Highway 29 Realignment & Construction
Access Roads
Highway 29 Realignment
Highway 29 – River & Creek Crossing Options

BRIDGE SPAN ONLY OPTION

BRIDGE SPAN AND CAUSEWAY OPTION

Example of causeway construction with riprap protection
Example of an earthfill causeway and bridge
Existing Halfway River Bridge
Construction Access Roads

- Transmission Line
- CN Rail’s Septimus Siding
- Jackfish Lake Road Extension
- Proposed Dam
- Fort St. John
- Construction Access Roads

SITE CLEAN ENERGY PROJECT

BC hydro REGENERATION
Transmission
Transmission Line

- Existing transmission right-of-way corridor – Site C to Peace Canyon Substation; two 138kV lines

- Current Transmission Planning /ROW
  - Three 500-kilovolt (kV) circuits connecting the generating station to the new 500 kV switchyard
  - Two 500 kV Alternating Current lines, approximately 77 km in length, along existing 138 kV right-of-way, connecting the switchyard to Peace Canyon Substation
  - Widening of the right-of-way by approximately 35 metres
  - Access roads
Transmission Right-of-Way Cross Section

View looking east from where 500kV circuits would parallel existing circuits 1L374 and 1L360

- 14 m
- 32 m
- 54 m
- 20 m
- 35 m (widened right-of-way)
- 118 m (existing right-of-way)
- 120 m (new clearing extent)
Reservoir Slopes
Reservoir Slopes

Historical Approach

- Residential safeline developed in 1978
- BCUC concerns re: land use impacts
- Best practice review - development of impact line approach
Stage 3 Work – Impact Line Approach

Objectives

- Ensure safety
- Maximize land use flexibility
- Minimize land required for the project
- Use international best practices to get better information about impacts of the reservoir
Reservoir Slopes

• Predict the geotechnical response of the reservoir shoreline and slopes to operation of the proposed reservoir and future public safety and land use considerations

• Types of Impact Lines
  ▪ Flood Impact Lines
  ▪ Erosion Impact Lines
  ▪ Stability Impact Lines
  ▪ Landslide Generated Wave Impact Lines
Flood Impact Line

• To be defined by a specified elevation above reservoir full supply level
• Includes allowance for floods, wind and waves
• Includes potential reservoir surcharge caused by spillway operations
Erosion Impact Line

- Predicts erosion and slope retreat over 100 years
- Current work: collection of wind data and refine understanding of shoreline geology
Hudson’s Hope Berm
Stability Impact Line

- Beach erosion, plus long term slope retrogression to a stable angle
- Current work: refine understanding of slope geology and ultimate slope angles
1973 Attachie Slide
Study Areas Regarding Potential Landslide Generated Wave
Field Investigation and Risk Assessment

• Require confirmation of surface and subsurface conditions at select areas
  • Geology, groundwater, evidence of prior or ongoing ground movement
  • Access to property to conduct surface mapping, geotechnical drilling, installation of instrumentation

• Stability Analysis & Risk Assessment
  • Site Specific Slope stability modeling (current conditions and with reservoir)
  • Adjustment of location of the stability impact line based on site specific info and analysis
  • Hazard/risk zonation within the stability impact line
Construction Materials
Fill Material Requirements

• Components:
  - Dam
  - Highway 29 Re-alignment
  - Access Roads
  - Hudson’s Hope Berm

• Materials:
  - Impervious till
  - Gravel and Aggregate
  - Temporary Rip Rap
  - Permanent Rip Rap
Total amount of material needed = 13,900,000 m³

Gravel and sand materials  |  On-site sources
---|---
Impervious material
Permanent riprap
Temporary riprap  |  Off-site sources
Reservoir Preparation and Clearing
Reservoir Preparation and Clearing

• Clearing for constructions sites, and preparing reservoir for flooding
• Reservoir Preparation considerations also include:
   realignment of segments of Highway 29
   reservoir impact line management (e.g. shoreline erosion and stability)
   reservoir and shoreline property management (property and infrastructure)
   potential contaminated site management
   water management during river diversion and reservoir filling
   construction of a berm for shoreline protection at Hudson’s Hope
   development of recreation and environmental mitigation sites
Workforce Requirements and Worker Housing
Site C - Clean Energy Project Construction Phase
Dam Site - Worker Requirements

- Average Personnel
- Peak Personnel

Workers from Construction Hours

By Year (Sept to Aug)

Year 1 2 3 4 5 6 7 8

0 200 400 600 800 1000 1200 1400 1600 1800
Worker Housing

The plan is being developed in consultation with communities

- Dam site construction camps
  - north bank
  - south bank

- Regional camps
  - Highway 29
  - Jackfish Lake Road

- Local in-community housing

- Scenarios for local resident / employment
Socio-Economic & Environmental Setting
Socio-Economic & Environmental Setting

• Socio-Economic Setting
• Aboriginal Communities
• Land and Resource Use
• Human Health
• Heritage Resources
• Environmental (physical, aquatic, terrestrial)
Social and Economic Setting
Social and Economic Setting

- Social and Community – nearby communities:
  - Regional population of 63,000

- Economy:
  - Cyclical natural resource driven economy
  - Low unemployment rate (active economy)
  - Infrastructure and Services

- Transportation:
  - Developed urban service areas, and remote rural residential
Social and Economic Setting

Key Issues and Related Study Areas:

• Workforce during construction
• Economic and employment
• Government finances
• Transportation
• Direct impacts on infrastructure
Aboriginal Community Assessments

Focus on Communities in vicinity of the Project

Key Issues to be identified through Community-Specific Studies, may include:

• Traditional Land Use
• Social Setting
• Economic Setting, employment, business
• Community Housing and Infrastructure
• Health and Healthy Living
Land and Resource Use Setting

- Fort St. John and Dawson Creek land use planning area, Peace Moberly Tract
- Private land use (e.g. residential, commercial, agricultural)
- North bank dominated by private land uses, agricultural, rural residential
- South bank dominated by crown land uses

Peace River at Halfway River, looking upstream
Land and Resource Use

Key Issues and Related Study Areas:

• General – baseline data collection to identify potential project interactions
• Forestry
• Oil, Gas and Energy
• Minerals
• Aggregate
• Hunting and Fishing
• Trapping and Guide Outfitting
• Outdoor Recreation
Land and Resource Use (cont’d)

Agricultural soil capability mapping:

• Updated agricultural capability maps
• Field inspections throughout reservoir area
• Review capability mapping in broader project area

Agricultural Resource Use:

• Interviews with farmers and ranchers (up to 19 farm operations in vicinity of project)
Human Health

Potential Human Health Topics:

• Healthy Living: Workforce
• Healthy Living: Public considerations
• Air Quality, Noise & Vibration
• Methyl Mercury
• Electro Magnetic Fields
Heritage Setting:
- Paleontological eras
- Archaeological evidence of ~10,000 years of human occupation
- Historic - fur trade (1793 – 1820’s), farming settlements 1900’s to current

Key Issues and Related Study Areas:
- Inventory for archaeological sites
- Inventory for historic sites
- Field reconnaissance for paleontological potential

Ammonite fossil found along the Peace River, August 2011
Physical, Aquatic and Terrestrial Environment
Insert figure 5.1 from PDR.
Physical Environment – Water

Current Setting:

• Mainstem and downstream conditions in project area influenced by upstream flow regulation, existing water licenses
• Groundwater - domestic, agricultural, and industrial

Key Issues and Related Study Areas:

• Water quantity
• Water quality
• Groundwater conditions
• Ice Regime
• Water Management
Physical Environment – Land

Current Setting:

- Flow regulation has occurred for many decades and river is or has adjusted to changes

Key Issues and Related Study Areas:

- River morphology
- Sediment transport
- Contaminated Sites
Physical Environment - Atmosphere

Current Setting:

• Continental climate - seasonal Arctic (Cold) and western (moist, warm)
• Distinct valley bottom microclimate

Key Issues and Related Study Areas:

• Micro-climate change due to reservoir
• GHG Emissions
• Air Quality
• Noise and Vibration
Fish and Aquatics

Current Setting

- Diverse resident fish community
- 31 species resident species
- Spatial distribution of fish follows habitat conditions
Fish and Aquatics

Key Issues and Related Study Areas:

- Fish habitat
- Fish populations
- Fish movement
- Aquatic Productivity
- Fish Passage
- Mercury
Wildlife and Vegetation

Current Setting:

- Abundant and diverse wildlife populations
- Peace River Basin eco-region, Peace Lowlands (PEL) eco-section
- Biogeoclimatic zone: “Boreal White and Black Spruce“
- Valley bottom landscape modified by agricultural land use and upstream river regulation
- Ungulate winter range, high diversity of song birds
Wildlife

Key Issues and Related Study Areas:

- Habitat
- Populations
- Habitat Use
- Migrations
Vegetation

Key Issues and Related Study Areas:

• Vegetation Community assessment

• Rare plant communities

• Invasive plant surveys

• Rare ecosystem features
Consultation & Engagement

Aboriginal Groups
Public, Stakeholder and Property Owners
Government Agencies
Consultation and Engagement - Aboriginal

- Project lies within Treaty 8 territory
- Engagement ongoing with 51 Aboriginal groups
- Consultation with Aboriginal groups in the project area and downstream from the Project
- Project information provided to Treaty 8 First Nations located outside of the Peace or Slave River watersheds
- Objective of consultation: identify potential impacts of the project on section 35(1) rights and communities and work with Aboriginal groups to identify strategies to avoid, prevent, or mitigate impacts
Map of First Nations Traditional Territories
Consultation Agreements

- Under negotiation or concluded with First Nations located in and downstream of the project area and with two First Nations located at the north end of the Williston Reservoir
- Set out the agreed-upon funding, principles, processes and scope for Stage 3 consultations
- 8 agreements have been concluded, representing 11 First Nations
- Consultation topics may include:
  - Key project components
  - Development of the Draft Environmental Impact Statement (EIS) Guidelines
  - Ongoing baseline studies
  - Alternative site assessments
  - Development of the Environmental Impact Statement (EIS)
Traditional Studies

- BC Hydro has entered into a number of Traditional Land Use Study (TLUS) agreements with First Nations to carry out studies, to enable data sharing and to set out confidentiality.

- TLUS data, where available, will be considered in effects assessment.

- First Nations Opportunities Strategy has been developed with a focus on trades training, and procurement opportunities.
Issues Identified during Stage 2:

- Potential impacts on section 35(1) rights and cultural and heritage resources
- Historic grievances
- Cumulative effects
- Short- and long-term employment and economic opportunities
- Effects on wildlife, fish, water quality and quantity
- Access to traditional hunting areas
- Energy conservation strategies, alternative energy sources
- Effect on existing infrastructure and local communities
Public and Stakeholder Consultation: Objectives

• To consult meaningfully with the public, stakeholders and property owners on impacts, benefits and features of the Site C project, consistent with BC Hydro’s commitment to consultation

• To consider input – in combination with technical, environmental and economic analysis

• To keep communities, stakeholders and the public informed about the project and the many opportunities for public involvement
Stage 2: Consultation and Technical Review

- Three rounds of consultation
- Nearly 1,000 participants in each round
- 121 stakeholder meetings and open houses
- Consultation topics included:
  - Impact lines
  - Highway 29
  - Reservoir preparation
  - Energy resource options, and more
- Community Relations:
  - Consultation offices
  - Presentations, updates
Stage 2 Consultation: Key Themes

- Consultation Summary Reports, all public meeting notes, available online
- Consideration Memos document consideration of input
- Key themes:
  - Avoiding or mitigating local impacts
  - Potential effects to air quality, water and agricultural land
  - Energy conservation and other alternatives to Site C including other renewable electricity sources (e.g., wind, solar, biomass and geothermal)
  - Potential benefits such as jobs, skills training, upgrades to local and regional infrastructure
Stage 3 Consultation

- Environmental Assessment Public Comment Periods (led by regulators)
- Additional BC Hydro-led consultations will include:
  - Regional and Local Government Liaison
  - Property Owner Consultation & Liaison
  - Local Area Consultations, i.e. Hudson’s Hope Berm Options Fall 2011
  - Preliminary Design Consultation, 2012
    - Highway 29
    - Recreation
    - Reservoir preparation
    - Worker Housing
    - Construction Access Roads
    - Agriculture
Opportunities for Input

• Range of consultation methods will be used:
  • Community Consultation Offices
  • Website
  • Public enquiries
  • Stakeholder meetings
  • Open houses
  • Print and online feedback forms
  • Written submissions

• For more info: www.bchydro.com/sitec
Regional and Local Government Engagement

• Regional and Local Government Liaison Committee
  ▪ Committee, chaired by BC Hydro Executive Vice President, with representation from region’s mayors and regional district directors

• Local Government Technical Engagement
  ▪ Individual, staff-level committees with each regional, local government
  ▪ Capacity funding provided

• Updates to councils
Ongoing Public Notification

- Monthly Field Studies Summary
- Field Studies Information Sheet
- Study updates
- Project updates
- Media relations

Available at:
- www.bchydro.com/sitec
- Community Consultation Offices - Hudson’s Hope and Fort St. John
- Hudson’s Hope Bulletin
Next Steps
Next Steps

- Review and evaluate Draft BC Canada Agreement for EA process
- Prepare and file draft Environmental Impact Statement (EIS) Guidelines