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Peace Project Water Use Plan

Dinosaur Reservoir Management Plan

Physical Works Terms of Reference

GMSWORKS-56 Hudson's Hope (Dinosaur) Boat Launch Maintenance

October 26, 2017

GMSWORKS-56 Hudson's Hope (Dinosaur) Boat Launch Maintenance Physical Works Terms of Reference

1 Background

1.1 Introduction

Under Clause (m) of Conditional Water Licence (CWL) 123025, and the Peace Project Water Use Plan Order dated August 9, 2007 (Schedule B, Clause 2 a), BC Hydro is required to provide reservoir access at Dinosaur Lake Park.

BC Hydro upgraded the existing Hudson's Hope (Dinosaur) boat launch¹ with all construction completed by December 2012. As part of the upgrades, BC Hydro undertook replacement of the existing boat ramp, installed a double lane concrete panel ramp, dock and gangway, dredging of the boat basin and erosion control, as well as parking lot improvements. The upgrade work was undertaken under the two physical works projects GMSWORKS-53: Hudson's Hope (Dinosaur) Boat Launch Design and GMSWORKS-51: Hudson's Hope (Dinosaur) Boat Launch Construction.

The purpose of this Terms of Reference (TOR) is to outline BC Hydro's approach and scope of work for maintenance of the Hudson's Hope (Dinosaur) boat launch.

**Figure 1: Hudson's Hope (Dinosaur) boat launch; 25 August, 2016. Reservoir elevation: 502.0 m (1647 ft.)
Lat: 55°58'40.11"N Long: -122°002'28.96"W**



¹ Boat ramp refers to the concrete or gravel ramp used to access the reservoir. Boat launch is used more broadly to refer to all related facilities, including the ramp, walkways, breakwaters, etc. and may include other non-access related facilities such as parking lots, etc.

1.2 Location

The Hudson's Hope (Dinosaur) boat launch is located on the north shore of the Peace River and approximately 10 kilometers south of Hudson's Hope. The boat launch is situated within the Dinosaur Lake Park and campground. The location of the Hudson's Hope boat launch is shown in relation to the town of Hudson's Hope, the WAC Bennett Dam, and the Peace Canyon Dam in Figure 2 below.

Figure 2: Location of the Hudson's Hope (Dinosaur) Boat Launch



1.3 BC Hydro's approach to boat launch maintenance

BC Hydro will undertake structural and routine maintenance of access-related facilities at boat launches where BC Hydro has water 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 Licence 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 complete maintenance at Hudson's Hope (Dinosaur) for the peak recreation season, and during the spring and fall shoulder recreation seasons when the ramp is available for launching. For the Dinosaur Reservoir, these periods are defined as follows:

- Peak recreation season: June 15 to September 15;
- Spring shoulder season: June 1 to June 14; and
- Fall shoulder season: September 16 to October 31.

In the event that a significant safety issue arises at the Hudson's Hope (Dinosaur) 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 Hudson's Hope (Dinosaur) boat launch maintenance

2.1 Area of responsibility

The Hudson's Hope (Dinosaur) boat launch is within Dinosaur Lake Park which is situated on Crown Land for which the District of Hudson's Hope holds the Licence of Occupation. Dinosaur Lake Park also includes a campground and other non-access related facilities (e.g., toilets, parking lot, etc.) for which the District of Hudson's Hope holds all maintenance responsibilities. BC Hydro is responsible for the structural and routine maintenance of the access-related facilities as shown in Table 1.

Table 1: Facilities at Hudson's Hope (Dinosaur) boat launch with BC Hydro's maintenance responsibilities

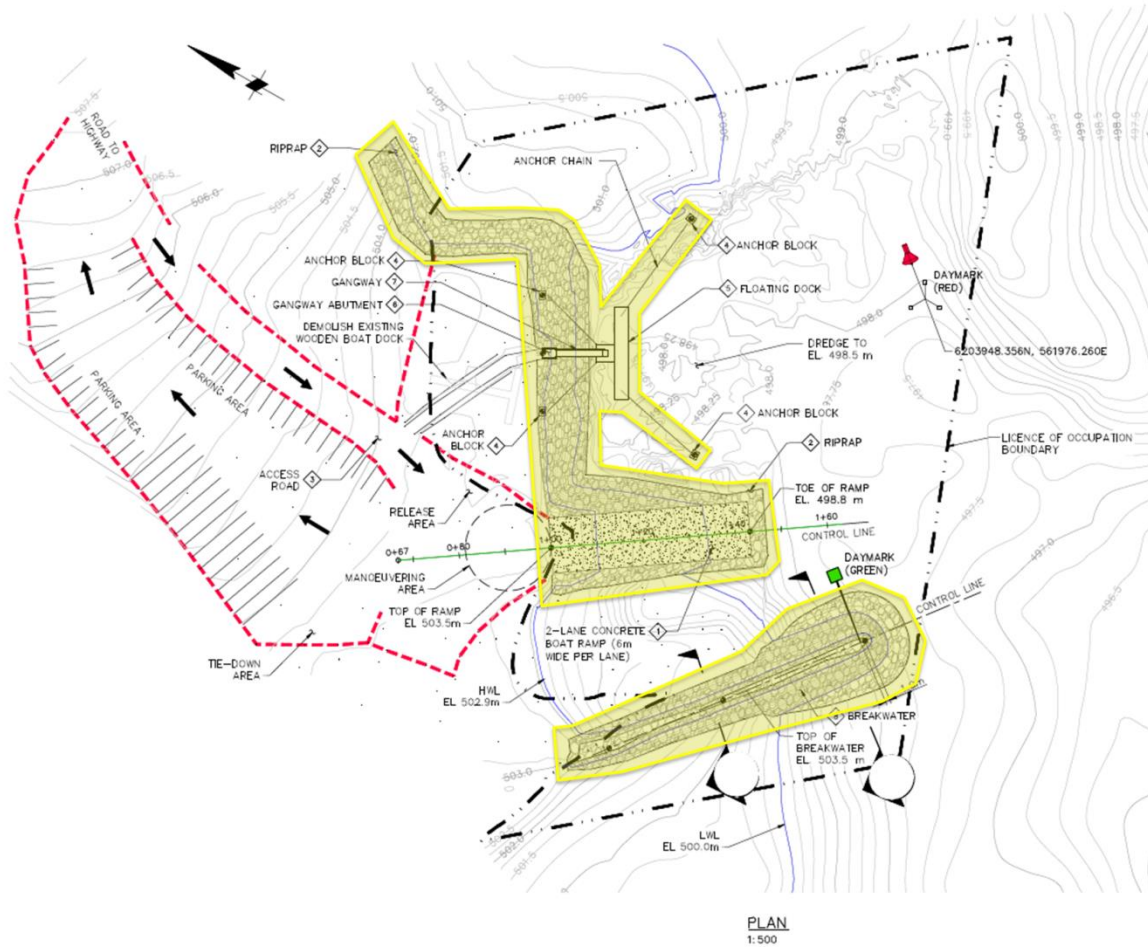
Boat Launch	Access Road	Parking Lot	Toilets	Concrete Ramp	Breakwater	Gangway & Dock
Hudson's Hope (Dinosaur)	X	X	X	BCH	BCH	BCH

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

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

The yellow highlighted area shown in Figure 3 below represents BC Hydro's area of responsibility for the Hudson's Hope (Dinosaur) boat launch. This polygon is provided to give greater clarity and certainty on which parts of the launch are part of BC Hydro's ongoing obligations under Clause (m) of CWL 123025.

Figure 3: Hudson's Hope (Dinosaur) boat launch. Yellow highlights represent BC Hydro's area of responsibility for facility maintenance



2.2 Facilities to be maintained

Table 2 below provides a list of the facilities on which BC Hydro will undertake maintenance at the Hudson's Hope (Dinosaur) 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 Hudson's Hope (Dinosaur) boat launch with a description of maintenance activities

Facilities	Details
Access related facilities	
Concrete boat ramp	<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 protection (toe and sides of ramp)	<ul style="list-style-type: none"> Riprap. Structural maintenance: inspect for slumps and depressions, ensure geotextile layer is not visible, etc.

Facilities	Details
	<ul style="list-style-type: none"> Routine maintenance: removal of debris and/or vegetation that could displace the riprap.
Breakwater	<ul style="list-style-type: none"> One rubble mound breakwater. Structural maintenance: inspect equipment (e.g., rip rap, geotextile layer, etc.) for wear and tear and proper function. Routine maintenance: removal of debris, ensure safety sign at end of breakwater is in place, etc.
Dock and Gangway	<ul style="list-style-type: none"> A 20 m long by 3 m wide main floating dock tethered by mooring chains to concrete anchor blocks A 10 m long by 1.5 wide aluminum gangway supported by a concrete abutment on shore and rests on a sliding plate on the landing float of the main dock Structural maintenance: inspect for any reduction in freeboard, missing hardware, etc. Routine maintenance: removal/re-installation of the gangway and floats every fall/spring to reduce damage to these structures from ice and winter storms. Throughout the recreation season routine maintenance can include removal of any unauthorized equipment, garbage, etc.
Shoreline between ramp and breakwaters.	<ul style="list-style-type: none"> BC Hydro's role is limited to removing significant safety hazards or removing debris and/or other items that pose a danger to the public/facilities or impede access to the reservoir. BC Hydro will remove significant safety hazards that may exist on the shoreline between the ramp and breakwater or restrict access to the boat launch or reservoir.

2.3 Known structural maintenance

Following the site inspection in fall 2017, BC Hydro identified erosion along the western and eastern edges of the concrete boat ramp. The rip-rap erosion protection along the edges of the ramp has moved downslope away from the ramp exposing the geotextile filter cloth. This action has exposed the sides of the ramp to erosion from wind and wave action with some undercutting of the ramp apparent on both sides of the ramp.

The structural work required to fix this issue includes, but is not limited to, an inspection from a qualified engineer to assess the full extent of the problem, filling the voids under the concrete slabs with grout or other material, and replacing the erosion protection with larger, stronger and more angular rip-rap. Repairs in fall/winter 2017 and/or spring 2018 (or as soon as it is possible to schedule) will protect from further erosion and provide a safe access point to the reservoir for recreationists.

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

2.4 Permit information

As the access-related boat launch facilities are located on Crown Lands, BC Hydro acquired the following access rights which must remain valid prior to commencing work:

- Crown Licence of Occupation (No. 81314) commencing July 10, 2012, and expiring July 10, 2042; and
- Annual notification is provided to the Ministry of Forests, Lands and Natural Resource Operations for maintenance works within an existing footprint according to *The Approved Work Practices for Boat Launch Construction and Maintenance in BC Hydro Managed Freshwater Systems (AWP)*.

BC Hydro is also confirming access arrangements with the District of Hudson's Hope to ensure BC Hydro or its agents have ongoing access through the campground for necessary maintenance to the boat launch.

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 \$\$478,385.

3.1 Known structural maintenance

This budget is necessary to remediate the erosion issues explained in Section 2.3 and to ensure safe access to the reservoir for the general public. This preliminary estimate is for an engineering assessment and a provision for remediation work based on similar work we have undertaken elsewhere. However, it is not based on a full assessment and should the remediation cost vary significantly, BC Hydro will make additional submissions as required.

3.2 Ongoing maintenance to 2026

Routine maintenance costs are generally higher for Hudson's Hope (Dinosaur) Boat Launch when compared to other boat launches with similar facilities. This is due to:

- The need to remove the gangway and wooden floats, shown in Figure 2 every fall;
- Storage of these facilities over the winter; and,
- Re-installation of the gangway and boarding floats in the spring.

Removal/storage/installation is necessary every year to limit the damage to these facilities from ice build-up and winter storms. The size and configuration of the gangway and boarding floats require heavy equipment (i.e., crane and flat-deck) for the removal/storage/installation.

4 References

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