none"> • Daily local trucking to/from Container Examination Facility, totalling 17,200 truck-trips per year • Daily local trucking to/from local container distribution 	<ul style="list-style-type: none"> • Dumas Trucking Ltd. • Haggard Trucking Ltd. • J W Berry Trucking Ltd. • L C Trucking Ltd. 	<ul style="list-style-type: none"> • Truck tractor and chassis fleet for short haul movements (drayage) between PATH terminal and CEF, local container distribution/stuffing facility

Figure 28-1. Source: “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

Business/Service	PATH Phase I Requirements	Existing Businesses / Services	Gaps Identified
	<ul style="list-style-type: none"> and stuffing facility, totalling 45,600 truck-trips per year Long haul trucking of containers to/from other destinations on Island totalling 182,800 truck-trips per year 		<ul style="list-style-type: none"> Large truck tractor and chassis fleet for long haul movements throughout Vancouver Island
Container Cargo Surveyor	<ul style="list-style-type: none"> Cargo surveyors for local container stuffing facility Cargo surveyors for other on-Island container stuffing facilities 	<ul style="list-style-type: none"> None currently 	<ul style="list-style-type: none"> Cargo surveyors for inspecting/monitoring container stuffing
Refrigeration repair and inspection services for refrigerated containers ("reefers")	<ul style="list-style-type: none"> Conduct pre-trip inspections on reefers Undertake any needed repairs/adjustments 	<ul style="list-style-type: none"> Alberni Valley Refrigeration Ltd. 	<ul style="list-style-type: none"> Refrigeration company offering specialized services for inspecting and repairing reefer containers
Security Services	<ul style="list-style-type: none"> Electronic surveillance, security and alarm systems management, monitoring and maintenance for PATH terminal, CEF and container distribution/stuffing facility Security personnel 24/7 for PATH terminal, CEF and container distribution/stuffing facility Required to meet the International Ship and Port Facility Security (ISPS) code Also must meet IMO <i>Code of Practice on Security in Ports</i> 	<ul style="list-style-type: none"> Alberni Technology Solutions Inc. (electronic) Falcon Eye Systems (electronic) Quay Security (foot patrol) 	<ul style="list-style-type: none"> Need for additional electronic surveillance, security and alarm systems management, monitoring and maintenance staff at existing companies specializing in this Need for additional security personnel at existing company specializing in on-site security personnel
Ship's Chandler	<ul style="list-style-type: none"> Local chandler services will be required by overseas container ships as this may be only North American port of call Would cater to other ships calling in at Port Alberni 	<ul style="list-style-type: none"> none locally 	<ul style="list-style-type: none"> Ship's chandler service, focused on needs of container ships and other ships calling at PATH and Port Alberni harbour

Figure 28-2. Source: "Port Alberni Trans-Shipment Hub (PATH) Feasibility Study."

6.2. Project Cost and Economic Impacts

6.2.1. Costs

The initial capital cost estimates for the Sarita Bay options was initially estimated below in Figure 29:

CAPITAL COST ESTIMATE – SARITA BAY OPTIONS

	Costs	Contingency
Sarita Bay South		
Capital Construction Costs	\$1,397,542,990	\$185,397,850
Engineering, Permitting, and Procurement	\$160,720,000	\$32,143,500
Total	\$1,775,800,000	
Sarita Bay South – Alternative		
Capital Construction Costs	\$1,718,983,524	\$244,649,074
Engineering, Permitting, and Procurement	\$197,680,000	\$39,536,600
Total	\$2,200,900,000	
Sarita Bay North		
Capital Construction Costs	\$1,642,205,118	\$239,990,418
Engineering, Permitting, and Procurement	\$188,850,000	\$37,771,000
Total	\$2,108,900,000	

Figure 29. Source: “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

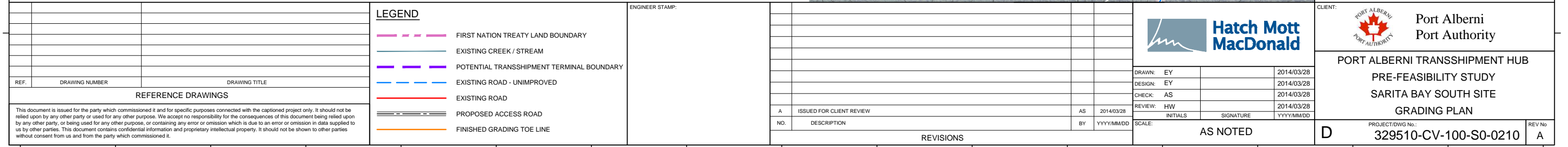
The cost estimates for Sarita Bay South were later refined. Figure 30 below shows the final estimated construction costs for the PATH facility at the Sarita Bay South location using the Option A yard layout:

Figure 3-1: Sarita Bay South Option A Total for Construction

Item	Description	Cost \$	Contingency \$
1	Mobilization/Demobilization	61,033,000	9,155,000
2	Dredging and Land Reclamation	46,792,800	11,698,200
3	Removals and Site Preparation	2,888,750	433,300
4	Excavation and Fill – Terminal Site	304,215,000	45,632,250
5	Wharf Structural	171,257,540	25,224,800
6	Civil & Misc. Structural Terminal Infrastructure	94,684,900	11,457,100
7	Offsite Improvements	4,116,500	617,500
8	Gate Complex	3,407,500	511,100
9	Buildings	26,573,000	2,657,300
10	Electrical Terminal Infrastructure	51,684,000	12,921,000
11	Container Handling Equipment for Fully Automated Terminal	515,045,000	51,504,500
Total for Capital Cost Construction		1,281,697,990	171,812,050
Total for Capital Cost Construction, Incl. Contingency		1,453,510,040	
12	Permitting, Engineering, Contract Administration	147,400,000	29,479,100
Total for Project		1,429,100,000	201,300,000
Total for Construction, Incl. Contingency		1,630,400,000	

Figure 30. Source: “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study - Expected Economic Impacts of PATH Project.”

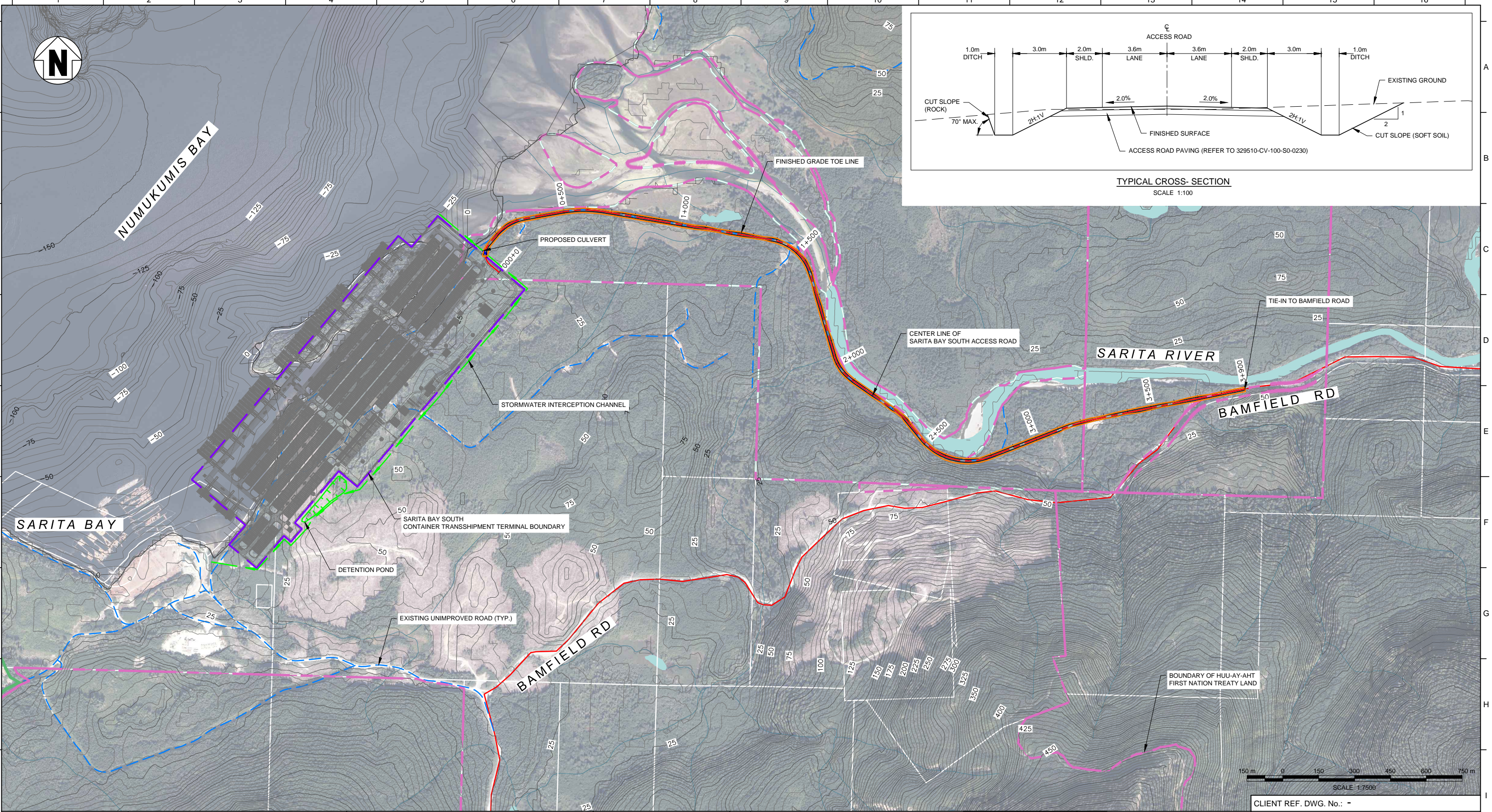
A full set of preliminary site drawings for the Sarita Bay South location is included in this report in the following pages.



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PLOT DATE: Monday, March 31, 2014 3:40:23 PM



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	POTENTIAL TRANSSHIPMENT TERMINAL BOUNDARY
	EXISTING ROAD - UNIMPROVED
	EXISTING ROAD
	PROPOSED ACCESS ROAD
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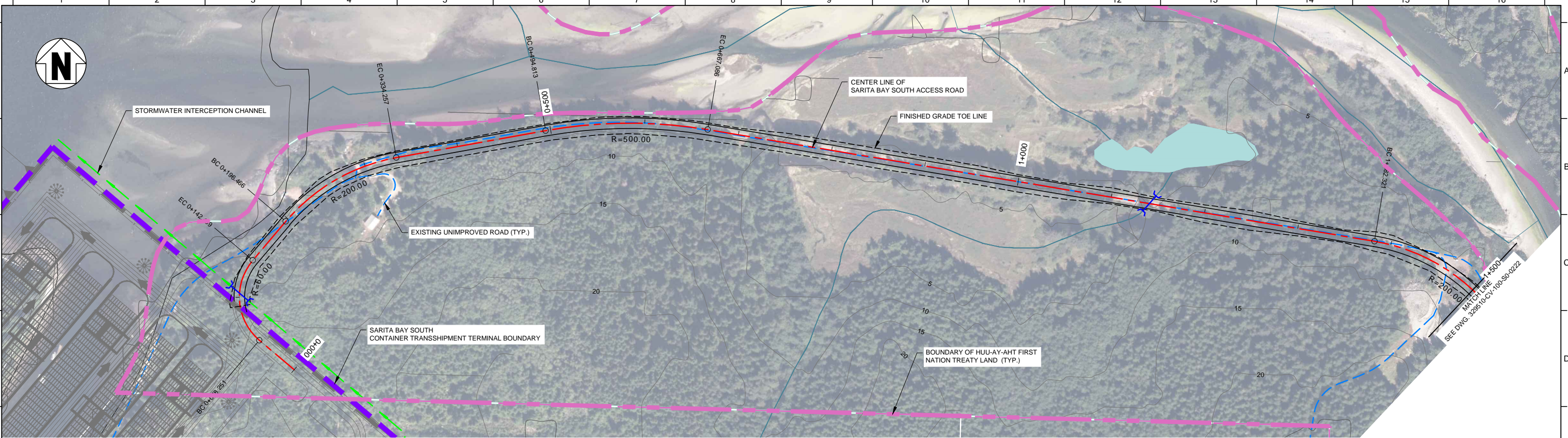
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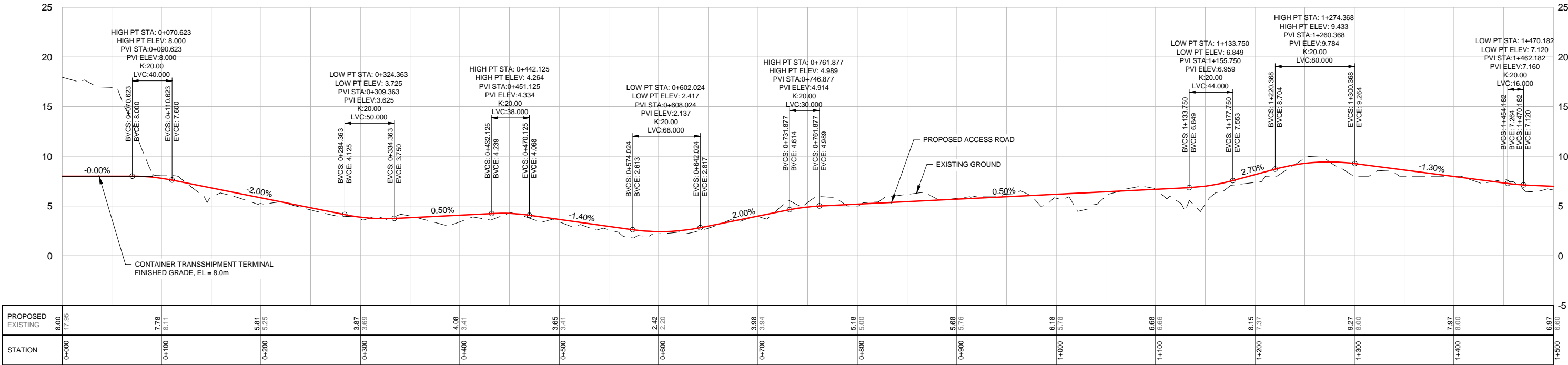
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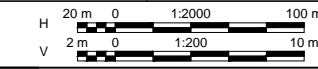
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	PROPOSED ACCESS ROAD
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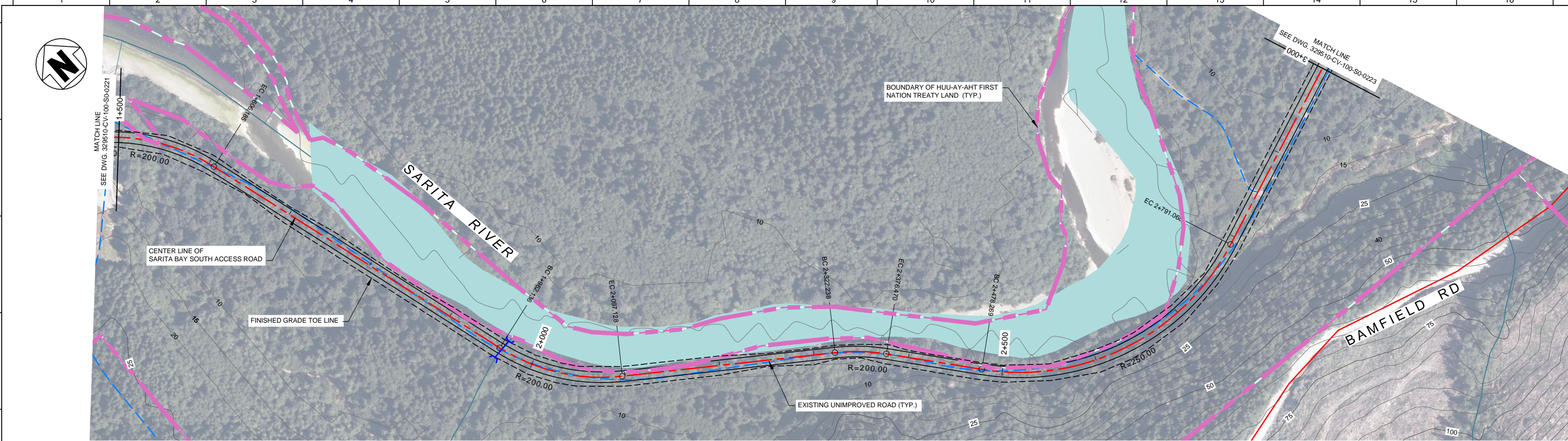
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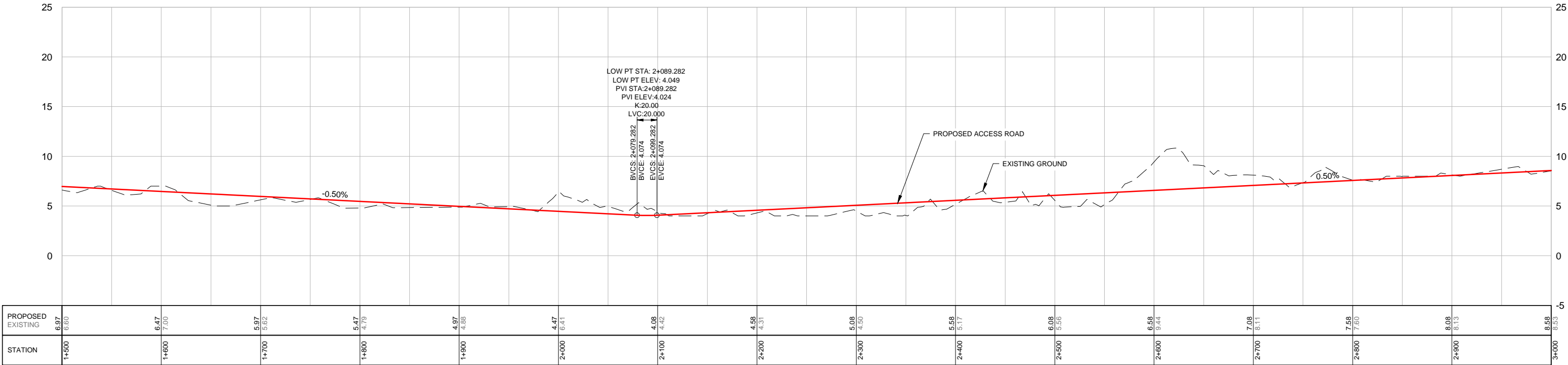
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	EXISTING ROAD - UNIMPROVED
	EXISTING ROAD
	PROPOSED ACCESS ROAD
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CLIENT: Port Alberni Port Authority	
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D	PROJECT/DWG No.: 329510-CV-100-S0-0222 REV No: A

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USER NAME: Yu, Elizabeth

PLOT DATE: Tuesday, April 08, 2014 8:31:54 AM



BOUNDARY OF HUU-AY-AHT FIRST NATION TREATY LAND (TYP.)

SARITA RIVER

CENTER LINE OF SARITA BAY SOUTH ACCESS ROAD

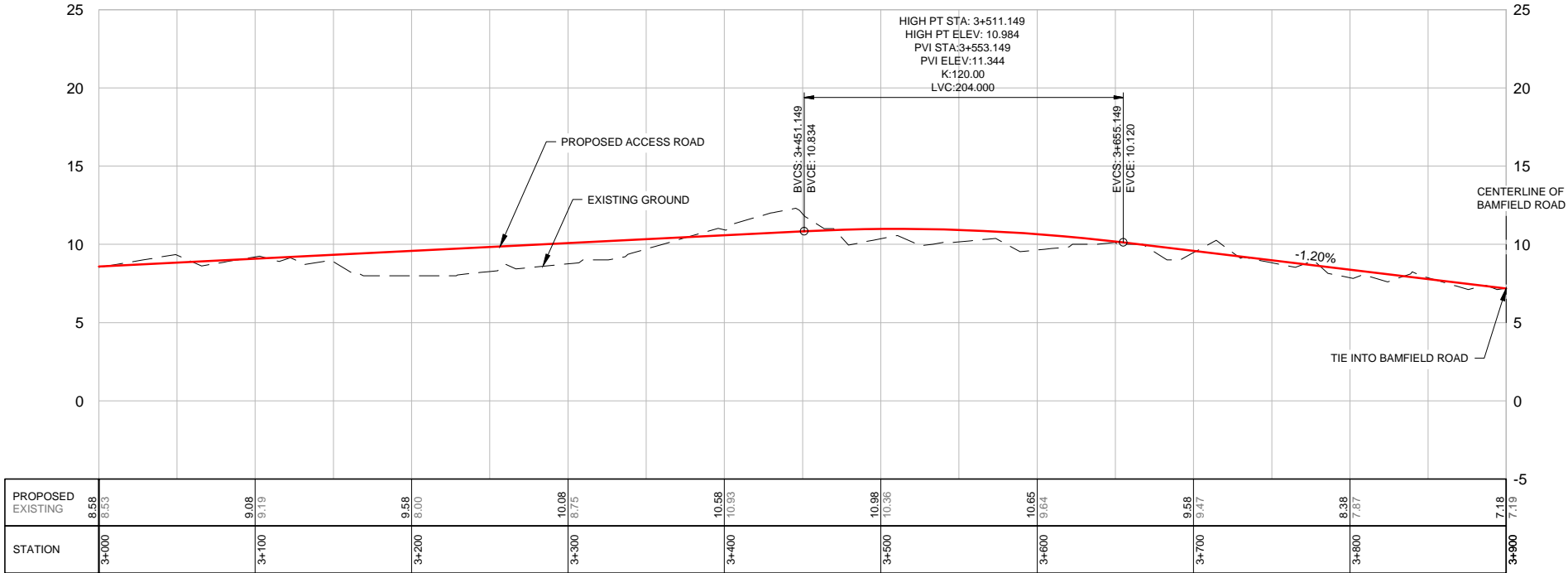
3+500

FINISHED GRADE TOE LINE

EXISTING UNIMPROVED ROAD (TYP.)

BAMFIELD RD

PLAN
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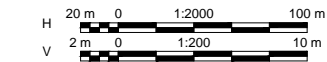


PROFILE
SCALE H 1:2000 V 1:200

LEGEND

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- EXISTING CREEK / STREAM
- POTENTIAL TRANSSHIPMENT TERMINAL BOUNDARY
- EXISTING ROAD - UNIMPROVED
- EXISTING ROAD
- PROPOSED ACCESS ROAD
- FINISHED GRADING TOE LINE
- PROPOSED CULVERT

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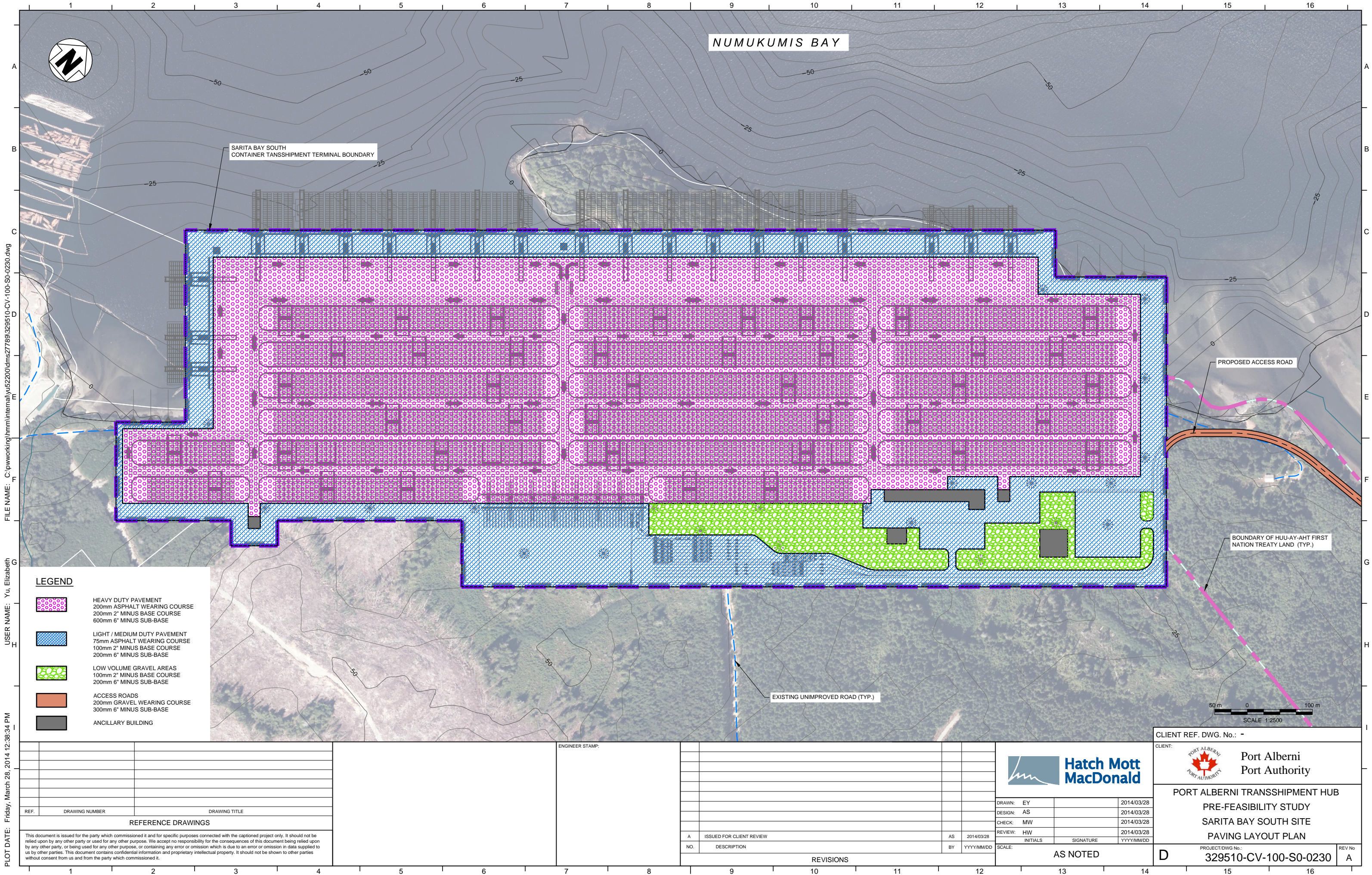
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Port Alberni
Port Authority

PORT ALBERNI TRANSSHIPMENT HUB
PRE-FEASIBILITY STUDY
SARITA BAY SOUTH SITE ACCESS ROAD
PLAN AND PROFILE - STA. 3+000 TO 3+900

D 329510-CV-100-S0-0223 A



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USER NAME: Yu, Elizabeth

PLOT DATE: Friday, March 28, 2014 12:38:34 PM

LEGEND

- HEAVY DUTY PAVEMENT
200mm ASPHALT WEARING COURSE
200mm 2" MINUS BASE COURSE
600mm 6" MINUS SUB-BASE
- LIGHT / MEDIUM DUTY PAVEMENT
75mm ASPHALT WEARING COURSE
100mm 2" MINUS BASE COURSE
200mm 6" MINUS SUB-BASE
- LOW VOLUME GRAVEL AREAS
100mm 2" MINUS BASE COURSE
200mm 6" MINUS SUB-BASE
- ACCESS ROADS
200mm GRAVEL WEARING COURSE
300mm 6" MINUS SUB-BASE
- ANCILLARY BUILDING

REF.	DRAWING NUMBER	DRAWING TITLE
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CLIENT: Port Alberni Port Authority

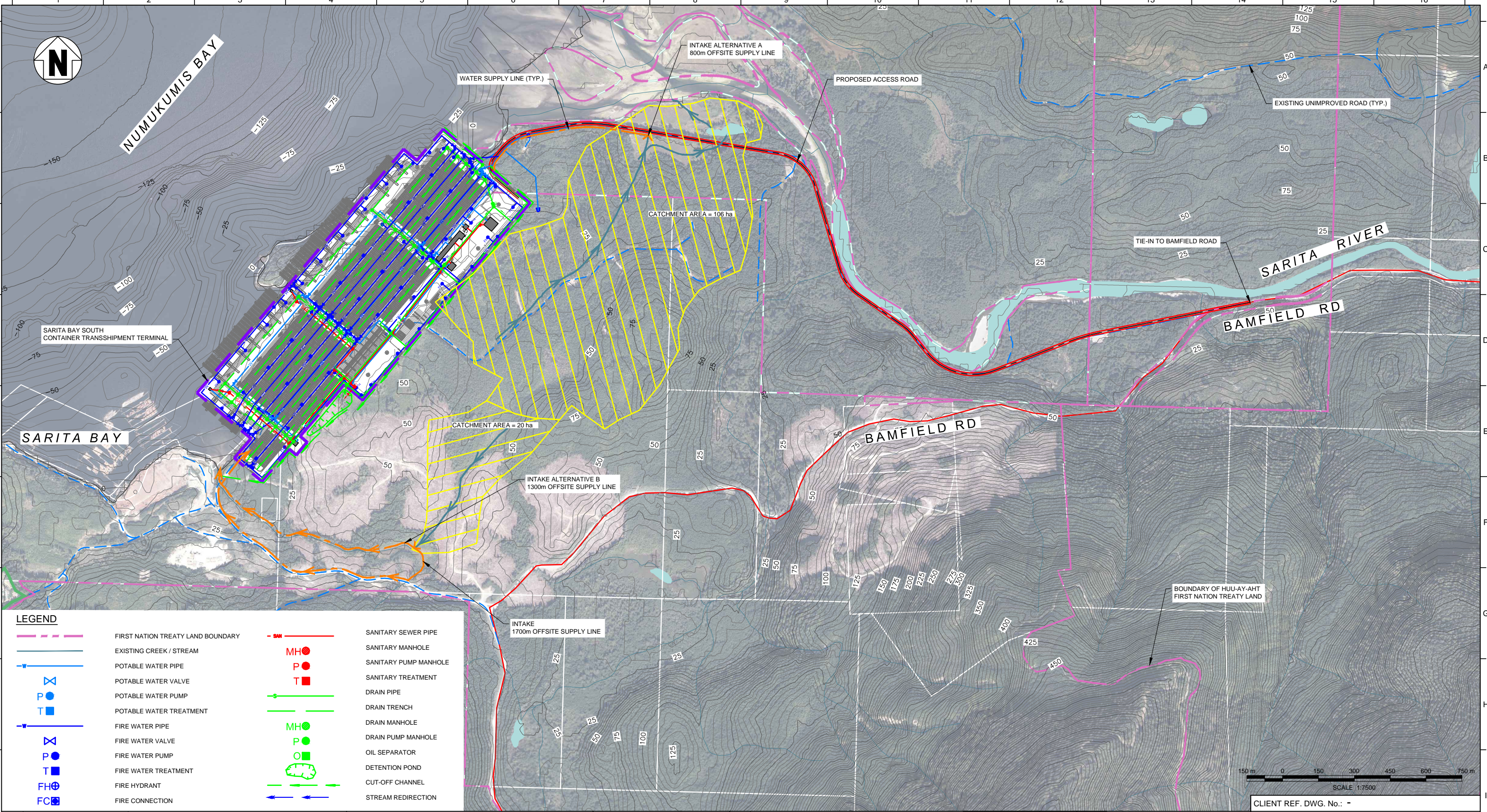
PORT ALBERNI TRANSSHIPMENT HUB
PRE-FEASIBILITY STUDY
SARITA BAY SOUTH SITE
PAVING LAYOUT PLAN

D PROJECT/DWG No.: 329510-CV-100-S0-0230 REV No: A

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PLOT DATE: Monday, March 31, 2014 1:42:06 PM



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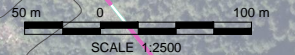
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PORT ALBERNI TRANSSHIPMENT HUB
PRE-FEASIBILITY STUDY
SARITA BAY SOUTH SITE
OVERALL UTILITY PLAN

PROJECT/DWG No.: 329510-CV-100-S0-0240

REV No: A




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LEGEND	
	EXISTING CREEK / STREAM
	PROPOSED POTABLE WATER PIPE
	PROPOSED WATER VALVE
	PROPOSED WATER PUMP
	PROPOSED WATER TREATMENT

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Hatch Mott MacDonald

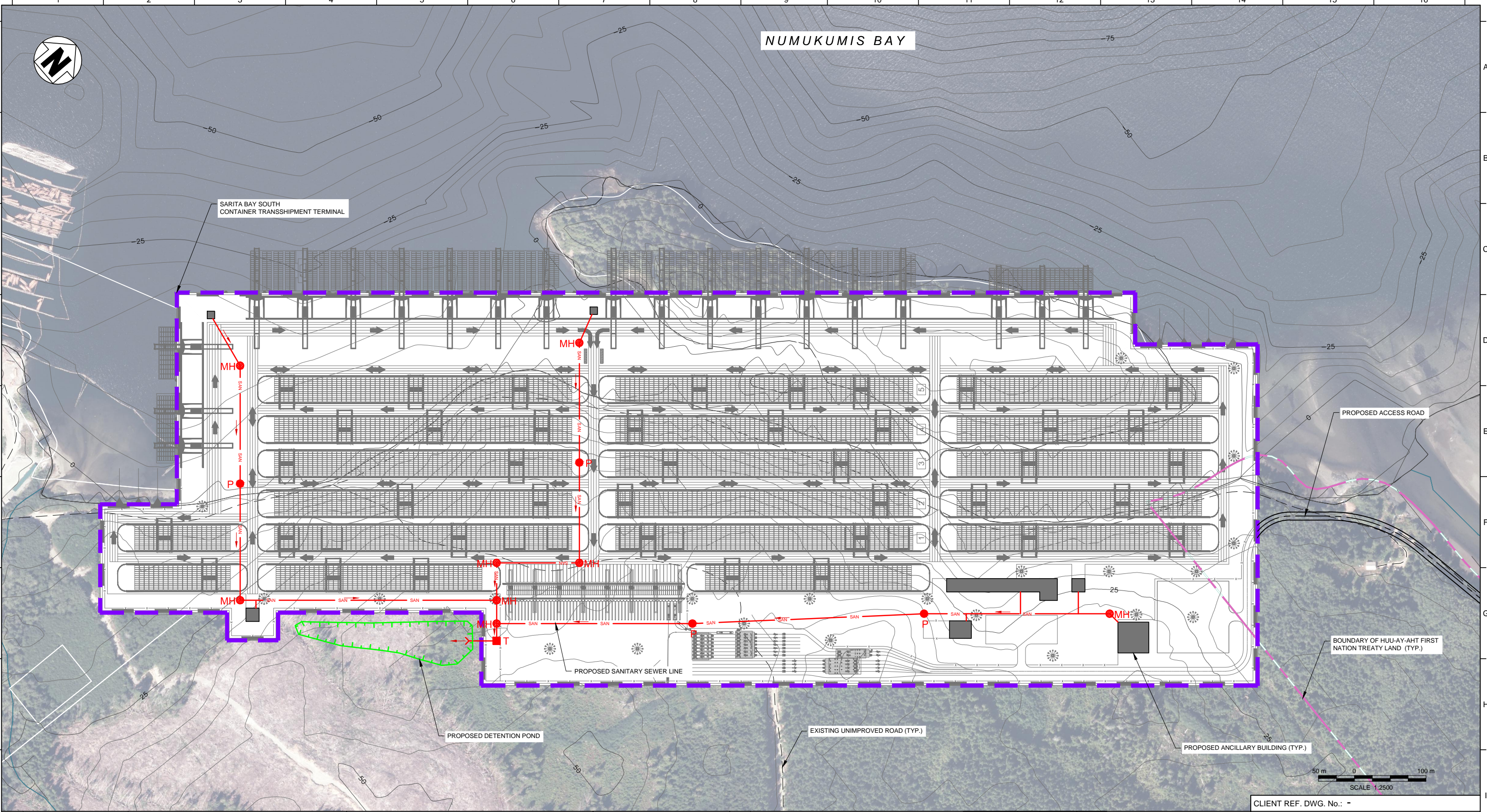
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SCALE:		
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CLIENT:	 <div>Port Alberni Port Authority</div>	
<div>PORT ALBERNI TRANSSHIPMENT HUB</div> <div>PRE-FEASIBILITY STUDY</div> <div>SARITA BAY SOUTH SITE</div> <div>POTABLE WATER LAYOUT PLAN</div>		
D	PROJECT/DWG No.: 329510-CV-100-S0-0241	REV No A

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USER NAME: Yu, Elizabeth

PLOT DATE: Thursday, March 27, 2014 6:36:51 PM



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LEGEND	
	EXISTING CREEK / STREAM
	SANITARY SEWER PIPE
	SANITARY MANHOLE
	SANITARY PUMP MANHOLE
	SANITARY TREATMENT
	SANITARY FLOW
	DETENTION POND

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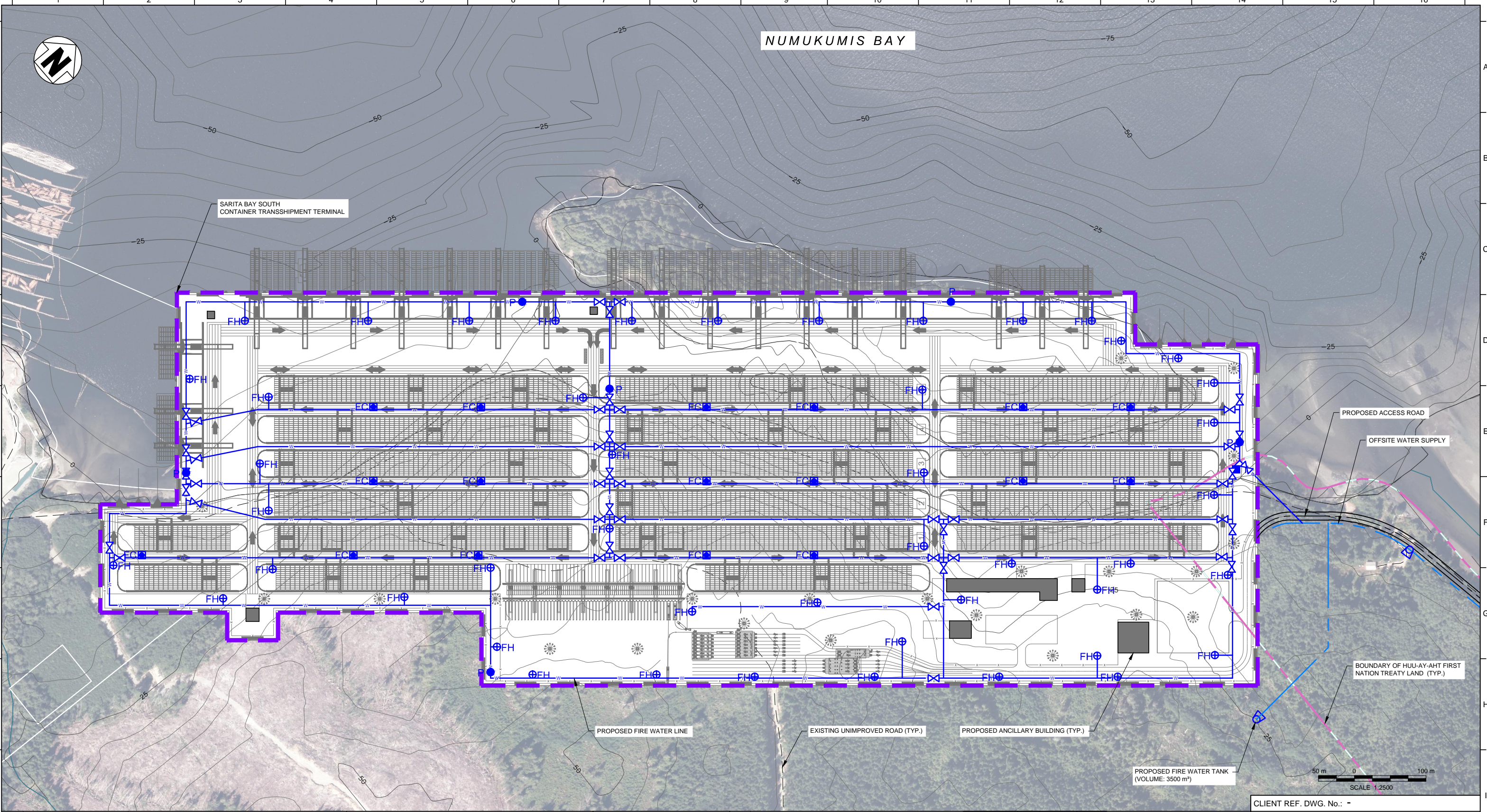
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CLIENT: Port Alberni Port Authority	
PORT ALBERNI TRANSSHIPMENT HUB	
PRE-FEASIBILITY STUDY	
SARITA BAY SOUTH SITE	
SANITARY SEWER LAYOUT PLAN	
D	PROJECT/DWG No.: 329510-CV-100-S0-0243
REV No: A	

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LEGEND	
	EXISTING CREEK / STREAM
	FIRE WATER PIPE
	FIRE WATER VALVE
	FIRE WATER PUMP
	FIRE WATER TREATMENT
	FIRE HYDRANT
	FIRE CONNECTION

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CLIENT: Port Alberni Port Authority	
PORT ALBERNI TRANSSHIPMENT HUB	
PRE-FEASIBILITY STUDY	
SARITA BAY SOUTH SITE	
FIRE WATER LAYOUT PLAN	
D	PROJECT/DWG No.: 329510-CV-100-S0-0244
REV No: A	

The proposed cost of PATH is less than the proposed Roberts Bank Terminal 2¹³² (T2) container port expansion at the Port of Vancouver, which is estimated at C\$2 Billion and involves creating an artificial island for the new container terminal. PATH could potentially handle as many containers as T2 at a lower capital investment cost. A map detailing the location of the T2 project in Metro Vancouver is shown below as Figure 31, and a rendering of the project is shown below as Illustration 4:



Figure 31. Source: “Roberts Bank Terminal 2 Project Meeting Canada’s Trade Demand.”



Illustration 4. Source: robertsbayterminal2.com

¹³²Port of Vancouver, “Roberts Bank Terminal 2 Project Meeting Canada’s Trade Demand.”

Additionally, If PATH were to handle the same amount of container traffic as T2, there would be an estimated savings of 14.4 million truck-kilometers driven per year. This reflects a potential commercial savings related to reduced kilometers travelled of C\$67.1 Million per year. Any volume that PATH diverts away from the other Pacific Gateway ports is forecasted to be made up by natural growth, as port container capacity could fall short of market demand by the 2030s.¹³³

A downside of expansion at the major regional ports is the impact it has on existing road and rail infrastructure in their respective regions, which is generally not upgraded as a part of a major cargo terminal expansion. For example, an increase in container traffic at the Port of Vancouver inevitably leads to more trucks on the roads and highways in the region, which has an impact on commuter traffic. However, the no road upgrades, new bridges, etc. would be included in the Port's expansion project. In fact, given the Port of Vancouver's congestion levels, it can take up to seven days to get containers out of the Port once offloaded¹³⁴

6.2.2. Economic Impacts

There are numerous anticipated economic impacts that the PATH project would have, not only in the area around the PATH site but also in British Columbia, Western Canada as a region, and Canada as a whole.

At 50% capacity PATH would employ 500 direct full-time-equivalent employees.¹³⁵

At 43% berth utilization (two weekly 14,000 TEU vessels calling with complete discharge and load-back) the planners estimate an annual project operating profit of C\$294 Million.¹³⁶

Over the 50 year-life of the project, its anticipated benefits include increased tax revenues of C\$1.6 Billion (C\$200 Million outside of BC), an increase of 288,079 full-time equivalent jobs throughout Canada (primarily in Western Canada) and an

¹³³CPCS, "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study - Expected Economic Impacts of PATH Project."

¹³⁴Ibid.

¹³⁵Port Alberni Port Authority, "Port Alberni Transshipment Hub (PATH): Business Plan Synopsis."

¹³⁶Ibid.

increase of Canadian GDP of C\$21.3 Billion.¹³⁷ The economic impacts of the PATH proposal are summarized below in Figure 32:

Figure A: Summary of Sarita Bay South Option A Economic Impact ⁽¹⁾

Construction Phase Impact (2)	
Total cost of construction (including contingency)	\$1.63 billion
GDP impact	\$1,282 million
Jobs impact	13,229
Tax impact	\$134 million
Operations Phase Impacts (3)	
Annual operating expense	\$271 million
Annual GDP impact	\$401 million
Annual Jobs impact	5,497
Annual Tax impact	\$30.1 million
Cumulative Impacts (4)	
GDP impact	\$21,332 million
Jobs impact	288,079
Tax impact	\$1,639 million
⁽¹⁾ Impacts shown are for Canada as a whole, and are the total of direct, indirect and induced effects. Jobs impacts are full-time equivalent, full year jobs and thus equal to person-years of employment. Tax impacts include taxes on production and on products but not on incomes. Dollar figures are 2006 values reflecting the current version of Statistics Canada's Interprovincial Input-Output (I-O) Model. ⁽²⁾ Construction costs and impacts are totals relating to the entire construction period. ⁽³⁾ Operating expense and impacts relate to a single year in the operating life of the project. ⁽⁴⁾ Cumulative impacts are the sum of the impacts for the construction period and the entire 50 year operating life of the project.	

Figure 32. Source: "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study - Expected Economic Impacts of PATH Project."

6.3. Challenges

The PATH concept is not without risks and challenges. Use of trans-shipment facilities can be discretionary and volatile, for lack of an immediate significant anchor market. The use of a container trans-shipment facility could also lead to increased cargo risks, transit times, and in some cases higher costs resulting from additional handling. These risks and challenges would need to be addressed or mitigated in the PATH operating plan.¹³⁸

The commercial feasibility of PATH is subject to PAPA receiving minimal traffic guarantees from one or more shipping lines or alliances. The list of major shipping lines with rotations in the area to be served by PATH is shown below as Tables 2-1, 2-2 and 2-3.

¹³⁷ Ibid.

¹³⁸ CPCS, "Port Alberni Trans-Shipments Hub (PATH) Feasibility Study."

Shipping Line	Alliance	Service Code	North American Ports	Foreign Countries Served	Foreign Ports	Notes
APL	New World Alliance, G6	PNW	Vancouver, Seattle, Tacoma	South Korea, Taiwan, China	Busan, Shanghai, Kaohsiung, Yantian, Hong Kong	
APL	New World Alliance, G6	PSX	Vancouver, Seattle, Oakland, San Pedro	Japan, China, Vietnam, Thailand	Tokyo, Yantian, Hong Kong, Cai Mep, Laem Chabang	
MOL	New World Alliance, G6	PN1	Vancouver, Tacoma	Japan, South Korea, Taiwan, China	Tokyo, Nagoya, Kobe, Shanghai, Kaohsiung, Yantian, Hong Kong, Xiamen	
MOL	New World Alliance, G6	PNW	Vancouver, Seattle, Tacoma	South Korea, Taiwan, China	Busan, Shanghai, Kaohsiung, Yantian, Hong Kong	
MOL	New World Alliance, G6	PSX	Vancouver, Seattle, Oakland, San Pedro	Japan, China, Vietnam, Thailand	Tokyo, Yantian, Hong Kong, Cai Mep, Laem Chabang	
OOCL	New World Alliance, G6	NWX	Vancouver, Tacoma	Japan, South Korea, China	Tokyo, Nagoya, Kobe, Busan, Ningbo, Shanghai, Qingdao	Weekly
OOCL	New World Alliance, G6	PAX	Tacoma Oakland, Los Angeles	Asia and East Coast US		Weekly, Pendulum service
OOCL	New World Alliance, G6	PNX	Vancouver, Tacoma	South Korea, Taiwan, China, Singapore, Thailand	Busan, Kaohsiung, Hong Kong, Da Chan Bay, Singapore, Leam Chabang	Weekly
Hapag-Lloyd	Grand Alliance, G6	NWX	Vancouver, Tacoma	Japan, South Korea, China	Tokyo, Nagoya, Kobe, Busan, Ningbo, Shanghai, Qingdao	
Hapag-Lloyd	Grand Alliance, G6	PNX	Vancouver, Tacoma	South Korea, Taiwan, China, Singapore, Thailand	Busan, Kaohsiung, Hong Kong, Da Chan Bay, Singapore, Leam Chabang	

Table 2-1. Source: “Port Alberni Trans-Shipments Hub (PATH) Feasibility Study.”

Shipping Line	Alliance	Service Code	North American Ports	Foreign Countries Served	Foreign Ports	Notes
Hyundai (HMM)	Grand Alliance, G6	PN1	Vancouver, Tacoma	Japan, South Korea, Taiwan, China	Tokyo, Nagoya, Kobe, Shanghai, Kaohsiung, Yantian, Hong Kong, Xiamen	
Hyundai (HMM)	Grand Alliance, G6	PNW	Vancouver, Seattle, Tacoma	South Korea, Taiwan, China	Busan, Shanghai, Kaohsiung, Yantian, Hong Kong	Add Kwangyang westbound
Hyundai (HMM)	Grand Alliance, G6	PS1	Vancouver, Seattle	Japan, South Korea, Taiwan, China	Yokohama, Kaohsiung, Chiwan, Hong Kong, Yantian, Xiamen, Busan	
NYK	Grand Alliance, G6	PNX	Vancouver, Tacoma	South Korea, Taiwan, China, Singapore, Thailand	Busan, Kaohsiung, Hong Kong, Da Chan Bay, Singapore, Leam Chabang	Weekly
NYK	Grand Alliance, G6	CKX	Seattle, Oakland, Long Beach	South Korea, China	Busan, Kwangyang, Shanghai	Weekly
NYK	Grand Alliance, G6	NWX	Vancouver, Tacoma	Japan, South Korea, China	Tokyo, Nagoya, Kobe, Busan, Ningbo, Shanghai, Qingdao	Weekly
NYK	Grand Alliance, G6	PAX	Tacoma, Oakland, Los Angeles	Asia and East Coast US		Weekly
ZIM	Aligned with G6	NWX	Vancouver, Tacoma	Japan, South Korea, China	Tokyo, Nagoya, Kobe, Busan, Ningbo, Shanghai, Qingdao	Weekly
ZIM	Aligned with G6	PNX	Vancouver, Tacoma	South Korea, Taiwan, China, Singapore, Thailand	Busan, Kaohsiung, Hong Kong, Da Chan Bay, Singapore, Leam Chabang	
"K" Line	CKYH	NOWCO-2	Prince Rupert, Vancouver, Seattle	China	Shanghai, Ningbo, Yantian, Hong Kong	
"K" Line	CKYH	NOWCO-3	Vancouver, Tacoma	South Korea, China	Busan, Shanghai, Ningbo	
"K" Line	CKYH	NOWCO-A	Vancouver, Tacoma	Japan, Taiwan, China	Tokyo, Nagoya, Kobe, Kaohsiung, Xiamen, Yantian, Hong Kong	
"K" Line	CKYH	CALCO-Q	Prince Rupert, Oakland, Long Beach	China	Qingdao, Xingang, Dalian	
CMA-CGM	P3	COLUMBUS / TP9	Vancouver, Seattle	South Korea, China, Malaysia	Busan, Shanghai, Yantian, Hong Kong, Tanjung Pelepas	Pendulum service with Asia/Europe. 17 x 8,500 TEU
MAERSK	P3	COLUMBUS / TP9	Vancouver, Seattle	South Korea, China, Malaysia	Busan, Shanghai, Yantian, Hong Kong, Tanjung Pelepas	Pendulum service with Asia/Europe. 17 x 8,500 TEU

Table 2-2. Source: "Port Alberni Trans-Shipment Hub (PATH) Feasibility Study."

Shipping Line	Alliance	Service Code	North American Ports	Foreign Countries Served	Foreign Ports	Notes
MSC	P3	-	Vancouver, Seattle, Oakland, Long Beach	Europe	Bremerhaven, Rotterdam, Antwerp, Balboa	
COSCO	N/A	CPNW	Prince Rupert, Vancouver, Seattle	Japan, China	Yokohama, Shanghai, Ningbo, Yantian, Hong Kong	Capacity: 6 x 7,500 TEU
COSCO	N/A	HPNW	Prince Rupert, Vancouver, Seattle, Portland	South Korea, China	Busan, Shanghai, Ningbo, Qingdao, Kwangyang	Capacity: 6 x 5,500 TEU
COSCO	N/A	KPNW	Vancouver, Tacoma	Japan, Taiwan, China	Tokyo, Nagoya, Kobe, Kaohsiung, Xiamen, Yantian, Hong Kong	Capacity: 6 x 5,500 TEU
COSCO	N/A	YPNW	Vancouver, Tacoma	South Korea, China	Busan, Shanghai, Ningbo	Capacity: 5 x 5,500 TEU
CSCL	N/A	ANW1	Vancouver, Seattle	South Korea, China	Nansha, Hong Kong, Yantian, Shanghai, Ningbo, Busan	
Hamburg Sud	N/A	-	Tacoma, Vancouver, Portland, Oakland, Los Angeles	Mexico, Panama, Venezuela, Europe	Hamburg, Rotterdam, Antwerp, Tilbury, Le Havre, Catagena, Panama, Manzanillo	Weekly
Hamburg Sud	N/A	-	Vancouver, Seattle, Oakland, Long Beach	Mexico, Chile, Guatemala, Peru	Lazaro Cardenas, Callao, Puerto Quetzal, Valparaiso, Puerto Angamos, Iiquien, Iquique	Weekly, 1,700 to 4,600 TEU
Hamburg Sud	N/A	-	Seattle	South Korea, Taiwan, China	Busan, Shanghai, Kaohsiung, Yantian, Hong kong	Weekly, 8,900 TEU

Table 2-3. Source: “Port Alberni Trans-Shipment Hub (PATH) Feasibility Study.”

Having a shipping line invest in the terminal, alongside other partners (operational or financial) would also help secure traffic. A shipping line alliance that finds sufficient value in PATH could potentially guarantee enough volume to make PATH essentially a dedicated facility. In that case, the shipping alliance might operate or managing the feeder service itself to increase potential efficiencies. In fact, many shipping lines have their own terminal operator divisions that can invest in port development projects to benefit their shipping line.¹³⁹

PATH's most critical ongoing challenge has been funding. In general it is much easier for ports with well-established traffic to attract investments. As Port Alberni has no experience handling containerized cargo, its inability to attract investments is perhaps not surprising. The Port Alberni Port Authority has applied for Federal funding for the PATH project on numerous occasions (including a C\$561 Million application in 2015) with no success.¹⁴⁰

The Port Alberni Port Authority has gathered endorsements for the PATH project from the local community, the regional district, the City of Port Alberni, various First Nations and the British Columbia Chamber of Commerce.¹⁴¹ However, if PAPA continues to insist on acting as its own terminal operator, and while it is obliged to operate under the statutory borrowing limits set by the Federal government, its funding options will continue to be limited.¹⁴²

7. Revised Port Alberni Trans-Shipment Hub Proposal

7.1. Approach

As previously discussed in Section 2.2, in the Doctor-Patient Model consulting approach, it is the consultant's role to identify the problem, diagnose it, and recommend a solution with limited input from the client. Accordingly, this report will make recommendations based on the author's review of the information presented.

¹³⁹Ibid.

¹⁴⁰McCormick, "Dollars for Docks."

¹⁴¹Striegler, "Looking for Solutions to Vancouver's Congestion and Lack of Industrial Land Port Alberni Puts Forth a Novel Idea."

¹⁴²McCormick, "Dollars for Docks."

The current model for success in the world of startup transshipping container port development is the Port of Prince Rupert, as discussed in Section 5.1. Its success has been so widely acclaimed that calling something “the next Prince Rupert” has become common parlance (to the extent of asking whether a new Wal-Mart distribution center in Mobile, Alabama will help turn it into the next Prince Rupert).¹⁴³

A key feature of the container port development at the Port of Prince Rupert is that, like many major capital investment programs, it was accomplished in phases. After its inaugural container terminal began performing beyond expectations, the Port of Prince Rupert could secure the business and the funding to build additional container terminals. See Figure 33, below for an overview drawing showing Phase I of the Prince Rupert Fairview Container Terminal in gray, and Phase II in green:

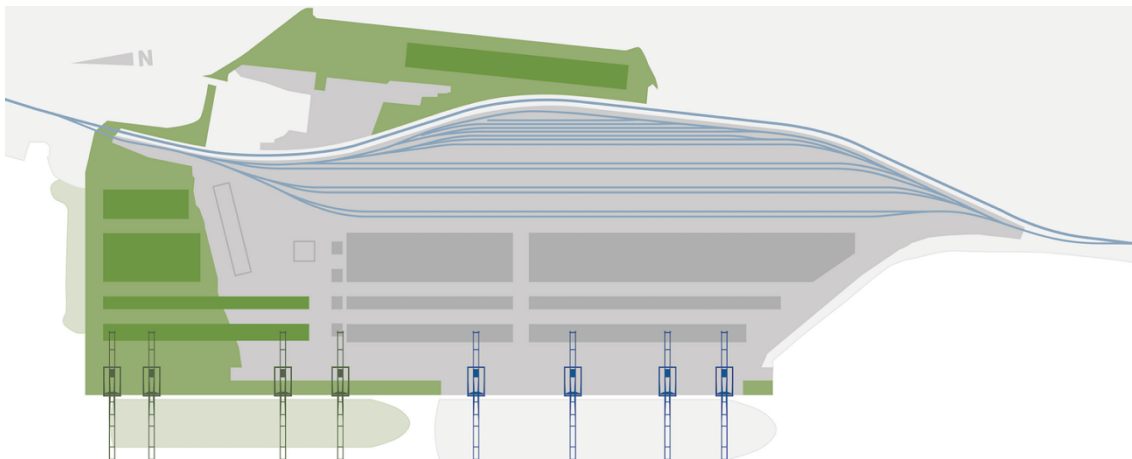


Figure 33. Source: rupertport.com

Considering that, as discussed in Section 6.3, that it is easier for ports with well-established traffic to generate investment, it can conversely be more difficult for ports with no established traffic to generate investment. This is precisely the situation that the Port Alberni Port Authority finds itself in.

The remainder of Section 7 will propose a phased approach for the development of the PATH project, give revised cost estimates for those phases, and provide additional recommendations for the Port Alberni Port Authority to consider.

¹⁴³Sands, “Wal-Mart’s New Distribution Center In Alabama - An Eventual Boon For Canadian National?”

7.2. Revised Scope

The rationale for a phased approach to the PATH project already exists within the PATH project documents. Specifically, it was estimated that a 43% average berth utilization (over two berths) would generate an average annual operating profit of almost C\$300 Million. Thus, with the same rate of cargo loading and unloading, it stands to reason that an 86% average utilization of a single berth should generate roughly the same level of income.

It was also determined that an 18,000 TEU container ship would take 3 days to unload and 3 days to load, for an average dwell time of 6 days. If a container ship is being serviced full time for 6 out of every 7 days, that leads to an 86% average utilization of that berth. This indicates that a single berth with utilization 6 out of 7 days a week should be as profitable as the baseline scenario envisioned in the PATH project documents. And, all else being equal, it should be easier for the Port Alberni Port Authority to find funding for a single berth project that costs less, than a two berth project that costs more, considering the potential income on the project is similar.

The current proposed design, as shown on page 71, involves two container ship berths, three barge berths, and 17 rows of rail-mounted container stacks. There are also support and administration buildings, truck receiving and delivery infrastructure, and utility infrastructure.

Dividing the modular portions of the design in half, and rounding up when necessary, it is conceivable that a Phase I of this project could consist of the following:

- 1 container ship berth
- 2 barge berths
- 9 rows of rail-mounted container stacks
- Half of the budgeted automated cranes, AGVs, etc.
- The support buildings and truck infrastructure should be built as part of Phase I for maximum functionality of the terminal

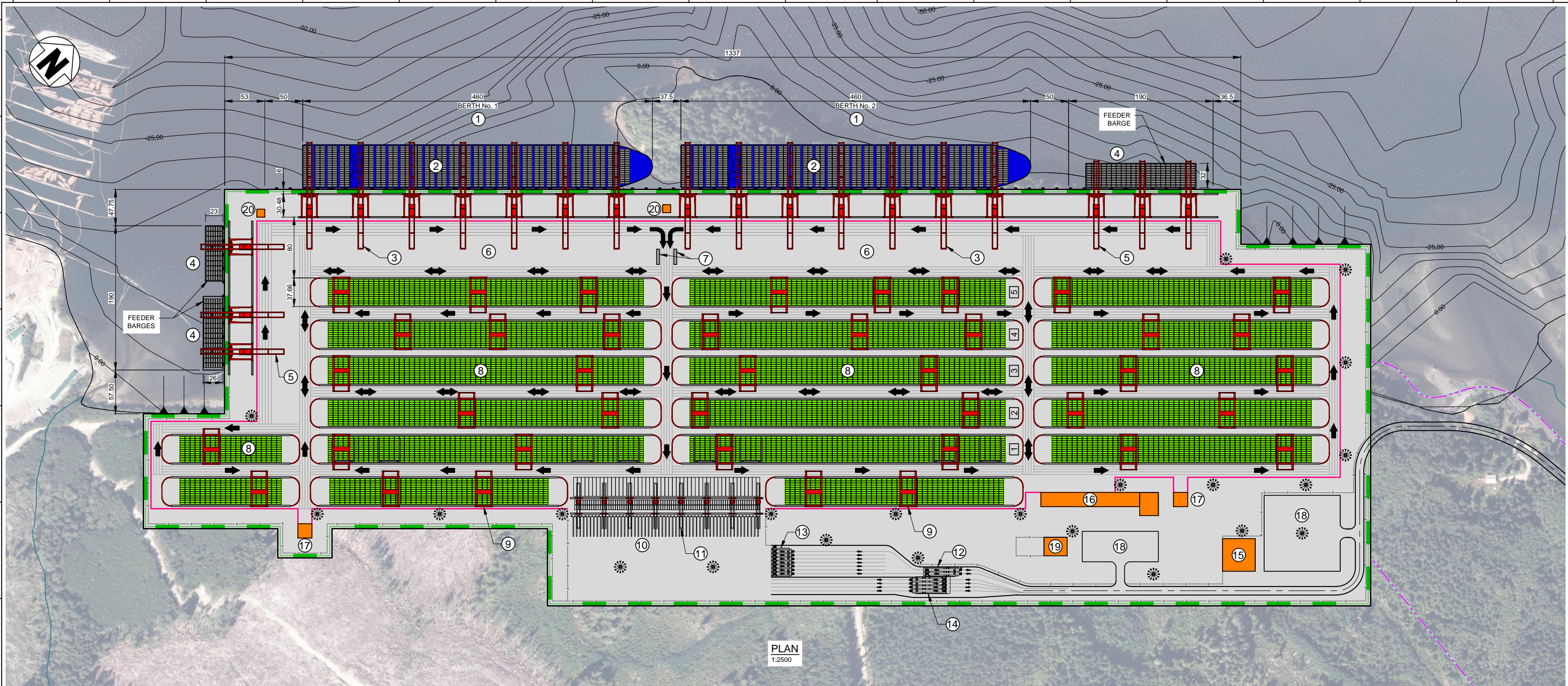
A rough Phase I terminal layout is shown on Page 72. Assuming Phase I is successful, Phase II could be built in the future. The overlay of gray in the Phase I layout is meant to indicate an undeveloped area rather than a paved area. The cost to move earth and pave such a large area when there is a possibility that it will be unused

is too high, considering that the cost of moving earth was one of the primary factors used in the site selection process.

FILE NAME: C:\pwworking\hmm\internal\hor40712\dms27725329510-PO-100-S0-0005.dwg

USER NAME: Horozian, Aram

PLOT DATE: Friday, March 21, 2014 10:33:39 AM



PLAN
1:2500

LEGEND:

- TERMINAL BOUNDARY
- TERMINAL SECURITY FENCE
- SAFETY FENCE - AUTOMATED AREA
- DIRECTION OF AGV TRAVEL
- AGV PATHS
- RAIL MOUNTED GANTRY (RMG)
- GROUNDING CONTAINERS
- GROUNDING REEFERS
- ANCILLARY BUILDING
- HIGH MAST LIGHT

KEY NOTES:

- PRIMARY BERTH
- 22,000 TEU VESSEL
- PRIMARY QUAY CRANE - 85 TONNE (14 TOTAL)
- FEEDER BERTH
- FEEDER QUAY CRANE - 65 TONNE (6 TOTAL)
- BERTH APRON
- RADIATION PORTAL MONITOR (RPM)
- CONTAINER YARD STACKS (12 WIDE)
- RAIL MOUNTED GANTRIES (40 TOTAL)
- TRUCK RECEIPT/DELIVERY AREA
- ASCs (8 TOTAL)
- OCR PRE-GATE (2 LANE)
- RECEIVING GATE (7 LANE)
- DELIVERY GATE OCR (4 LANE)
- ADMINISTRATION BLDG. 2-STORY (39,000FT²)
- MAINTENANCE BLDG. (41,500FT²)
- AGV BATTERY EXCHANGE BLDG.
- POV PARKING
- SUBSTATION
- MARINE AMENITIES BLDG.

STATIC CAPACITY:

12,012 TGS @ 5 HIGH = 60,060 TEU'S

PRELIMINARY
FOR DISCUSSION PURPOSES ONLY

REF.	DRAWING NUMBER	DRAWING TITLE
REFERENCE DRAWINGS		
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties. This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.		

ENGINEER STAMP:

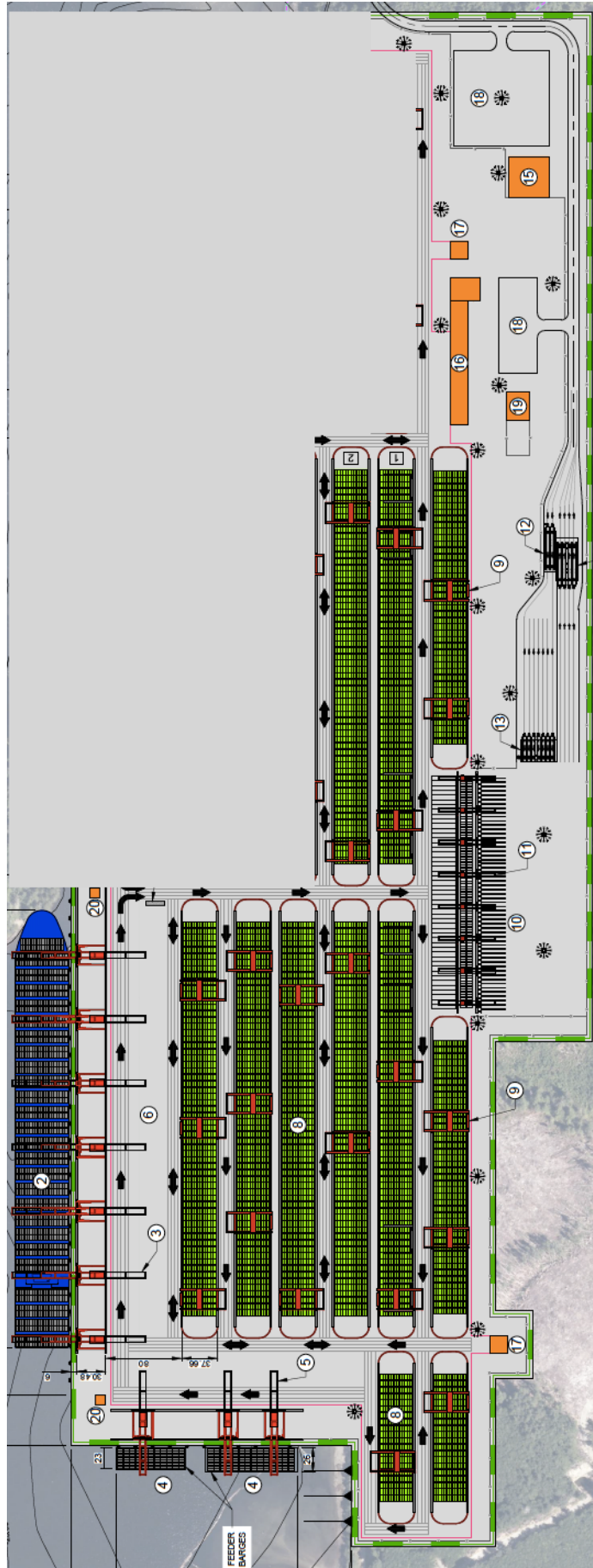
NO.	DESCRIPTION	BY	DATE
B	ISSUED FOR CLIENT REVIEW	HW	2014/03/21
A	ISSUED FOR CLIENT REVIEW	HW	2014/03/14
REVISIONS			



DRAWN:	ABH	2014/01/27
DESIGN:	HW	2014/01/27
CHECK:	AS	2014/01/27
REVIEW:	HW	2014/01/27
INITIALS	SIGNATURE	YYYYMMDD

SCALE: 20 m 0 1:2500 100 m

CLIENT REF. DWG. No.: -	
CLIENT:	Port Alberni Port Authority
PORT ALBERNI TRANSSHIPMENT HUB	
PRE-FEASIBILITY STUDY	
SARITA BAY SOUTH SITE	
GENERAL ARRANGEMENT	
PROJECT/DWG No.: 329510-PO-100-S0-0005	REV No: B



Proposed Port Alberni Trans-Shipment Hub Phase I Terminal Layout

7.3. Revised Cost

The major cost components of the PATH project (as recounted from Figure 30) are:

- Mobilization / Demobilization
- Dredging and Land Reclamation
- Removals and Site Preparation
- Excavation and Fill
- Wharf Structural
- Civil & Misc. Terminal Infrastructure
- Offsite Improvements
- Gate Complex
- Buildings
- Electrical Terminal Infrastructure
- Container Handling Equipment
- Permitting, Engineering, and Contract Administration

Some of these costs will need to be fully implemented in Phase I (such as the Gate Complex and Buildings). Others can be split out between phases based on the number of units (wharf structural) or the area they cover (site preparation).

From the proposed Phase I terminal layout it appears that the Phase I area takes more than 50% of the overall terminal. For the purposes of making a first order approximation on cost allocation, it will be assumed that the Phase I area covers 60% of the terminal area.

A proposed cost split between Phase I and Phase II is shown on the next page. One point worth making is that given the tendency for costs to increase over time, and for economies of scale to be lost in smaller projects, in the real world it is conceivable that the sum of Phase I and Phase II will be higher than the cost of doing the entire project in a single phase. However, in this exercise, splitting into phases accomplishes at least one goal, which is lowering the project cost to make it more attractive to potential investors. C\$900 Million is arguably a much more palatable figure to investors than C\$1.6 Billion.

Description	Total Cost	Contingency	Phase I Cost	Contingency	Phase II Cost	Contingency
Mobilization / Demobilization	\$61,033,000	\$9,155,000	\$36,619,800	\$5,493,000	\$24,413,200	\$3,662,000
Dredging and Land Reclamation	\$46,792,800	\$11,698,200	\$28,075,680	\$7,018,920	\$18,717,120	\$4,679,280
Removals and Site Preparation	\$2,888,750	\$433,300	\$1,733,250	\$259,980	\$1,155,500	\$173,320
Excavation and Fill - Terminal Site	\$304,215,000	\$45,632,250	\$182,529,000	\$27,379,350	\$121,686,000	\$18,252,900
Wharf Structural	\$171,257,540	\$25,224,800	\$85,628,770	\$12,612,400	\$85,628,770	\$12,612,400
Civil & Misc. Structural Terminal Infrastructure	\$94,684,900	\$11,457,100	\$56,810,940	\$6,874,260	\$37,873,960	\$4,582,840
Offsite Improvements	\$4,116,500	\$617,500	\$4,116,500	\$617,500	\$0	\$0
Gate Complex	\$3,407,500	\$511,100	\$3,407,500	\$511,100	\$0	\$0
Buildings	\$26,573,000	\$2,657,300	\$26,573,000	\$2,657,300	\$0	\$0
Electrical Terminal Infrastructure	\$51,684,000	\$12,921,000	\$31,010,400	\$7,752,600	\$20,673,600	\$5,168,400
Container Handling Equipment - Automated Terminal	\$515,045,000	\$51,504,500	\$257,522,500	\$25,752,250	\$257,522,500	\$25,752,250
Total for Capital Cost Construction	\$1,281,697,990	\$171,812,050	\$714,027,340	\$96,928,660	\$567,670,650	\$74,883,390
Total for Capital Cost Construction, Inc. Contingency	\$1,453,510,040		\$810,956,000		\$642,554,040	
Permitting, Engineering, Contract Administration	\$147,400,000	\$29,479,100	\$73,700,000	\$14,739,550	\$73,700,000	\$14,739,550
Total for Project	\$1,429,097,990	\$201,300,000	\$787,727,340	\$111,668,210	\$641,370,650	\$89,631,790
Total for Project, including Contingency	\$1,630,400,000		\$899,395,550		\$731,004,450	

Proposed Port Alberni Trans-Shipments Hub Phase I / Phase II Cost Estimates

7.4. Additional Recommendations

Beyond splitting the PATH project into phases as recommended above, the following additional recommendations are made to the Port Alberni Port Authority with the goal of making the PATH project more marketable:

1. Engage an established container terminal operator to manage the PATH terminal, even though the terminal is yet to be funded or built. Port Alberni is the only Canadian port authority that manages its own terminals, and considering that they have no experience managing container terminals, this is not a selling point for investors. The major terminal operators have existing relationships with container shipping lines and alliances and may be in a better position to obtain shipping commitments.
2. Seek investments from outside the usual sources in the Federal and Provincial governments. Since the Huu-ay-aht First Nations view the PATH project as a potential benefit for their citizens, perhaps they would want to take an ownership stake in the project.
3. Seek out public / private partnerships. All it takes is one shipping line agreeing to send one container ship a week to the PATH terminal for it to be profitable. And if that shipping line wishes to invest in the terminal in order to make it more efficient for their use, that is a positive step towards a long-term commitment.
4. Leverage the expected income from shipping commitments to obtain funding from institutional or private sources to fund Phase I.
5. Use the cash flow from Phase I to fund Phase II, either directly or by leveraging future cash flows to obtain additional investments.

8. Conclusion

This report analyzed the Port Alberni Trans-Shipment Hub proposal and made recommendations for updating it to make it more marketable to potential investors. Additional recommendations were made to the Port Authority to alter their approach to the PATH proposal with the goal of successfully funding the project.

While additional work will be needed in order to revise the PATH proposal and secure funding in order to bring this ambitious project to fruition, it is hoped that the project's architects will find success in revitalizing their community and local economy as well as contributing to their regional and national economy's well-being.

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Appendix A

NAFTA REGION CONTAINER TRAFFIC															
2017 PORT RANKING BY TEUs															
2017 Rank	Port	Country	2017	2016	Absolute Change	Percent Change	2016 Rank	2017 Rank	Port	Country	2017	2016	Absolute Change	Percent Change	2016 Rank
1	Los Angeles	United States	9,343,192	8,856,783	486,409	5.5%	1	26	Anchorage	United States	460,678	471,166	-10,488	-2.2%	25
2	Long Beach	United States	7,544,507	6,775,170	769,337	11.4%	2	27	Wilmington (DE)	United States	374,600	362,492	12,108	3.3%	27
3	New York/New Jersey	United States	6,710,817	6,251,953	458,864	7.3%	3	28	Mobile	United States	318,889	272,734	46,155	16.9%	28
4	Savannah	United States	4,046,212	3,644,521	401,691	11.0%	4	29	Palm Beach (fy)	United States	282,290	267,280	15,010	5.6%	29
5	Seattle/Tacoma Alliance	United States	3,665,329	3,615,752	49,577	1.4%	5	30	Boston	United States	270,881	248,391	22,490	9.1%	31
6	Vancouver (BC)	Canada	3,252,223	2,929,585	322,638	11.0%	6	31	Wilmington (NC)	United States	259,819	260,195	-376	-0.1%	30
7	Hampton Roads	United States	2,841,016	2,655,707	185,309	7.0%	7	32	Ensenada	Mexico	230,185	191,708	38,477	20.1%	33
8	Manzanillo	Mexico	2,830,370	2,578,822	251,548	9.8%	8	33	Gulfport	United States	216,683	165,095	51,588	31.2%	34
9	Houston	United States	2,459,107	2,182,894	276,213	12.7%	10	34	Eddystone (PA)	United States	201,096	158,083	43,013	27.2%	35
10	Oakland	United States	2,420,837	2,369,641	51,196	2.2%	9	35	Apra (GU)	United States	198,681	198,209	472	0.2%	32
11	Charleston	United States	2,177,550	1,996,276	181,274	9.1%	11	36	San Diego	United States	132,566	142,764	-10,198	-7.1%	36
12	Montreal	Canada	1,537,669	1,447,566	90,103	6.2%	12	37	Hueneme	United States	119,170	83,600	35,570	42.5%	40
13	San Juan (fy)	United States	1,319,572	1,084,374	235,198	21.7%	14	38	Kahului (fy)	United States	113,725	109,065	4,660	4.3%	37
14	Honolulu (fy)	United States	1,204,568	1,211,997	-7,429	-0.6%	13	39	Progreso	Mexico	91,318	67,842	23,476	34.6%	42
15	Lazaro Cardenas	Mexico	1,149,079	1,115,452	33,627	3.0%	15	40	Freeport	United States	85,540	91,411	-5,871	-6.4%	38
16	Veracruz	Mexico	1,117,304	965,294	152,010	15.7%	19	41	Kawaihae (fy)	United States	82,870	81,407	1,463	1.8%	41
17	Port Everglades (fy)	United States	1,076,893	1,037,226	39,667	3.8%	16	42	Saint John	Canada	57,402	90,262	-32,860	-36.4%	39
18	Jacksonville (fy)	United States	1,033,068	968,279	64,789	6.7%	18	43	Tampa	United States	56,555	49,716	6,839	13.8%	44
19	Miami (fy)	United States	1,024,338	1,028,156	-3,818	-0.4%	17	44	Nawiliwili (fy)	United States	52,374	50,814	1,560	3.1%	43
20	Baltimore	United States	962,484	869,485	92,999	10.7%	20	45	Mazatlan	Mexico	48,380	35,285	13,095	37.1%	48
21	Prince Rupert	Canada	926,540	736,663	189,877	25.8%	21	46	Hilo (fy)	United States	47,875	42,731	5,144	12.0%	46
22	Altamira	Mexico	803,222	684,931	118,291	17.3%	22	47	Nanaimo	Canada	44,160	43,024	1,136	2.6%	45
23	Halifax	Canada	559,242	480,722	78,520	16.3%	24	48	Manatee	United States	39,726	28,191	11,535	40.9%	50
24	Philadelphia	United States	545,408	459,701	85,707	18.6%	26	49	Panama City	United States	35,462	29,626	5,836	19.7%	49
25	New Orleans	United States	532,597	522,364	10,233	2.0%	23	50	Galveston	United States	33,752	35,414	-1,662	-4.7%	47

Reported data represent total loaded and empty containers handled in domestic and foreign trade. Sources: AAPA survey; Coordinación General de Puertos y Mercante (México); various websites. fy = Fiscal Year. NAFTA = North American Free Trade Association

Affidavit

I herewith confirm that this thesis entitled '*Container Port Development: Revising the Port Alberni Trans-Shipment Hub (PATH) Proposal*' was written by myself independently and without any unauthorised third-party support. All used references and resources are clearly indicated. All quotes and citations are properly referenced in the bibliography. This thesis was never presented in the past in the same or similar form to any examination board.

Place, date

Coppell, Texas, US / September 17, 2018

Signature