

VICINITY MAP

*GENERAL LAYOUT
PRINCE RUPERT*

Prince Rupert Ferry Terminal

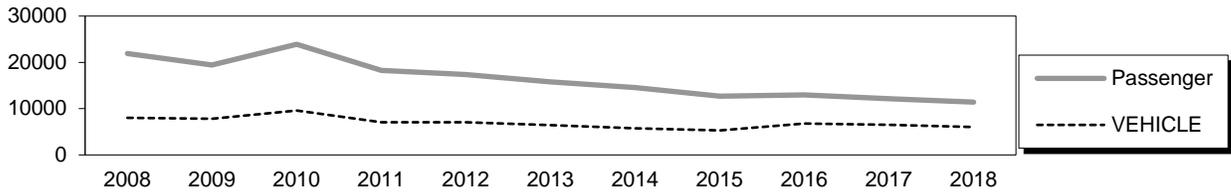
2100 Park Avenue

Owner: City of Prince Rupert / Prince Rupert Port Authority

Terminal Manager: Cathy Basdeo – 250-627-6523

Terminal Description: Prince Rupert Ferry Terminal is a stern-loading facility consisting of a timber transfer bridge, supported by a timber framed lift tower and counterweight system at the seaward end, with two timber stern dolphins, and three timber breasting dolphins connected by timber catwalks. Uplands include a terminal building built in 1992, with US & Canadian customs stations, paved parking and overhead lighting. The facility was originally constructed in 1963 to service AMHS vessels. Terminal is owned by the Prince Rupert Port Authority (PRPA). The City of Prince Rupert also had interest in the terminal building. As of April, 2013, AMHS now leases the entire facility under a fifty-year term for exclusive AMHS operations. AMHS is now responsible for all operation and maintenance of the marine and upland structures.

The past 10 years of total passenger and vehicle traffic counts for Prince Rupert are shown below.



The most recent above water survey was completed on October 5, 2017.

Vessels	
Name	Berthing, Alignment
All AMHS Vessels	Stem

Tidal Data
No data available at time of printing.

Utilities		
	at terminal	at ramp
Electrical:	Yes	Yes
Water:	Yes	Yes
Sewer:	Septic	No
Telephone:	Yes	No
Cable TV:	No	No
Fuel:	Yes	No
Wireless Bridge:	No	No

Generator & building
This facility does not have a generator.

Bridge Lift System	
Type:	Timber framed lift tower and counterweight system.
Year Built:	1963
Lift Towers:	15 timber piles with cross bracing (each side)
Lift Beams:	(2)-20.5'x44" glulams
Bridge lift:	Cable supported counterweights (2:1) w/ electric motor hoist (6:1)
Apron lift:	Hydraulic
Condition:	Poor

Uplands	
Short-Term Parking:	5 cars
Long-Term Parking:	0
Staging Area:	1000 lineal feet, 3 lanes; 10,000 lineal feet of pre-staging
Paint Striping:	Yes
Driving Surface:	Asphalt

Terminal Building	
Year Built:	1992
Square Footage:	8500 s.f.
Heating System:	Furnace (Natural Gas)
Fuel Storage	City Supply (Natural Gas)
Fire Protection:	Alarm
Condition:	Good

Vehicle Transfer Bridge	
Type:	18' x 140' Glue-Laminated Twin I-beam
Year Built:	1963
Shoreward Support:	Rocker bearing on piles
Seaward Support:	Counterweighted cable support
Pedestrian Access:	Separate 4' wide on bridge
Lighting:	Light on overhead beam
Condition:	Poor
Load Posting Sign:	N/A
Original Design Load:	H20 - Rated in 2008 to 70,000 lb max vehicle load.

Dolphins							
Dolphins	Rubbing Piles	Fender Piles	Dolphin Piles	Anchor Piles	Built	Cond.	Notes
W1	24V	31V	18B, 28V	18V	1963	Poor	Green navlight (Rubbing 7 Fender piles replaced - 2007)
E1	22V	29V	18B, 28V	18V	1963	Poor	Crushed.
E2	18V	24V	18B, 28V	18V	1963	Poor	
E3	9V	12V	10B, 12V	12V	1963	Poor	Three anchor piles share with E4.
E4	30V	40V	28B, 45V	18V	1963	Poor	Red navlight

LEGEND

B = Battered Timber Piles

V = Vertical Timber Piles

Catwalks / Gangways									
#	From Struct.	To Struct.	Lenth / Style / Main Members		Built	Safety Chains?	Cond.	Lighting	Notes
C1	Bridge	E4	200' / Catwalk / Timber stringers on piles		1963	No	Good	Jelly Jars	Sringers, metal grating and
			spaced 10' (roughly) apart						
C2	Brige	W1	200' / Catwalk / Timber stringers on piles		1963	No	Good	Jelly Jars	handrails were replaced in 2007
			spaced 10' (roughly) apart						

Terminal Projects			
Year	Project #	Project Name	Description
1963	N/A	Prince Rupert Ferry Terminal Construction	Original fill onto tidelands; built transfer bridge and lift system and six timber mooring dolphins (W1, E1-5).
1998	N/A	Prince Rupert Ferry Terminal Apron Replacement & Miscellaneous Repairs	Replaced original 15; timber apron with steel 15; apron and 10; articulating extension to fit Kennicott. Steel was added to counterweight boxes due to increased weight of new apron. Replaced old apron cable, lift gears and motors; replaced shoreward bridge bearings; replaced rotten bridge decking; relocated electrical bridge controls.
2002	N/A	Prince Rupert FT Repairs	Catwalk repairs: new stringers, expanded metal decking and aluminum railings.
2003	N/A	Prince Rupert FT Maintenance	Replaced bridge hoist cables, shackles and blocks after the existing shackle broke.
2008	N/A	Prince Rupert Ferry Terminal Rehabilitation	Replaced main lifting beams, replaced main lifting cables and connection lugs, equalizer plates, etc., removed asphalt from transfer bridge (approx 58,000 lb) and replaced it with a lighter timber wear deck, removed 3 ft sidewalk on east side of transfer bridge between lifting beams and shore, reinforced counterweight boxes, removed approx 11,000 lb from counterweights, drove 2 new steel piles on west headframe tower, replaced hanging bar assemblies both sides of ramp, replaced sections of laminated deck over top of lifting beam and at abutment, replaced deteriorated bracing on headframe towers, replaced timber bearing surfaces at abutment with steel bearing plates

Observations

1. A combined terminal and customs building was completed in 1992. This facility is approximately 8,500 square feet and houses passenger waiting areas, restrooms, ticket offices, terminal operator offices, customs agent offices, and a customs clearance room. In 2002, AMHS helped fund a secure room for Canada Immigrations to house the computer used by Canadian Police Information Center (CPIC).

Cracks in the concrete sidewalk surrounding the building reveal likely foundation settlement. Settlement of the main support beam on the arched roof has caused the steel beam to bear on the window wall and deflect the header above the double doors. The weather seal between the double pane windows have failed in several locations. Carpets are stained and smell of mold.

Paint coatings are failing on the steel roof over the Canadian Customs vehicle inspection area and there is minor surface rust along the gable edges and on structural members exposed to the elements beneath. The paint coating has only 30% remaining on the steel frame for the covered walkway between the terminal building and the bridge, with corrosion on exposed steel.

Several sheet-metal sheds in the uplands are in need of replacement, with large corrosion holes in the roofs requiring equipment within to be covered by tarps. There is a light pole missing off its concrete base at the edge of the covered walkway, which is a hazard to vehicles and pedestrians. There are numerous potholes in the asphalt surface of the staging area.
2. The transfer bridge was built in 1964 and consists of twin glue laminated I-shaped girders, and a nailed laminated deck. The 5-foot wide cantilevered pedestrian walkway was cutoff the RT side of the transfer bridge in 2008 to reduce dead load. The bridge is supported at the shore abutment on pin & rocker bearings and at the seaward end by a steel cross girder. The original glue laminated cross girder was replaced in 2008 with a welded steel girder. The cross girder is attached to a cable on counterweight lift system. New bearing pads and rockers were installed on the bridge abutment in 2008.

In 1997 the timber deck was overlaid with an asphalt topping lift, 2-1/2" thick in the driving lane and 1" thick in the walkway. The asphalt was removed in 2008 to decrease weight on the aging bridge. Timber deck boards show signs of deterioration & decay.
3. A new steel, hydraulically operated apron was installed in 1998 to accommodate the Kennicott. The primary apron is 15 ft. long, with an articulating 10 ft. secondary apron extension for the Kennicott mounted below. The new structure weighs considerably more than the original 15 ft. timber apron. All of the UHMW wear strips on the underside of the extension have come off and the tube girders have been bearing and rubbing against the vessel sponson. The wear has removed the galvanized coating and the steel is freely corroding. The east hinge pin cover plate is missing a bolt and has rotated out of position.

A 2016 structural inspection notes that the secondary apron should be removed to reduce the cantilevered dead load on the aging timber transfer bridge, since the Kennicott does not dock at Prince Rupert anymore.
4. The lift towers consist of 15 timber piles with cross bracing, with two steel support piles installed in 2008 on the outboard end of the towers. The original structural timber support piles from 43 years ago are covered in barnacles up to the mean high water line. The through-bolts that connect the diagonal braces to the timber piles should be checked for corrosion throughout both towers, and the bolt holes checked for marine borer infestation.
5. The overhead beams are 7-1/4" x 30" creosote-treated glue-laminated (glulam) timber and support the cable sheaves for the counterweight-lift system. Two of the beams span the distance between the two towers, while the short middle beam spans between the pile caps on each tower. Combined, the three beams on each tower support the weight of a counterweight box and a quarter of the weight of the vehicle transfer bridge. Work on the 2008 project removed the lichen/moss buildup and added a new coat of paint to the overhead beams.
6. The only light source along the bridge is a high-pressure sodium fixture bolted midspan beneath the overhead beams.
7. Two steel lifting beams support the seaward end of the bridge. The beams support half the bridge weight & up to 100% of the vehicle loads. Cables tied to the counterweight system support the bridge lift beams at each end. We were not able to inspect the underside of the lift beams as access requires a skiff. Lift cables were replaced by a Contractor under an AMHS contract in 2017.

Observations (continued)

8. The counterweight boxes are made of 3/8" steel plate with a bulkhead/stiffener that divides the box into quarters. The boxes were filled with steel ingots and topped with concrete. 2 tons of steel were added in 1998 after the installation of the new apron. Loose chain was piled on top, most likely due to the increase in weight of the asphalt topping lift, higher moisture content of structural timber, etc. All that remains is loose rebar after they reduced the bridge weight in 2008. The block and wire ropes to the counterweight boxes were replaced in 2008.

Critical welds between the hangar plate and the box, as well as the cable attachment to the hangar plate, could not be checked by visual inspection due to the items within the box. The hangar plate was re-painted in 2008, but we're not sure if the welds to the counterweight box were inspected during the project.
9. The stern dolphins W1 and E1 center the vessel on the bridge, to allow transfer of vehicles and crew. They are skewed at roughly a 45° angle to the centerline of the bridge to fit the rounded sterns of AMHS vessels. The stern dolphins are built of creosote-treated timber piles and consist of 24 fender piles, 28 vertical piles, and 18 anchor piles. Two smaller 7 & 9-pile dolphins were built on either end of each stern dolphin, although the 7-pile dolphin is missing on the seaward side of dolphin W1.

In summer of 2007 a project was completed that included replacing fender piles for dolphin W1 and capping the tops of vertical piles with aluminum flashing. The same work was performed on dolphin E1 in 2008.
10. There are four breasting dolphins on the East side of the berth. Their construction is similar to the stern dolphins. Several front fender piles are missing; dolphin E2: 10 of 18 remain; dolphin E3: 7 of 9 remain; dolphin E4: 5 of 12 remain. This facility was originally designed to handle 79-foot wide vessels (MALASPINA, MATANUSKA, and TAKU) which fit the three eastern dolphin groups. This properly aligns the stern with the transfer bridge. The facility is too narrow for the 85-foot wide Kennicott to use all of the breasting dolphins and allow proper alignment of the stern opening and the transfer bridge. When moored, the Kennicott is skewed so that the stern is centered correctly against the stern dolphins and then made snug against the first eastern starboard breasting dolphin. All lateral loading is applied to the first group of breasting dolphins E1. During gusty or high wind conditions it is possible for the vessel to damage this dolphin group.
11. On March 28, 2007, the terminal was closed for structural repairs to dolphin W1 and elsewhere noted. During shutdown, the M/V Taku was able to dock in the BC Ferries' Prince Rupert Ferry Terminal, next door to the AMHS terminal. In order to keep the apron centered on the Taku car deck, the ship was tied off skew from the fender line, and only rested on the two stern fenders and the nearest dolphin on the west side of the bridge.

Summary: Elements of the mooring structures, transfer bridge, and lift system have remained in service since 1963 and are showing signs of years of use and degradation from the marine environment. Several inspection reports from AMHS and consulting engineering firms in recent years have recommended that elements of these timber structures be replaced or repaired. The repair work performed in 2008 was to stabilize the major structural elements. Complete replacement of all marine structures is needed (and currently under design by AMHS with construction funding established for FY15).

The following list of recommendations include those provided by consulting engineers reports and are focused on repair/replacement of existing structural elements. They are numbered starting with the highest priority. These issues will no longer be of concern once the facility is replaced.

Inspection Summary		
Structure	Priority	Recommendations
<i>Category I - Safety Repairs</i>		
Apron	1	Remove the fold-down apron from the end of the bridge, as this is a significant dead load on the aging timber structure that is not necessary since the Kennicott is the only vessel that uses the apron, and doesn't stop at Prince Rupert.
Counterweight lift tower	2	Replace the timber headframe structure and overhead beams that show significant deterioration. Coast Isle Engineering recommends these be replaced by 2018 at the latest.
Timber Transfer Bridge	3	Horizontal cracks in the top flange of the glulam bridge girders should be treated, sealed and monitored. Horizontal tie-rods between bridge girders should be replaced where they are not long enough to be fully threaded onto the nuts. Replace tie-rods where corrosion is severe. Repair the galvanized coating of the wear area on the underside of the apron and reinstall the UHMW wear strips with larger diameter mounting studs.
Maintenance & Annual Inspections	4	Institute a routine detailed inspection cycle and more frequent maintenance schedule for greasing cables, blocks and fittings on lift system parts. Perform annual/biennial inspections of primary structural elements of the facility and provide a report/loading limitations (if any) to the owner and AMHS.
<i>Category II - Rehabilitation Work</i>		
Timber Mooring Dolphins	5	Replace damaged and deteriorated front fender piles and mounting hardware as necessary. These structures have been in use for 43 years.
Terminal Building & Uplands	6	Hire engineer/architecture firm to analyze foundation settlement and associated damages to the windows & doors, including associated moisture in floor system. Re-paint the gable edges and underneath the rood over the Canadian Customs vehicle inspection area. Re-paint the vertical and horizontal tube supports for the covered walkway between the terminal building and the bridge. Other miscellaneous items also on file with terminal manager.
<i>Category III - Upgrades Needed</i>		
Marine	7	Replace all marine facilities with new, modern structures to service current and future AMHS service. This project is under active planning and design (Project 68531) with construction obligation scheduled for August, 2015.

REFERENCES:

Coast Isle Engineering Ltd. (November, 2003). *Prince Rupert Port Authority, Alaska Ferry Terminal 2003 Condition Review*. Prince Rupert, B.C., Canada.

Coast Isle Engineering Ltd. (February, 2004). *Alaska Ferry Terminal, Prince Rupert; Interim report II: follow-up of Marine Structures Inspection*. Prince Rupert, B.C., Canada

Coast Isle Engineering Ltd. (June, 2004). *Alaska Ferry Terminal, Prince Rupert; Further Investigation into condition of components*. Prince Rupert, B.C., Canada

Appendix A: Foreshore Technologies Inc. (June 2004) *Alaska Ferry Terminal, Headframe Towers Pile Inspection Report*. North Vancouver, B.C., Canada

Appendix B: Equilibrium Consulting Inc. (May 2004) *Alaska Ferry Terminal, Prince Rupert, B.C.; Superstructure Assessment*. Vancouver, B.C., Canada

Project #68531 – Prince Rupert Ferry Terminal Replacement:

The final design is complete for a project to remove and replace the entire marine facilities with new structures to provide a new stern berth. Project was advertised once, and bid documents were pulled due to Buy America issues. The project is on hold until a resolution is found.