

Two vertical bars, one green and one blue, are positioned on the left side of the page, extending from the top of the text area to the bottom.

Columbia River Project Water Use Plan

Physical Works Terms of Reference

CLBWORKS-7B Bush Harbour Boat Launch Maintenance

May 26, 2017

CLBWORKS-7B Bush Harbour Boat Launch Maintenance Physical Works Terms of Reference

1 Background

1.1 Introduction

Under Clause (m) of Conditional Water Licence (CWL) 27068, Clause 5(a), BC Hydro is required to provide reservoir access at Bush Harbour.

Under CLBWORKS-7A Bush Harbour Boat Launch project, upland construction work (parking lot and toilet) began in 2010 and the parking lot, toilet, and upper ramp work was completed in 2011. Additional lower ramp work was completed in 2013.

The purpose of this Terms of Reference (TOR) is to outline BC Hydro's approach and scope of work for maintenance of the Bush Harbour boat launch¹.

Figure 1: Bush Harbour boat launch; October, 32011. Reservoir elevation: 754.05m Lat: 51° 45' 23.043" Long: -117° 34' 26.8242"

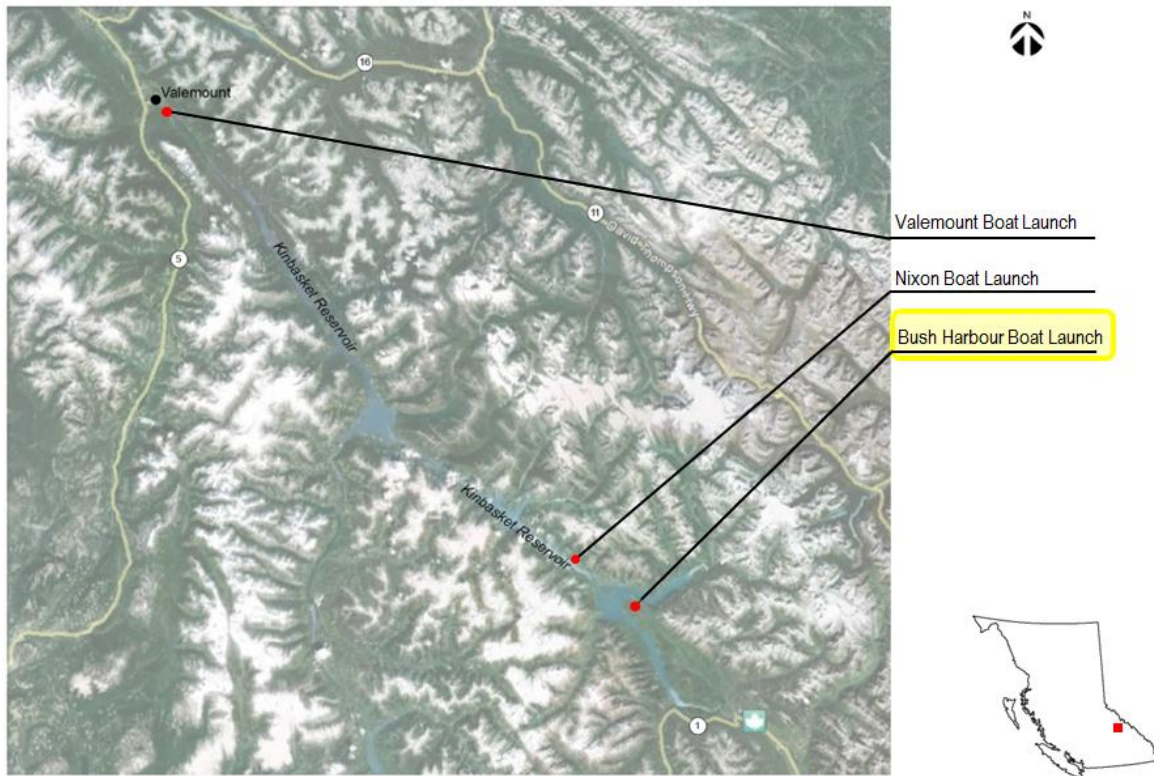


¹ Boat ramp refers to the concrete or gravel ramp used to access the reservoir. Boat launch is a broader term to refer to all related facilities, including the ramp, walkway (boarding floats), breakwaters, etc., and may include non-access related facilities such as a parking lot, etc.

1.2 Location

The Bush Harbour boat launch site is located approximately 42 km from the exit to Donald off Highway 1 when headed towards Revelstoke from Golden on the Bush Arm of the Kinbasket reservoir (southeast), as shown in Figure 2 below.

Figure 2: Boat launches on the Kinbasket reservoir



1.3 BC Hydro's approach to boat launch maintenance

BC Hydro filed its approach to boat launch maintenance with the Comptroller of Water Rights (CWR) on January 30, 2017. As described in that letter, BC Hydro will undertake structural and routine maintenance of access-related facilities at boat launches where BC Hydro has licence or Water Use Plan responsibilities.

In some locations, additional non-access facilities may have been constructed or upgraded as part of the boat launch upgrade projects. Typically, the Park Operator or land owner will hold the responsibility for maintenance of these non-access facilities as part of their crown License of Occupation or tenure and would be specified in their Crown Management Plan responsibilities. However, in a few instances where there is no other operator and BC Hydro holds the right and responsibilities by tenure or by the License of Occupation, then BC Hydro will additionally take on the maintenance (structural and routine) of these non-access facilities.

These terms are defined below:

- **Access-related facilities** are defined as those structures and facilities that provide safe access to the reservoir (i.e., ramps, low-water turnarounds, breakwaters, and boarding floats).
- **Non-access-related facilities** are defined as those structures and facilities that provide related infrastructure adjacent to the boat launch but are not directly related to access (e.g., day use areas, parking lots, access roads, toilets etc.).

- **Structural maintenance** refers to work that occurs at infrequent intervals to ensure the physical facilities are structurally sound and are functioning as intended (i.e., to ensure safe access to the reservoir). Examples would include, repair of a major crack that has formed in a ramp, replacing breakwaters when they can no longer be effectively repaired, etc.
- **Routine maintenance** refers to the work that must occur on a routine and regular basis such as annual activities in preparation for the recreation season, or throughout the recreation season, as required. For access-related facilities this includes, for example, debris, or sediment removal, replacing safety signs, any pre-season repairs to walkways or breakwater bumpers. For non-access related facilities, this may include garbage removal, toilet pumping, etc.

1.4 Maintenance period

BC Hydro will undertake routine and structural maintenance of the access-related facilities at Bush Harbour to ensure that the general public have safe access to the reservoir for the peak recreation season, and during the spring and fall shoulder recreation seasons when the ramp is available for launching. For the Kinbasket reservoir, these periods are defined as follows:

- Peak season: June 15 to September 15;
- Spring shoulder season: June 1 to June 14; and
- Fall shoulder season: September 16 to September 30.

In the event that a significant safety issue arises at the Bush Harbour boat launch outside of the maintenance period, then BC Hydro will use reasonable efforts to ensure the site is secured until the hazard can be removed.

2 Bush Harbour boat launch maintenance

2.1 Area of responsibility

At Bush Harbour, BC Hydro is responsible for the structural and routine maintenance of the access-related facilities only as shown in Table 1 below. Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO) is the operator and maintains the non-access facilities (e.g., toilet, parking lots, etc.), as discussed in Section 2.4 below.

Table 1: Facilities at Bush Harbour with BC Hydro’s maintenance responsibilities

Boat Launch	Access Road	Parking Lot	Upland Turn Around	Toilet	Lower Turn Around	Concrete Ramp	Breakwaters	Boarding Floats	Pilings
Non access-related facilities					Access-related facilities				
Kinbasket (Conditional Water License 27068)									
Bush Harbour	X	X	X	X	BCH	BCH	BCH	BCH	

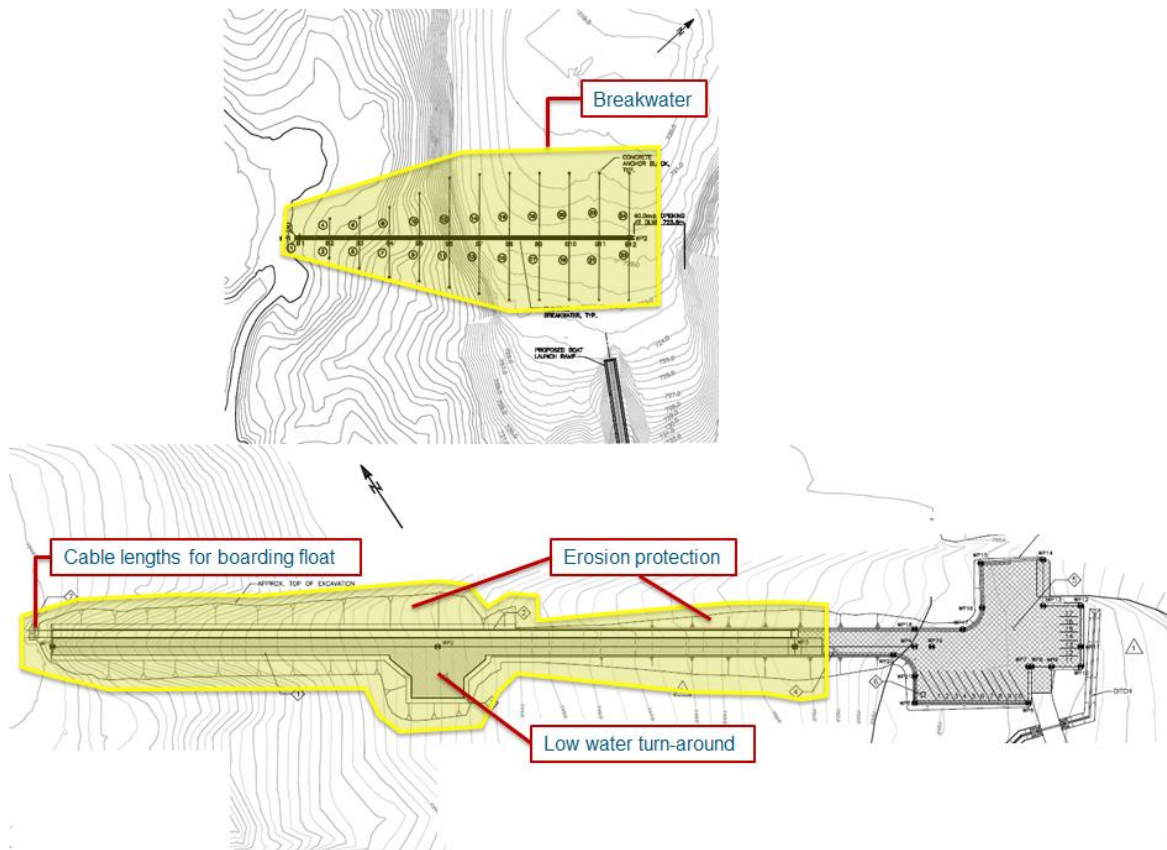
BCH = BC Hydro will undertake maintenance (both structural and routine)

X= Asset exists but are not to be maintained by BC Hydro

Blank = Asset not present

The yellow highlighted area shown in Figure 3 represents BC Hydro’s area of responsibility for the Bush Harbour boat launch. This polygon is provided to give greater clarity and certainty on which parts of the launch form part of BC Hydro’s ongoing obligations under Clause (m) of CWL 27068.

Figure 3: Yellow highlights represent BC Hydro's area of responsibility for facility maintenance at Bush Harbour boat launch



2.2 Facilities to be maintained

Table 2 below provides a more detailed list of the facilities on which BC Hydro will undertake maintenance at the Bush Harbour boat launch and the typical type of work required. The work listed under the heading 'Details' is not exhaustive but is provided for illustration purposes. All items below are to be inspected at least once annually with repairs to be done as needed. Any public safety hazards will require immediate action.

Table 2: Facility details at Bush Harbour boat launch with a description of maintenance activities

Facilities	Details
Access related facilities	
Concrete boat ramp and low water turnaround	<ul style="list-style-type: none"> Concrete panels. Structural maintenance: inspect for cracks, depressions and any other significant abnormalities that will impede safe access to the reservoir. Routine maintenance: remove sediment and/or debris where it obstructs access and/or could harm the facilities.
Scour and erosion protection (toe and sides of ramp)	<ul style="list-style-type: none"> Riprap. Structural maintenance: inspect for slumps and depressions. Routine maintenance: removal of debris and/or vegetation that could displace the riprap.
Breakwaters	<ul style="list-style-type: none"> Two floating timber breakwaters with lock-block anchors, chains and navigational lights. Structural maintenance: inspect equipment (e.g., connecting chains, shackles, navigational lights, etc.) for wear and tear and proper function. Routine maintenance: removal of debris, replacement of end caps, etc.

Facilities	Details
Boarding Floats	<ul style="list-style-type: none"> • A line of floating wharves that rolls up and down the ramp with changing water elevations via a cable system. • Structural maintenance: inspect for any reduction in freeboard, missing hardware, etc. • Routine maintenance: removal of any unauthorized equipment.

2.3 Known structural maintenance

Following the inspection in spring 2017 as the water receded, BC Hydro identified significant erosion along the northern portion of the rip-rap slope on which the upper part of the ramp sits. This erosion has caused the cable run concrete slabs (i.e., the concrete slabs that sit adjacent to the boat ramp concrete slabs) to subside, crack and create a safety hazard. The structural work required to fix this issue includes, but is not limited to filling the voids under the concrete slabs with grout, and replace the erosion protection with larger, stronger and more angular rip rap. Immediate repairs in spring 2017 prior to reservoir levels rising will provide some stability, and will prevent further erosion from occurring. The significant structural repairs will be undertaken in Fall 2017 or Spring 2018 after water recedes and there is a larger window within which to complete the work.

The budget for this work is shown in Section 3.1 below.

2.4 Permit information

MFLNRO holds the *Land Act* Section 16 Map Reserve (No. R104002) for the property on which the Bush Harbour Boat Launch is located. The Map Reserve allows MFLNRO to operate this area for public boat launch and recreation site purposes commencing May 7, 2010 for so long as required. A written agreement is forthcoming between BC Hydro and MFLNRO to formalize the current arrangement for BC Hydro to access the site for access-related maintenance.

In addition, annual notification is also provided to the MFLNRO for maintenance within an existing footprint according to *The Approved Work Practices for Boat Launch Construction and Maintenance in BC Hydro Managed Freshwater Systems (AWP)*.

2.5 Safety

All work must be in compliance with all WorkSafeBC health and safety regulations and must be undertaken following BC Hydro's current processes for ensuring worker and contractor safety.

3 Budget

Total Program Cost \$688,456.

3.1 Ongoing maintenance to 2027

- The typical expected life of the facilities range from 10-20 years for breakwaters and floats; to 40-50 years for the concrete ramps. Given the expected life of the facilities, BC Hydro will monitor the trend in maintenance costs over time to determine whether a major reinvestment in the boat launch facilities may be appropriate in the future.

4 References

BC Hydro (May 13, 2014). *Approved Work Practices for Boat Launch Construction and Maintenance in BC Hydro Managed Freshwater Systems*. 21pp.

Moffatt & Nichol (September 26, 2016). Bush Harbour Boat Launch Project Completion and Operation and Maintenance Manual. 39pp.