

## HUDSON'S HOPE BERM OPTIONS

Stage 3 of the Site C Clean Energy Project (Site C) is the environmental and regulatory review phase. As part of an environmental assessment of Site C, BC Hydro will identify and assess potential project effects — environmental, economic, social, heritage and health — and opportunities to provide lasting benefits for the region and First Nations. Where effects cannot be avoided, BC Hydro will identify and evaluate options for mitigation.

This study update provides an overview of work completed to date and currently underway and is current as of fall 2011. Studies may be changed or revised in scope or timing on the basis of input from regulators, government agencies, First Nations, stakeholders and the public as part of the pre-application stage of the environmental assessment process.

The Site C project requires environmental certification and other regulatory permits and approvals before it can proceed to construction. In addition, the Crown has a duty to consult and, where appropriate, accommodate Aboriginal groups.

### DEFINITION

BC Hydro is proposing a berm to offset the effects of the Site C reservoir on slope stability at the base of the slope at Hudson's Hope. The berm would be designed to protect the shoreline from effects of erosion from the reservoir, and thereby maintain or improve the stability of the slopes compared to their historical performance.

BC Hydro is proposing options for a berm and is presenting three options for consultation with local government, property owners and the community in fall 2011.

### STUDY PURPOSE

As part of the 1980s Site C project design, a 1,360-metre long berm was proposed to protect the residential portions of the shoreline at Hudson's Hope. Preliminary results of Stage 2 geotechnical investigations verified that parts of the shoreline at Hudson's Hope have potential to erode. The purpose of studying options for a berm at Hudson's Hope is to update the historical design and develop options to take forward for consultation with the District of Hudson's Hope, property owners and the community.

### STATUS OF STUDIES

- **Background**

The slopes below Hudson's Hope comprise erodible sand, silt and clay overburden material and more resistant bedrock. Creation of the Site C reservoir would result in a change in the groundwater conditions that, when coupled with the effects of shoreline erosion, is predicted to cause some bank recession in the sand, silt and clay slopes.

As a result, a 1,360-metre long berm was proposed as part of the historic project design. Preliminary results of Stage 2 geotechnical investigations verified that parts of the shoreline at Hudson's Hope have potential to erode. As a result, BC Hydro has reiterated its commitment to providing a berm at Hudson's Hope.

- **Impact Line Approach**

During Stage 2 consultation with the community, stakeholders and the public, BC Hydro introduced an impact lines-based approach to assess the potential effects of the proposed Site C reservoir on the reservoir slopes. The purpose of the impact line approach is to:

- Ensure safety;
- Maximize land use flexibility; and
- Minimize the amount of land required for the project.

Areas of interest have been identified that are potentially affected by flooding, slope stability, erosion, changes in groundwater levels, and landslide-generated waves. To date, this work has been completed through historical knowledge of the ground conditions in the region, with limited site-specific assessment. Further geological mapping and subsurface investigations are underway to develop and refine the position of the impact lines, with emphasis on locations where there are residences, municipal infrastructure and sections of Highway 29 that might be affected. More information can be found in the Impact Lines Study Update.

- **Geotechnical Investigations**

To gather more information about shoreline conditions, BC Hydro began a series of geotechnical investigations along the proposed reservoir slopes in April 2011. This program consists of surface inspections, subsurface investigations and the installation and monitoring of geotechnical instruments on both private and Crown land.

Information from these geotechnical investigations is being used to conduct modelling of erosion and slope stability, which will allow BC Hydro to develop and refine the location of the impact lines and to make recommendations for berm options at Hudson's Hope and for future land use planning. This information will be available for public review once complete, and will be included as part of the environmental assessment application.

### **Stage 3 Work**

As part of Stage 3, options for a berm at Hudson's Hope have been developed for consultation with local government, property owners and the community in fall 2011.

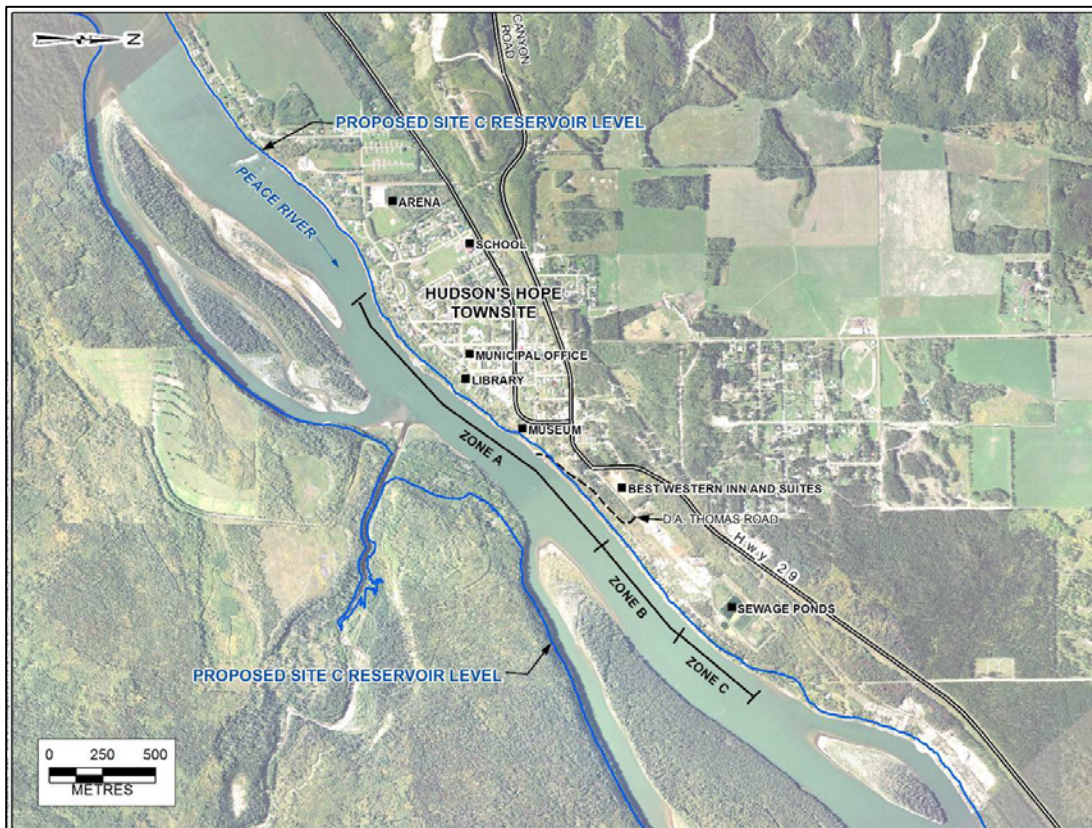
Since the 1980s, additional development (i.e., the hotel) has occurred just to the east of where the 1980s berm design ended. As a result, the updated design for the berm has been extended approximately 300 metres to the east to protect this additional development, as well as long-term maintenance access to the berm from D. A. Thomas Road. In addition to the area protected by the 1980s berm, consideration has also been given to a berm option that protects the shoreline area to the east, including the municipal sewage lagoons.

# HUDSON'S HOPE BERM – STUDY UPDATE

In developing options for a berm, the Hudson's Hope shoreline was divided into three zones, with the following land uses and lengths. The land in all three zones currently has potential for erosion.

Zone	Geological Description	Current Land Use Description	Length
A	Overburden slopes – interbedded sand, silt and clays	Residential area. Zone is based on the historical length of the berm, with an additional 300 metres downstream (east) added to include additional commercial development since the 1980s berm design.	1,650 metres
B		Undeveloped land zoned as light industrial. Currently used for industrial use and gravel pit.	550 metres
C		Municipal sewage pond facility.	450 metres

The map below illustrates the length of the berm option zones along the Hudson's Hope shoreline.



**Berm Options**

BC Hydro has developed three options for a berm to take forward for consultation with local government, property owners and the community in fall 2011. These options are summarized below.

Option	Description	Length of Berm/Protection	Considerations
1	Zone A berm	1,650 metres	Berm in front of residential land and commercial development added since the 1980s berm design.
2	Zone A and C berm	2,100 metres	Berm in front of residential land and commercial development added since the 1980s berm design, as well as municipal sewage ponds.
3	Zone A and C berm, slope flattening in Zone B	2,650 metres	Berm in front of residential land and commercial development added since the 1980s berm design, as well as land zoned as light industrial and municipal sewage ponds.  Materials taken from Zone B could be used as construction materials for the berm in Zones A and C.

In addition to consultation about the length and area of the berm, BC Hydro is seeking input about potential public access to the berm. Specifically, feedback is being sought on potential options for public access, landscaping approaches and possible recreational amenities.

More information can be found in the Hudson's Hope Berm Options Technical Consultation Brief ([www.bchydro.com/sitec](http://www.bchydro.com/sitec)). This consultation is currently underway and the deadline for public input is November 30, 2011.

Input received through consultation will be considered, along with technical and financial information, as BC Hydro determines which berm option to include in the application for an Environmental Assessment Certificate.

**Stage 3 Consultation**

The Site C project requires environmental certification and other regulatory permits and approvals before it can proceed to construction.

The Stage 3 environmental and regulatory review process will include opportunities for consultation and input by the public, Aboriginal groups, communities, property owners and stakeholders.

In addition to the consultation opportunities led by the environmental regulatory agencies within the environmental assessment process, BC Hydro will lead several streams of public and stakeholder

consultation during Stage 3:

- Regional and Local Government Liaison
- Property Owner Liaison
- Local Area Consultation
- Preliminary Design Consultation

BC Hydro and Aboriginal groups are also engaged in a thorough consultation process that will continue through all stages of the project.

### How Input Will Be Used

A Consultation Summary Report will be prepared and released on the project website following each consultation period and Consideration Memos will be prepared, indicating how input has been considered, along with technical and financial information, for use in project designs or plans, including engineering and environmental mitigation plans.

### FURTHER INFORMATION

Further information is available on the Site C website: [www.bchydro.com/sitec](http://www.bchydro.com/sitec). The following are available in the Site C Reports section of the website.

1. Stage 2 Report: Consultation and Technical Review, Fall 2009. (page 68).
2. Notice of Geotechnical Drilling, April 2011.
3. Notice of Geotechnical Drilling, Updated August 2011.
4. Impact Lines Study Update, Fall 2011.
5. Hudson's Hope Berm Options Technical Consultation Brief, Fall 2011.

### INQUIRIES

Updates on field studies are available at [www.bchydro.com/sitec](http://www.bchydro.com/sitec) and in the Community Consultation offices in Fort St. John and Hudson's Hope.

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