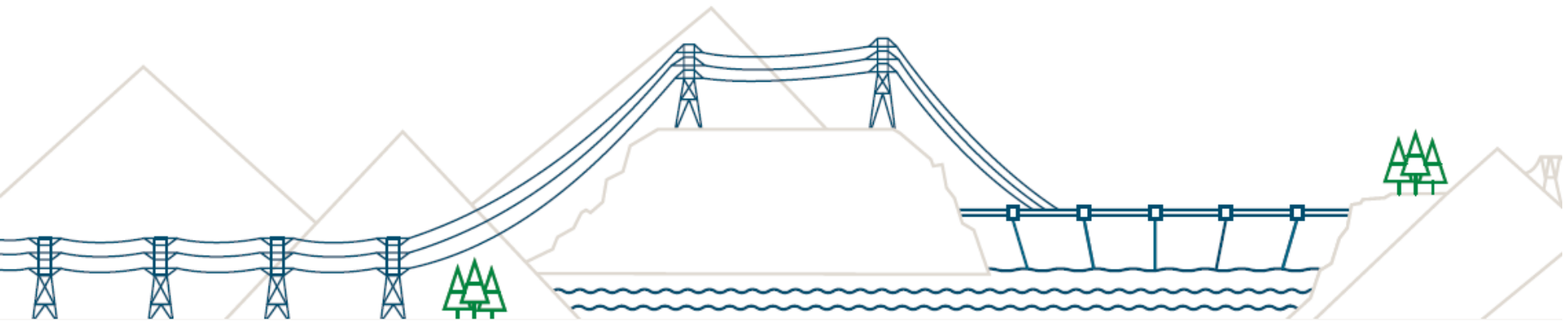


Site C Clean Energy Project

Regional Community Liaison Committee
Project Briefing

November 28, 2018



2018-2019 Site C Update

Ken McKenzie
Executive Vice President, Site C, BC Hydro



Privileged and confidential

Site C project

Construction phase objectives

- **To complete the project safely**
- **To uphold our environmental and social commitments**
- **To uphold our commitments to First Nations and our community stakeholders**
- **To focus on quality**
- **To complete the project on time**
- **To complete the project within budget**

2018 milestones

2018 roller-compacted concrete placement



May 2018

2018 milestones

2018 roller-compacted concrete placement



Oct 2018

2018 milestones

Completion of north bank excavation



2018 milestones

Diversion tunnel excavations underway



2018 milestones

Work begins on Highway 29



2018 milestones

Transmission/substation, reservoir clearing advances



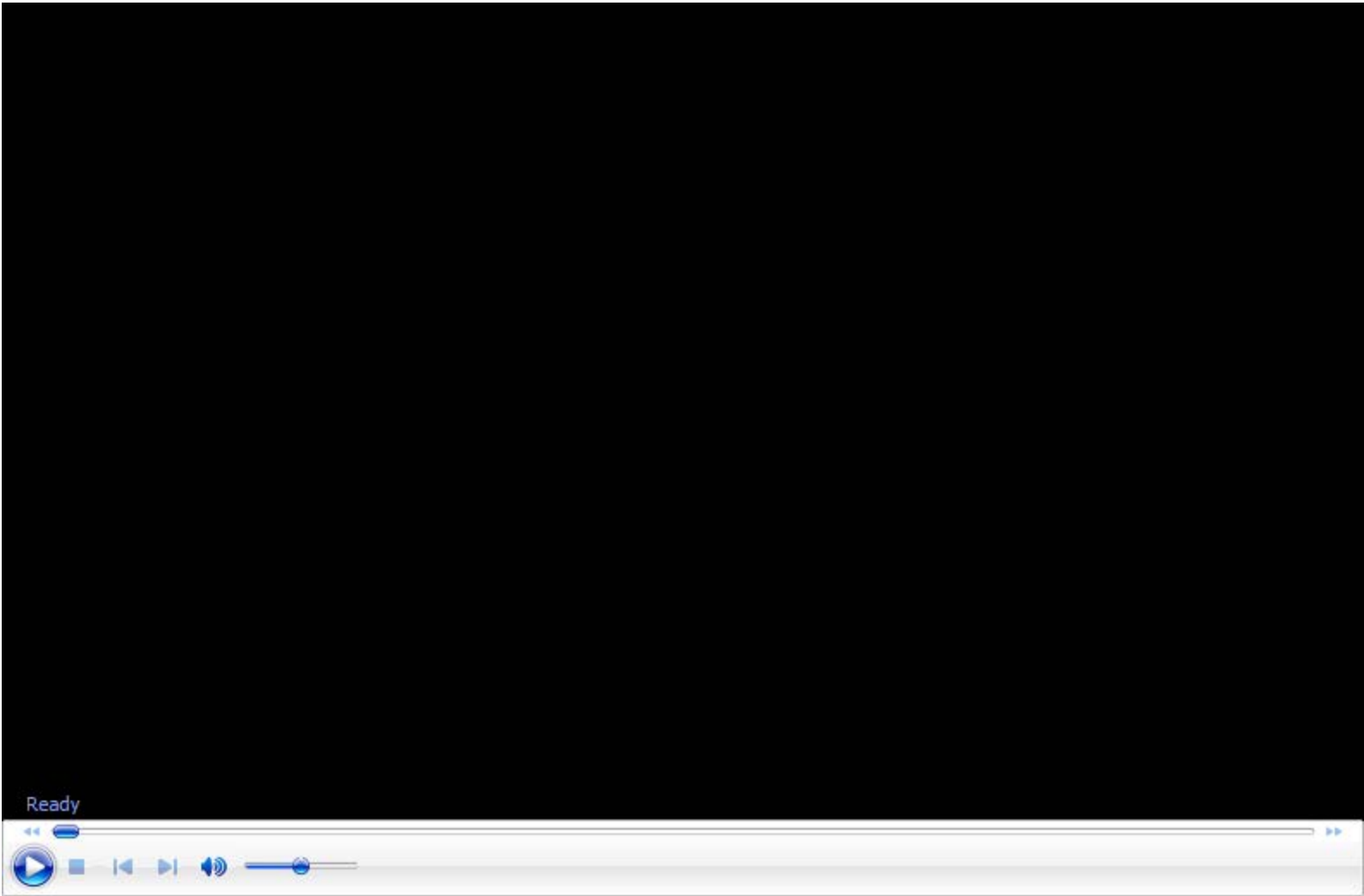
2018 milestones

Progress on non-construction work

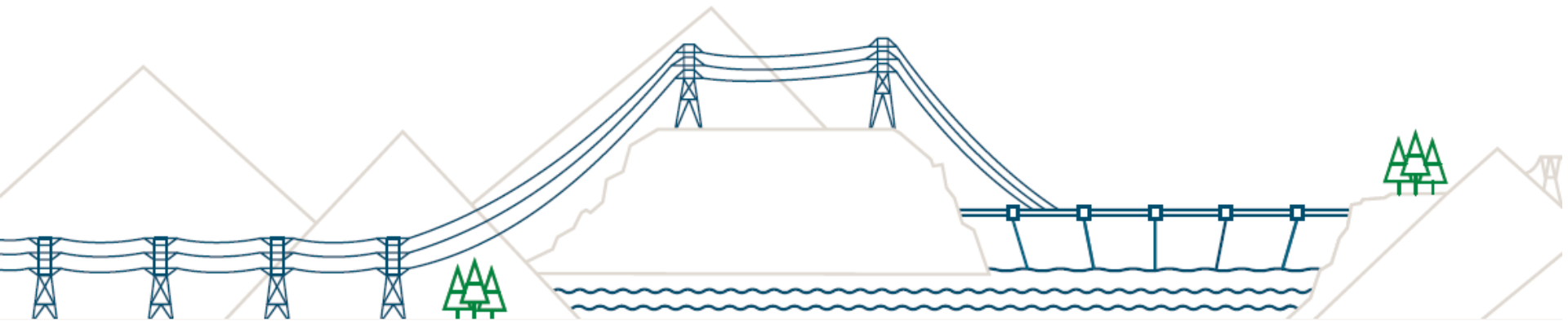


Students work with us in support of community neighbourhood development in Hudson's Hope.

October 2018 Site C drone footage



Site C: Looking ahead to 2019



2019 focus areas

Focus on 2020 river diversion, dam site construction



2019 focus areas

Focus on advancing work in all project areas



On Dam Site Construction Update

Steve Abbey



On Dam Site Construction Update

- Left Bank: Diversion Tunnels
 - Inlet Portal Tunnels 1 and 2
 - Outlet Portal
- Right Bank: Powerhouse and Spillway
 - Roller Compacted Concrete
 - AFDE Cast-in-place
 - Excavation Work
- Plans for Winter Season
 - RCC Insulation
 - Upcoming Excavations

On Dam Site Construction Update

Construction Activity	Anticipated schedule
Excavation and material relocation on the north and south banks	July 2015 – spring 2023
Roller compacted-concrete buttress	Early 2017 – late 2020
Generating station and spillways	2018 – 2024
Turbines and generators	2017 – 2024
Substation	2018 – 2020

North Bank: Diversion Tunnels



Diversion Tunnels

- Inlet Portal Tunnels 1 and 2



Diversion Tunnels

- **Inlet Portal Tunnel 1**



Diversion Tunnels

- Outlet Portal

Datum: WGS-84

Azimuth/Bearing: 066° N66E 1173mils (True)

Elevation Angle: -03.4°

Horizon Angle: -20.8°

Zoom: 1X

Outlet Portal



South Bank: Powerhouse and Spillway



Powerhouse Buttress

- **Roller Compacted Concrete**



Powerhouse

- **AFDE Cast-in-place**



Powerhouse

- **AFDE Cast-in-place**



Spillway

- Excavation Work



Plans for Winter Season

- **RCC Insulation**



Plans for Winter Season

- **Upcoming Activities : Right Bank**



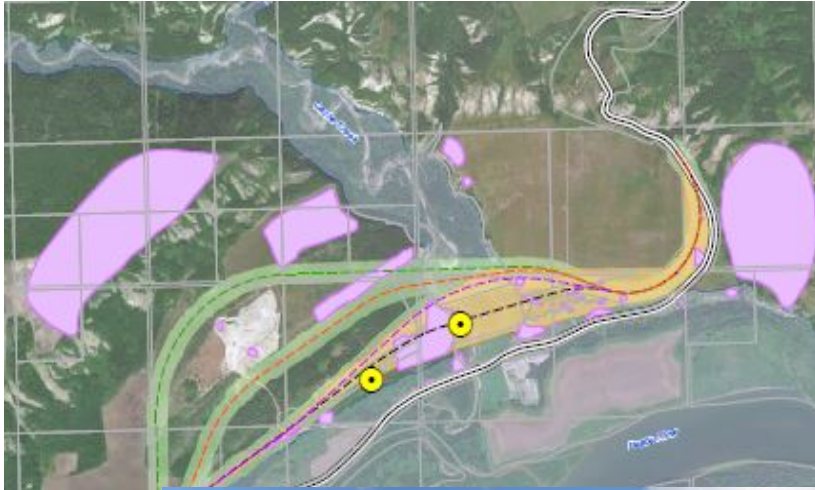
Plans for Winter Season

- **Upcoming Activities: Left Bank**



Off Dam Site Construction Update

Chris Waite



Off Dam Site Construction Update

- **Transmission Work**
 - Site C Substation
 - Transmission Lines
 - Peace Canyon Gas Insulated Switchgear Expansion
- **Highway 29 Realignment**
 - Schedule
 - Cache Creek/Bear Flat Realignment Decision
 - Cache Creek West Construction
- **Reservoir Clearing Work**
 - Planned work for winter 2018/2019
 - Schedule

Building the Site C Clean Energy Project

Roads & highways

- Upgrades to 240, 269, 271 and Old Fort Roads
- Realignment of six segments of Highway 29

Hudson's Hope shoreline protection

- Upgrades to DA Thomas Road
- Construction of a berm along the shoreline
- Re-paving of Clarke Ave, if required

Peace River / Reservoir area

- Public safety signs and beacons installed upstream and downstream of the dam site
- Clearing activities, river diversion and reservoir filling

Production & transport of materials

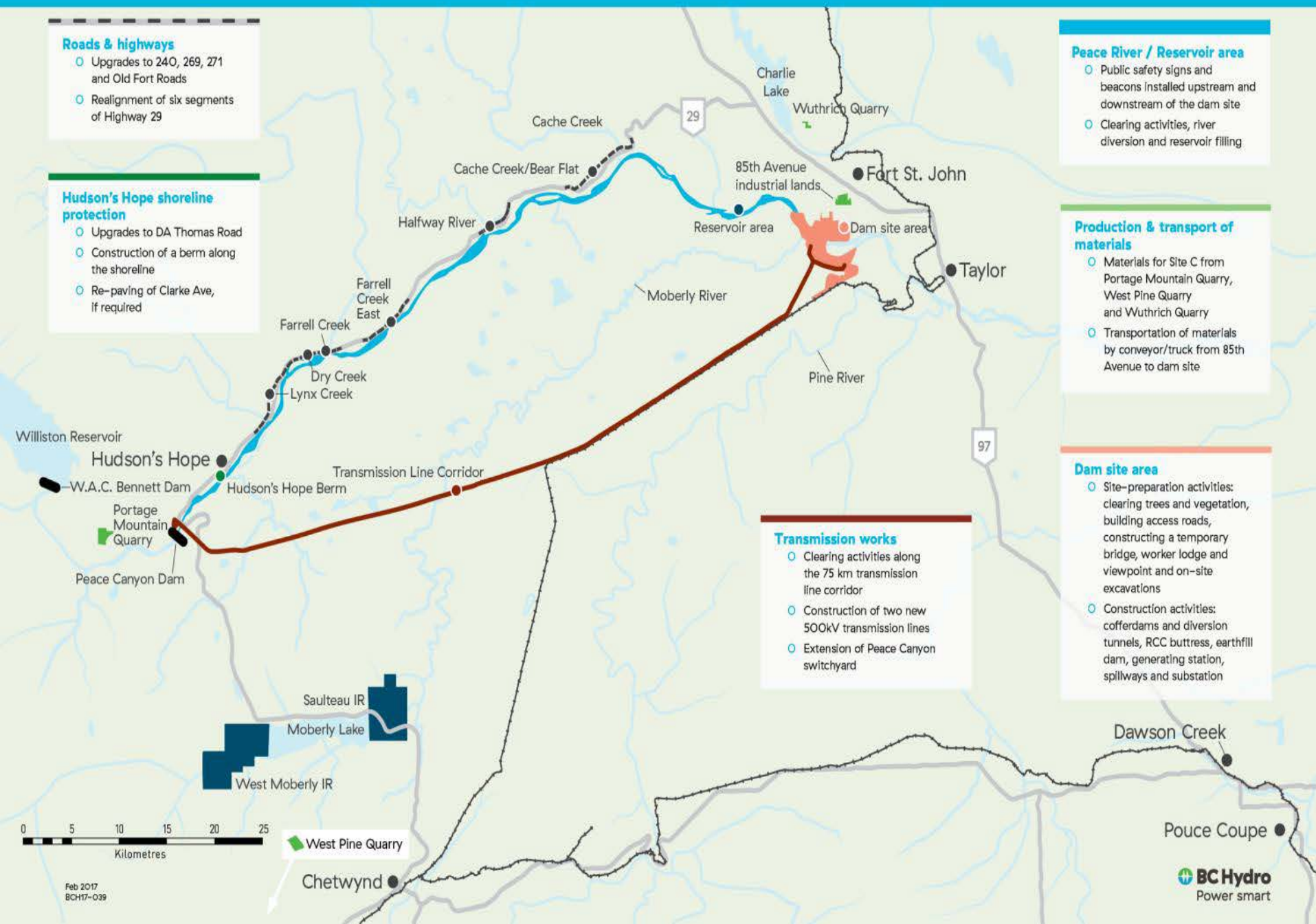
- Materials for Site C from Portage Mountain Quarry, West Pine Quarry and Wuthrich Quarry
- Transportation of materials by conveyor/truck from 85th Avenue to dam site

Dam site area

- Site-preparation activities: clearing trees and vegetation, building access roads, constructing a temporary bridge, worker lodge and viewpoint and on-site excavations
- Construction activities: cofferdams and diversion tunnels, RCC buttress, earthfill dam, generating station, spillways and substation

Transmission works

- Clearing activities along the 75 km transmission line corridor
- Construction of two new 500kV transmission lines
- Extension of Peace Canyon switchyard



Site C Substation



- 500kV electrical equipment installation
- Date of photo: October 17, 2018



- Control building assembly completed
- Date of photo: September 2018

Site C Substation: 500kv Transformer



- Transformer Offloading in Surrey, BC
- Date of photo: July 24, 2018



- Installation of Transformer at Site C Substation
- Date of photo: August 2, 2018

Transmission Line Tower Assembly



- First lattice structure assembly began October 22, 2018.
- Helical pile foundation design issued for construction by Allteck with installation starting in November 2018.

Date of photo: October 23, 2018

Peace Canyon Gas Insulated Switchgear Building Expansion



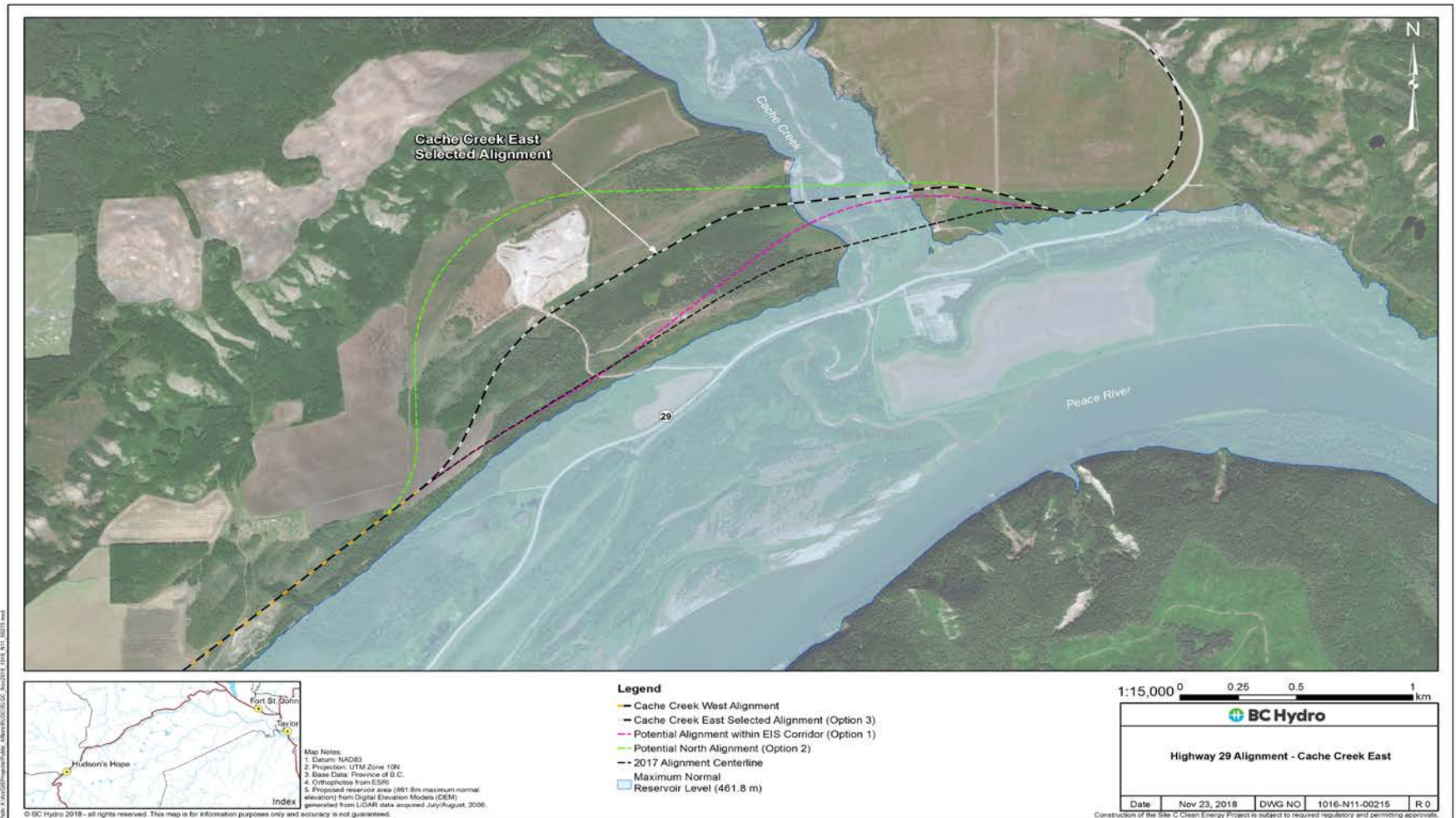
- Outdoor switchyard civil work substantially completed.
- Assembly of line terminal steel structures completed.

Date of photo: October 17, 2018

Highway 29 Realignment



Highway 29 Realignment



- Cache Creek/Bear Flat realignment decision

Highway 29 - Cache Creek West



- Site offices in the background.
- Development of the borrow area which is the source of aggregate for road construction.

Date of photo: October 28, 2018

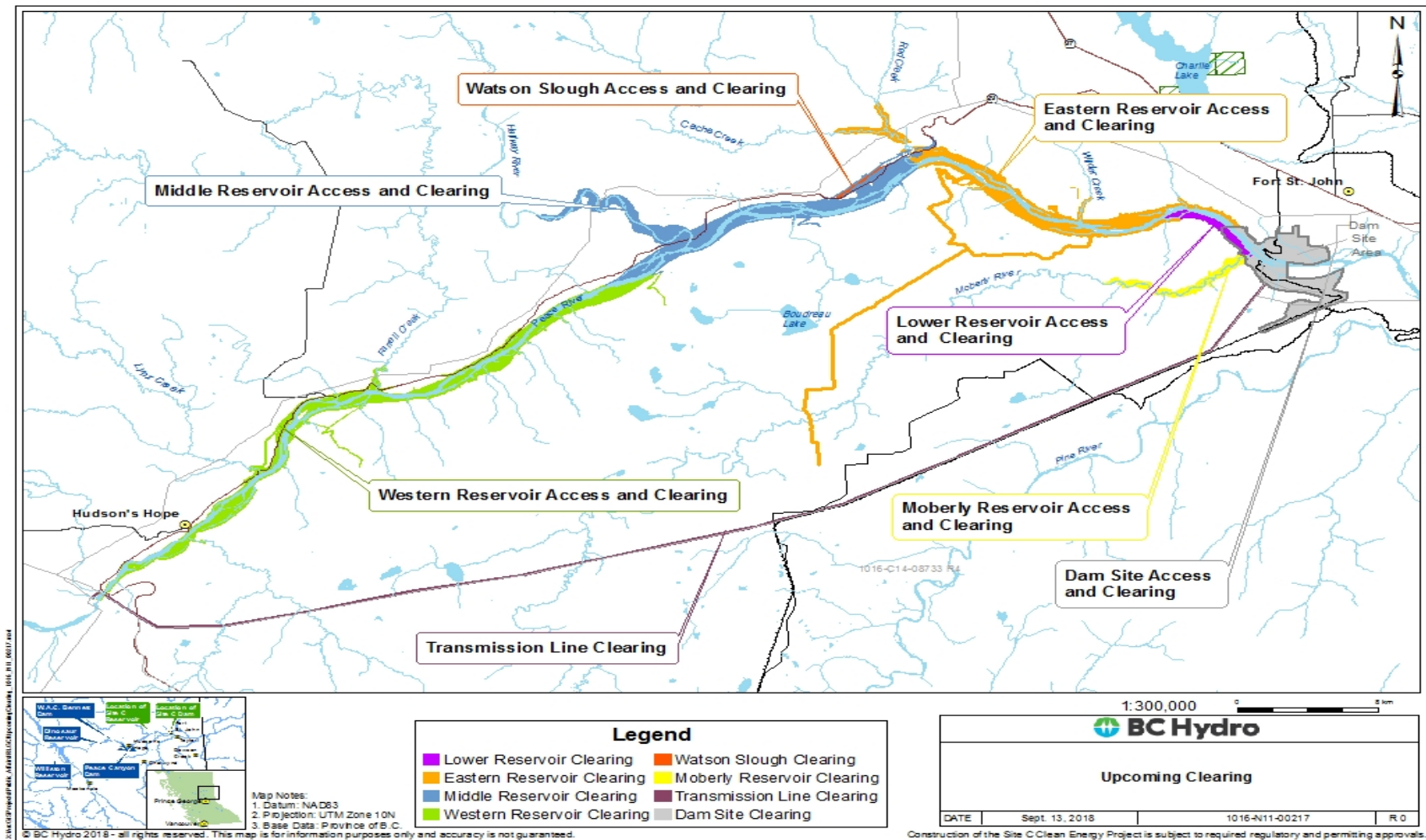
Highway 29 - Cache Creek West



- Development of the haul road that connects the borrow area with the new highway right of way.

Date of photo: October 27, 2018

Reservoir Clearing Work



- Planned work for winter 2018/2019

Reservoir Clearing

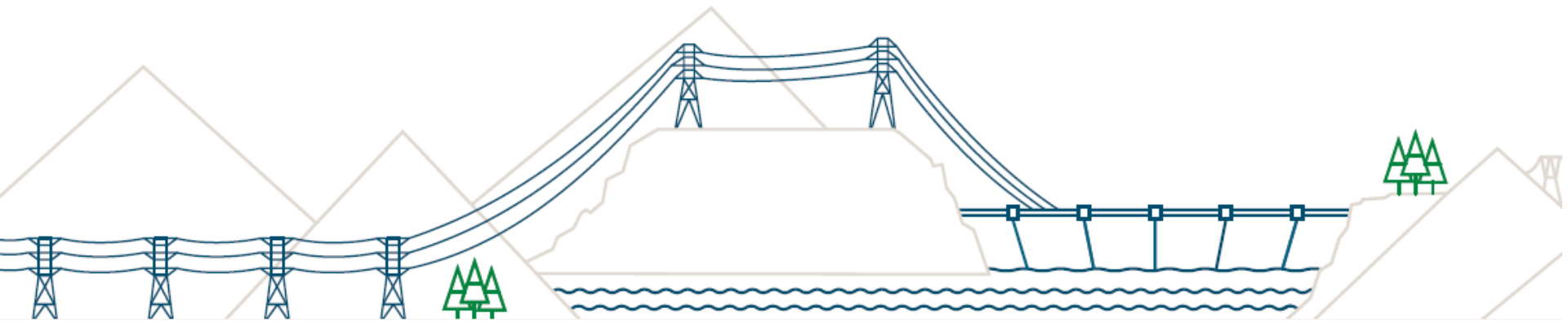


- Debris piling in the lower reservoir waiting for burning window.

Date of photo: October 2018

EAC Amendments & Program Updates

Shanna Mason



EAC Amendments Update

- 1) EAC Generating Station and Spillway Design Amendment – **Approved**
- 2) EAC Halfway River Bridge Design Amendment - **Approved**
- 3) EAC Gravel Pit Source for Highway 29 (to include West Pine Quarry) – **Approved**
- 4) EAC Selective Machine Clearing in Riparian Zones – **Under Review**
- 5) EAC Highway 29 Cache Creek East Realignment Amendment – **In Development**

Site C Project Fish and Aquatic Program

June 2018



Fish mitigation and monitoring

While the Site C reservoir is expected to support a new and productive fish community, the Site C Environmental Impact Statement (EIS) identified several potential changes that the project could have on fish and fish habitat, including:

- Changes to fish habitat
- Changes to fish health and survival
- Changes to fish movement

In order to address these potential changes, mitigation, management and monitoring plans were developed for the project, taking into account the measures outlined in the EIS, information received during the Joint Review Panel hearing process, and the Report of the Joint Review Panel on the project. The project's plans are consistent with and meet requirements set out in the conditions of the Environmental Assessment Certificate and the Decision Statement, and are available on the Site C project website.

Mitigation measures

A variety of mitigation measures will be used during the construction and operation of the project.

These include:

- Addressing fish and fish habitat through design considerations (e.g., turbine and spillway design),
- Habitat enhancements for fish in the Peace River, reservoir and tributaries, and
- Fish passage management, which will help facilitate safe and timely passage of fish at the dam site.

Planned habitat enhancements in the Peace River are significant in scope and size compared to other habitat enhancements in B.C. The planned enhancements associated with the Site C project include:

- Peace River channel contouring and side-channel enhancement, the bulk of which will take place downstream of the dam,
- Rock spurs along River Road (completed),
- Reservoir shoreline enhancement, and
- Reservoir shallow water habitat near the dam site.

Monitoring programs

Site C project teams have worked since the 1970s to establish long-term datasets on baseline conditions in the mainstem Peace River and many of its tributaries from the Peace Canyon Dam downstream to Alberta (distance of 275 km). General surveys completed during the 1970s were followed by large scale inventories of fish communities in the late 1980s and early 1990s. From 2005 to present, numerous baseline studies have been completed to investigate fish communities, fish habitats, fish movements, and genetic connectivity.

BC Hydro developed the Fisheries and Aquatic Habitat Monitoring and Follow-up Program (FAHMFP) to monitor fish and aquatic valued components during the construction phase (2015 to 2024) of the project and the **first 30 years of operation** (2024 to 2053).

The FAHMFP is a coordinated approach of 18 spatially and logistically distinct monitoring programs that monitor the abundance and life history of fish, movement of fish, and spawning, rearing, and feeding in the Peace River and its tributaries.

sitecproject.com

Site C Project Wildlife Program



November 2018

Wildlife mitigation and monitoring

BC Hydro has established a number of aquatic and land-based wildlife programs aimed at avoiding, reducing or off-setting the potential impacts of the Site C project on fish and their habitat, land-based species and their habitat, and rare vegetation.

BC Hydro's extensive range of environmental programs integrate feedback from Indigenous groups, the public and over 200 requirements from the provincial and federal approvals.

Most environmental programs span the entire project construction phase and well beyond into dam operations. They involve both mitigation measures during construction to avoid or reduce impacts, as well as species-specific monitoring programs. These monitoring programs will provide valuable insight into how the area was used by wildlife prior to dam construction and operation compared to post-construction, in order to inform future programs.

This information sheet outlines just some of the environmental programs specific to land-based wildlife programs. More details on these programs and others are available at sitecproject.com.



Example of the 120 bat box habitats being installed

Mitigations

BC Hydro has a number of mitigation measures to avoid, reduce, or compensate for the potential effects that could result from the project. These include:

- Avoiding environmentally sensitive areas through work scheduling, redesign or modifications to approach where possible;
- Creating new wetlands and restoring historically impacted wetlands;
- Rebuilding areas impacted by the project that do not need to be permanently disturbed;
- Building wildlife habitat structures, like nest boxes for cavity nesting birds, denning boxes for fishers, roosting boxes for bats, nesting platforms for eagles, and dens for gartersnakes;
- Protecting and enhancing habitat for migratory birds;
- Planting and working to spread rare plant species of conservation concern; and



Installing 38 eagle nest platforms



Monitoring 60 eagle nests

Monitoring programs

- Wetland monitoring
- Waterbird monitoring
- Songbird monitoring
- Woodpecker monitoring
- Common nighthawk monitoring
- Snake and amphibian downstream monitoring
- Monitoring bat habitat use near Portage Mountain Quarry
- Bald eagle nest, productivity monitoring
- Ground nesting raptor monitoring
- Migratory bird nest monitoring
- Use of wildlife habitat structures



sitecproject.com

Community and Social Mitigation Update

Nancy Pepper



BC Hydro Peace Agricultural Compensation Fund

To Date:

- February 2018 – Began Board establishment and Fund Administrator public procurement
- June 2018 - 10-member Board established
- August 2018 – Northern Development Initiative Trust selected as Fund Administrator after public procurement process.
- October 2018 – Board and Fund Administrator submitted Five Year Plan and Financial Management Plan to BC Hydro for approval

Next Steps:

- Approval of Five Year Plan and Financial Management Plan by BC Hydro
- Transfer of \$20 million to the fund financial manager

Margaret 'Ma' Murray Daycare

- Opened August 1, 2018
- Owned by School District 60
- Operated by YMCA of Northern British Columbia
- 37 spaces total
 - 12 spaces infant/toddler
 - 25 spaces ages 3-5



Generate Opportunities "GO" Fund

\$800,000 GO Fund
established in
September 2016

Funding decisions by
committee of local
representatives

\$276,645 distributed
since 2016



Northern Environmental Action Team (NEAT), received \$10,000 for its NOURISH program

RCMP Traffic Enforcement

- BC Hydro has a letter of understanding with the Ministry of Justice for additional traffic enforcement by the RCMP
- BC Hydro pays the cost of the additional enforcement activities
- Currently targeting roads leading to and from the dam site

- For the reporting period of July-September 2018:
 - 141 tickets issued
 - 8 written warnings
 - 116 tickets were for speeding
 - No impaired driving citations

BC Housing/BC Hydro Affordable Housing Project



Jobs and Business Opportunities



Construction contracts awarded

Procurement approach designed to achieve value for money to ratepayers

- North and south bank clearing
- North and south bank site preparation
- Moberly River basin reservoir clearing
- Temporary Peace River construction bridge
- Moberly River construction bridge
- Public road upgrades in vicinity of dam site
- Worker accommodation lodge
- Main civil works
- Turbines and generators
- Transmission line towers
- Peace Canyon substation upgrade
- Site C substation
- GSS civil works
- GSS powerhouse bridge cranes
- Transmission Construction
- GSS Hydro-Mechanical Equipment Supply

Status of construction contracts

Procurement approach designed to achieve value for money to ratepayers

Procurements underway:

- GSS Balance of Plant in RFSQ

Future procurements:

- Highway 29 realignments
- Supporting works

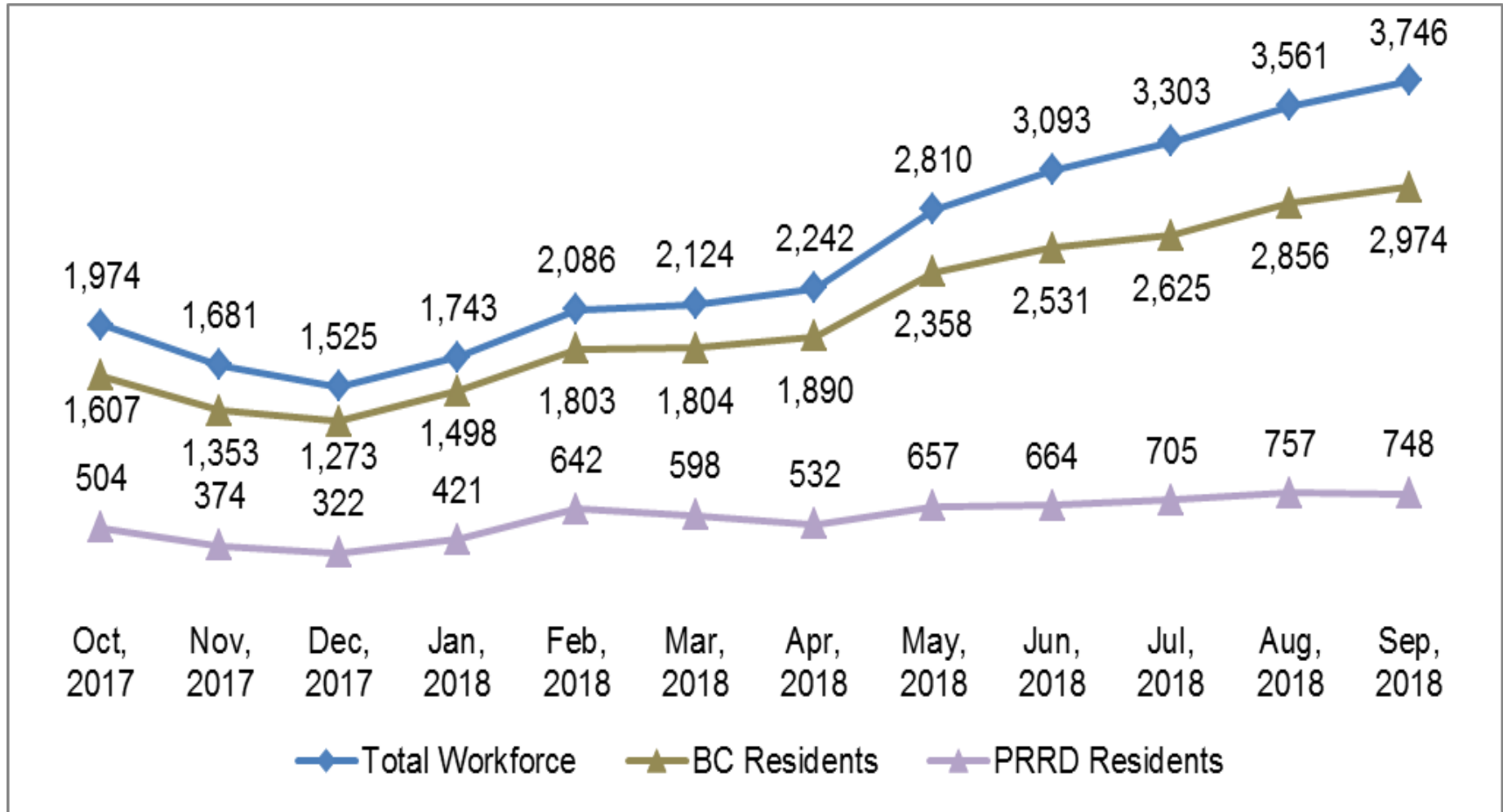


Employment Statistics

- Site C jobs posted to WorkBC / Employment Connections (Fort St. John) website; all contractors listed on Site C website.
- BC Hydro requires all major contractors to report employment information.
- Total of **3,746 workers** in September; **2,974** from B.C (79%). Total of **748** workers from PRRD (24%).

Site C Employment Statistics – September 2018			
	# of Total Workers	# of BC Primary Residents	% of BC Workers
Construction and Environmental Contractors	3,145	2,426	77%
Engineers and Project Team	601	548	91%
Total Workforce	3,746	2,974	79%

Site C jobs snapshot (September 2018)



2018 Q3 Regional Business Participation

Companies engaged by BC Hydro and Site C contractors to provide goods & services in relation to Site C construction between July-September 2018

Community	Number of Businesses	Community	Number of Businesses
Baldonnel	1	Moberly Lake	4
Cecil Lake	1	Montney	1
Charlie Lake	18	Pouce Coupe	1
Chetwynd	34	Prince George	38
Dawson Creek	30	Rose Prairie	1
Fort Nelson	1	Taylor	6
Fort St. John	305	Tumbler Ridge	2
Hudson's Hope	5		
Total		448	



BC Hydro

Power smart