FortisBC Energy Inc. Muskwa River Pipeline Crossing CPCN

Streamlined Review Process Presentation

Jan 24, 2014

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Introduction

- Paul Tassie – Project Manager
- John Quinn – Project Engineer
- Michelle Carman – Regulatory
- Bob Gibney – Municipal and Aboriginal Relations
- Terry Penner – System Capacity Planning

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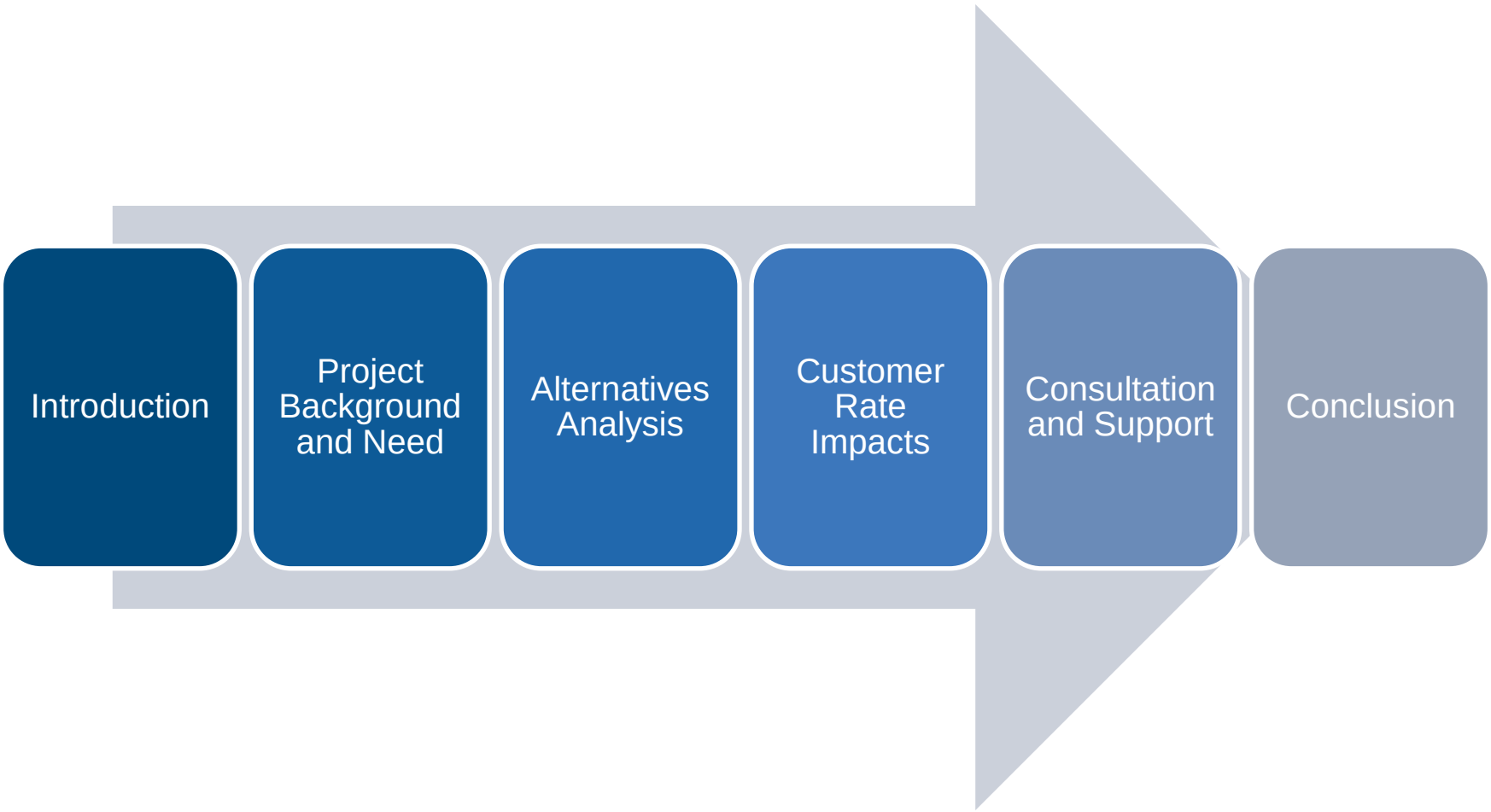
Agenda



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Project Background

- Replacement of the existing pipeline crossing of the Muskwa River in Fort Nelson is required
- Stakeholders and FNFN recognize the need and the urgency
- The previously approved “IP Bridge Option” is no longer available
- HDD is the preferred option for technical, financial, non-financial and timing reasons
- The HDD risks are managed with an appropriate risk mitigation plan
- FNFN has endorsed the HDD option
- Community needs are met

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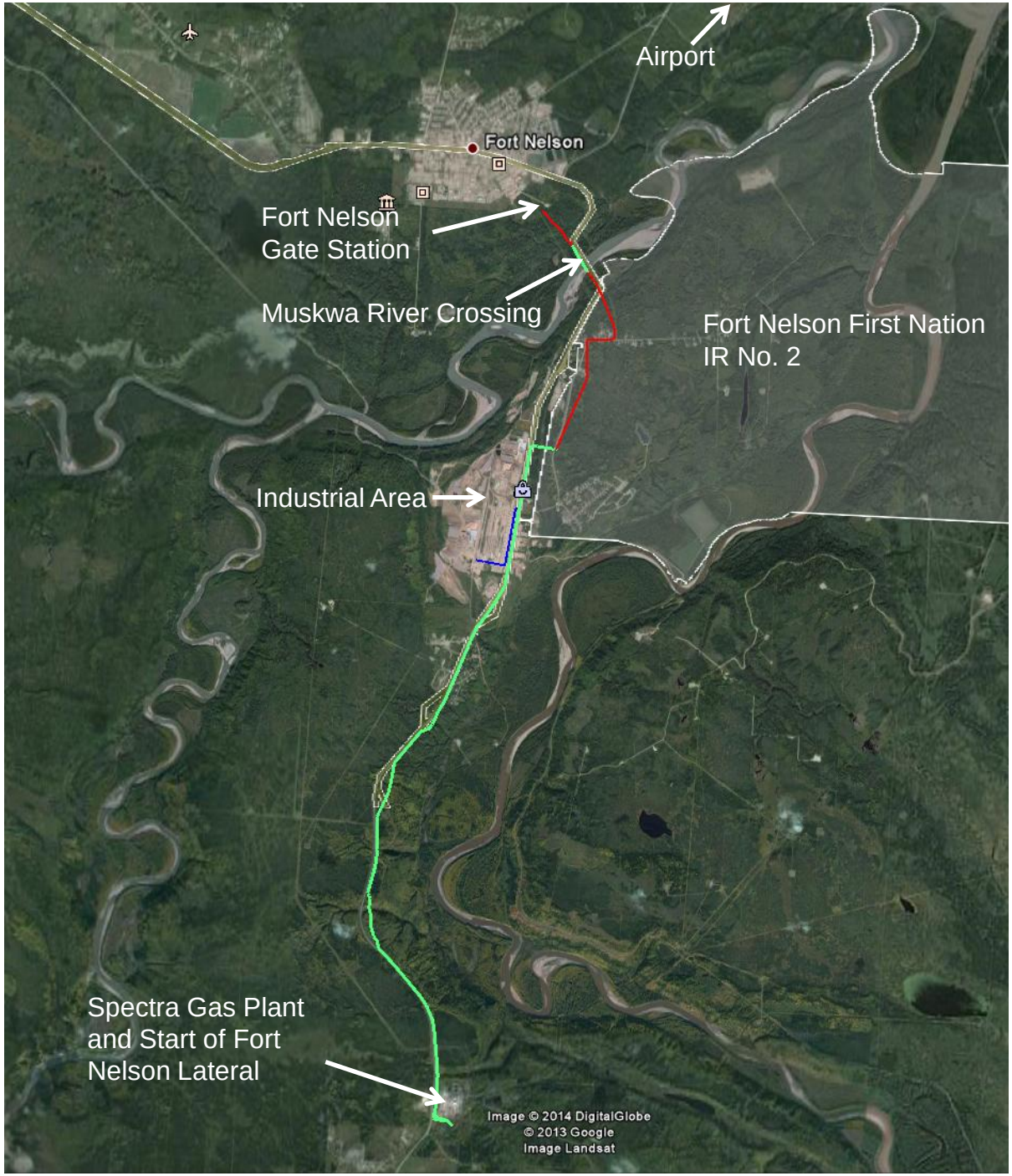
Airport
Fort Nelson
Fort Nelson
Gate Station
Muskwa River Crossing
Fort Nelson First Nation
IR No. 2
Industrial Area
Spectra Gas Plant
and Start of Fort
Nelson Lateral
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Regulatory Background

- The IP Bridge Crossing Option was approved on February 24, 2011:

  "The Commission accepts the Muskwa Project using the IP Bridge Option alternative as being in the public interest as TGFN has presented sufficient evidence to justify project need, cost alternative selection"

  "If TGFN determines that the IP Bridge Option alternative is no longer the desired alternative due to permitting or other matters … TGFN is directed to advise the Commission, reconsider and investigate all of the remaining crossing options more closely with regard to cost, feasibility, risk assessment and appropriateness."

- Due to a much lower cost for this option, FEI exhausted all avenues to obtain the required approval from PWGSC

- On May 17, 2013, PWGSC advised that installing the pipeline on the Muskwa River Bridge would not be permitted such that the IP Bridge Option was no longer feasible

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Approvals Sought

1. A CPCN to construct and operate a replacement NPS 6 transmission pressure pipeline crossing of the Muskwa River for the Fort Nelson Service Area using a trenchless crossing method; and

2. Deferral treatment of the application and project development costs under sections 59 to 61 of the Act.

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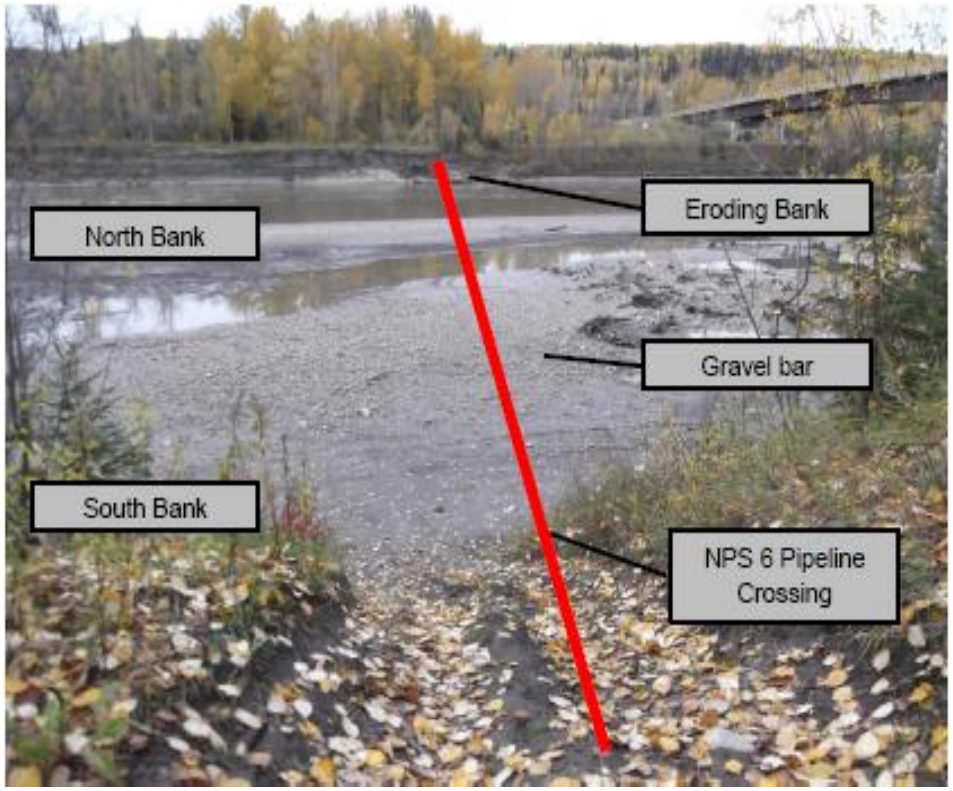
Present Pipeline Condition



Muskwa River Crossing

The risks have intensified:

- Approximately 20 metres of pipeline currently exposed
- The north bank has eroded to minimal cover
- Upcoming spring freshet likely to erode pipeline cover further

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Project Considerations

- Single feed to Fort Nelson may become severely compromised, perhaps lost if pipeline is ruptured
- No other sources of sweet natural gas to Fort Nelson
- 2014 freshet (May to September) adds considerable risk to the existing pipeline crossing
- Adding protection to the existing pipeline is not cost-effective because of high cost and uncertain longevity
- Small rate base

Key Objective: Replace pipeline crossing by early May 2014

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Alternatives Analysis

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Alternatives Screening

Initially Considered

- IP Pipeline on Highway Bridge
- HDD
- HDD + Open Cut
- Aerial Bridge Crossing
- Non-Isolated Open Cut
- Lowering of Live Existing Pipeline
- Armouring of Existing Pipeline

Technically Feasible Selected

- ~~IP Pipeline on Highway Bridge~~
- HDD
- Microtunnel (new)
- Aerial Bridge Crossing
- Isolated Open Cut

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Alternatives Analysis Key Criteria

- Technical Criteria
  - Sufficient depth of cover
  - Overhead clearances
  - Adequate setbacks
  - Future river channel migration
  - Longevity
  - Proven construction technique
  - Constructible through anticipated ground conditions
- Financial Criteria
- Non-Financial Criteria
  - Impact assessment
  - Risk analysis
- Timing Requirement

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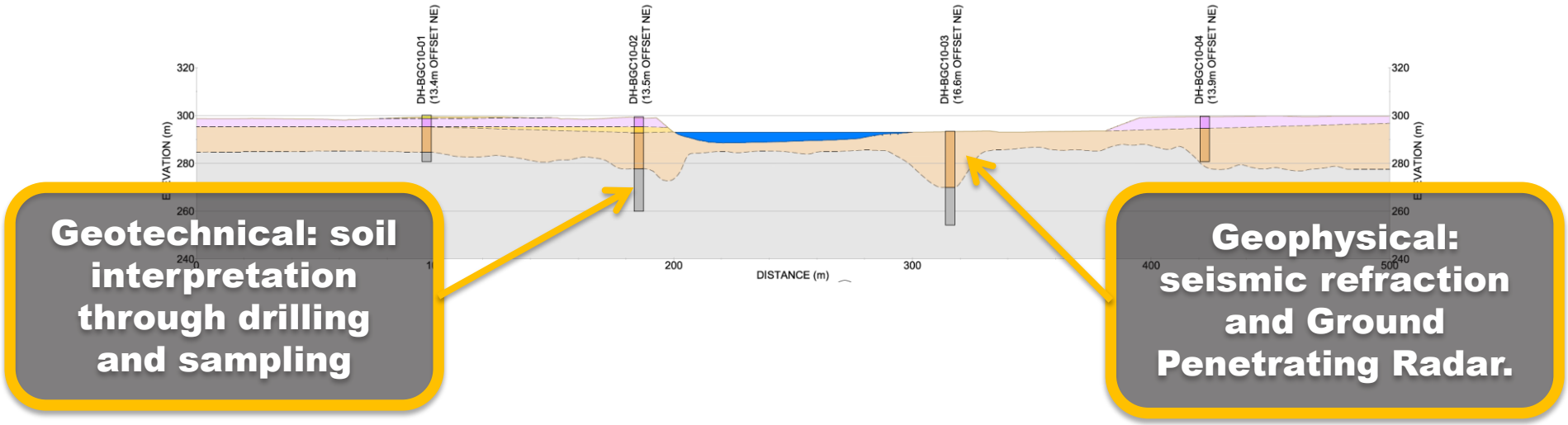
Technical Criteria - Geotechnical



Test holes indicated gravel and sand will be encountered at entry on both sides of the river.

The gravels are underlain by hard silts.

The gravel conditions present a challenge for HDD in terms of successfully drilling through to the more favorable stiff and hard silt which underlies the gravel layer.

While drilling through the gravels is difficult, it can be, and has been, done successfully before.

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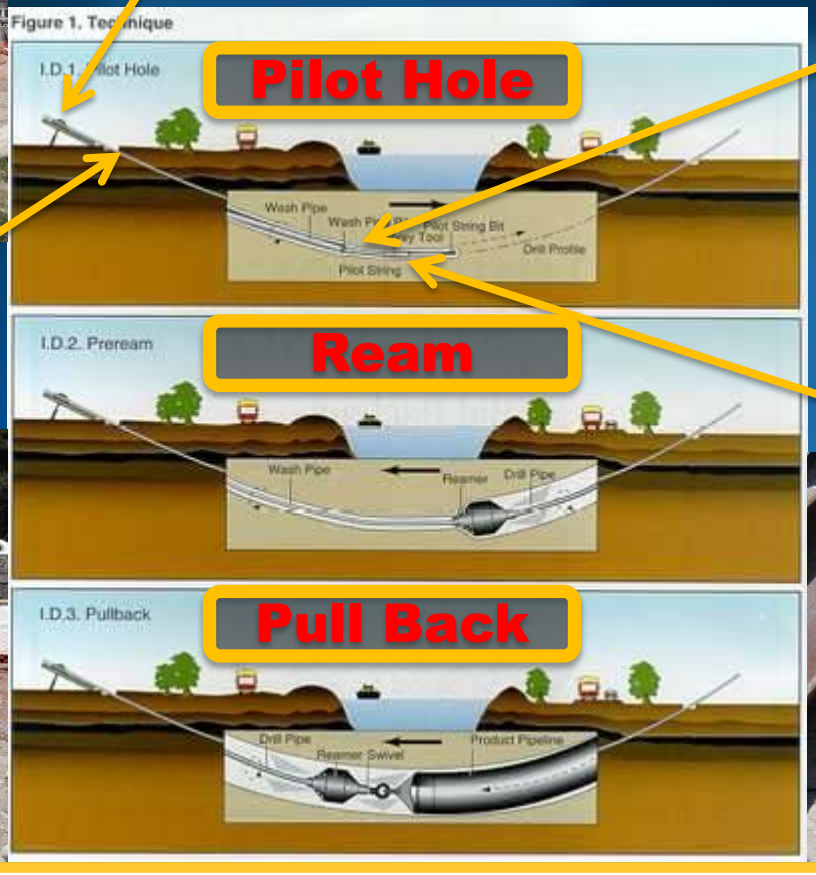
Option 1 - HDD

HDD Rig



Drill String comprised of Drill Rods

Drill Entry Point

Drill Bit

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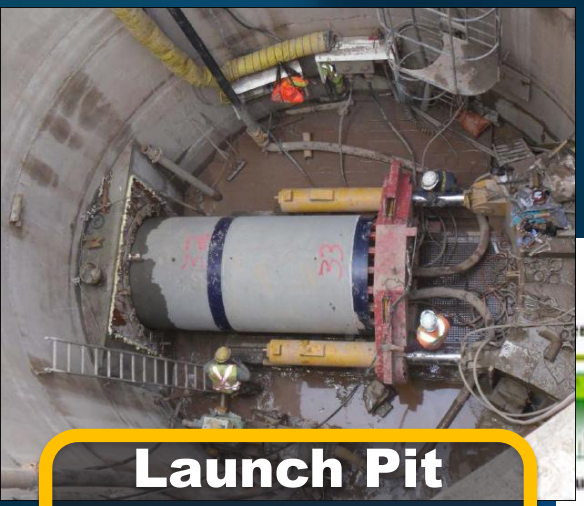
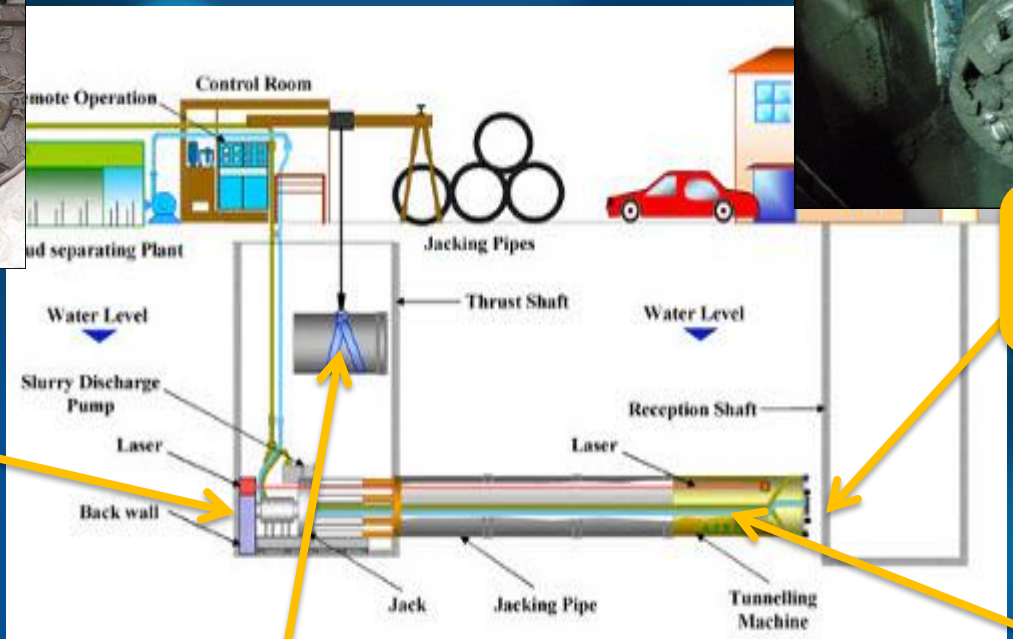
Option 2 - Microtunnel



Launch Pit and Jacking Face

Reception Pit



Jacking Pipe

Boring machine

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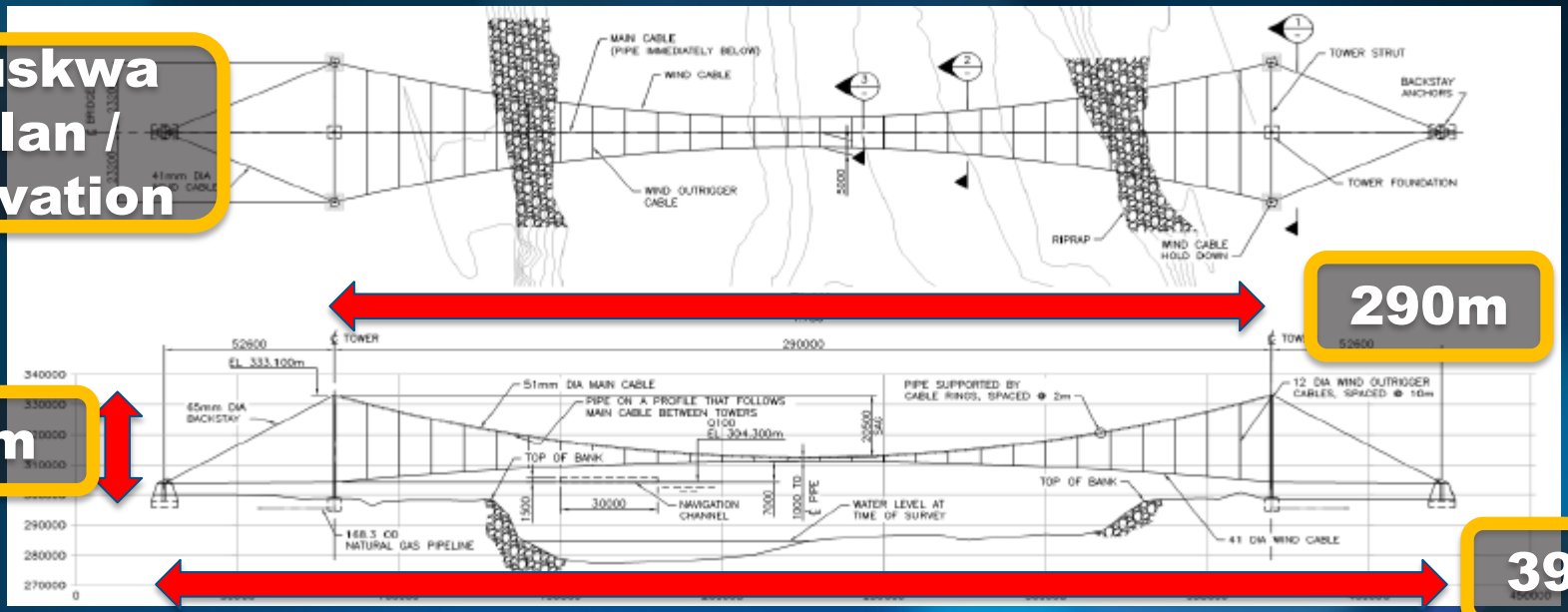
Option 3 - Aerial Crossing

Muskwa Plan / Elevation



Laveau Creek Aerial Crossing

1. **Highly visible permanent bridge structure**
2. **Require additional O&M costs over buried pipeline**

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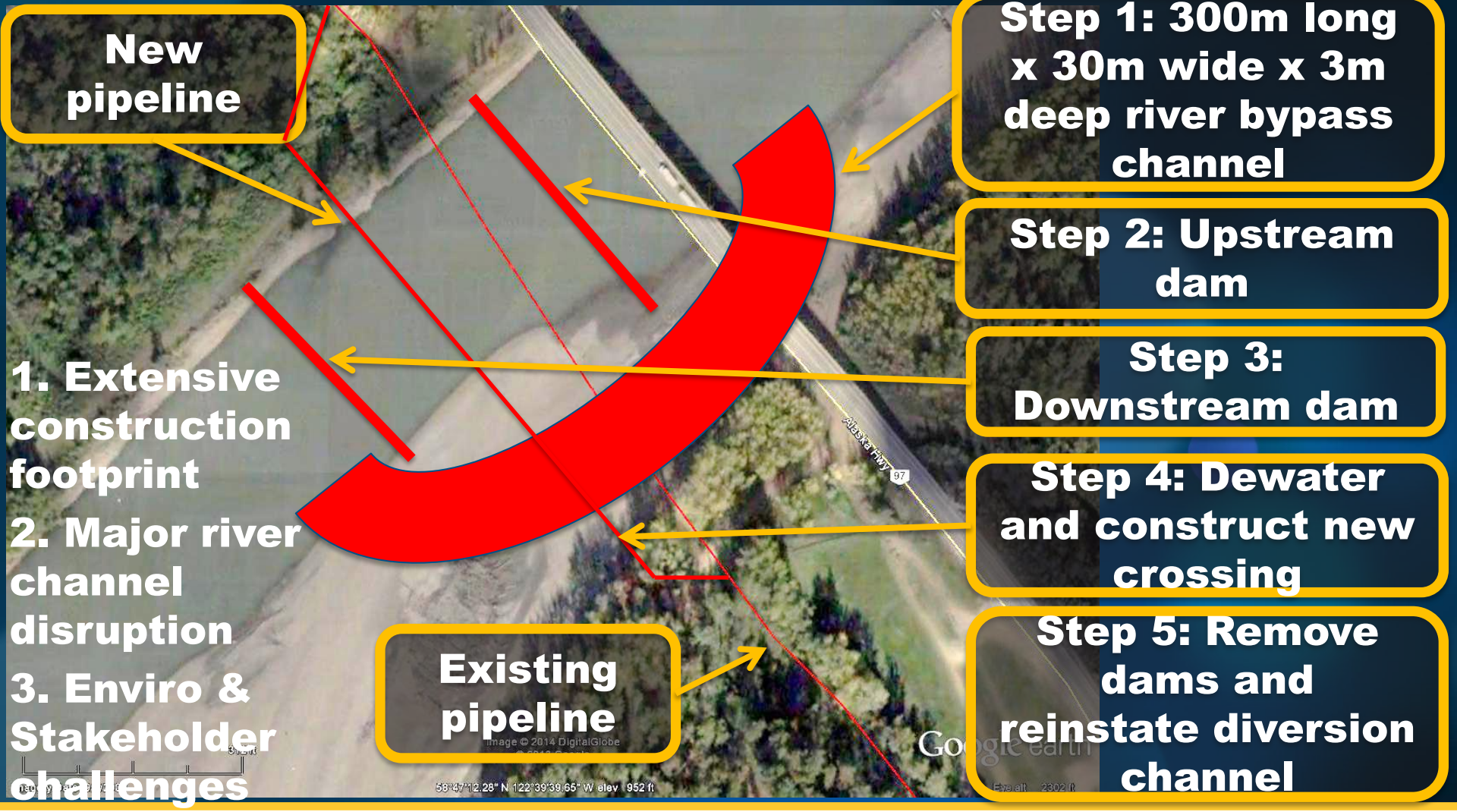
Option 4 - Isolated Open Cut



Financial Criteria - Cost Estimate

Class 3 Estimates, in 2013 $, 000's	HDD	Microtunnel	Aerial Crossing	Isolated Open Cut
Total Project Capital Cost	$ 5,763	$ 7,786	$ 6,858	$ 10,474

- Jacobs Associates, who are trenchless experts, and FEI completed the cost estimates and risk analysis for the HDD and Microtunnel Options.
- Buckland & Taylor and FEI prepared the Aerial Bridge Crossing cost estimate.
- Worley Parsons and FEI prepared the Isolated Open Cut cost estimate.

Conclusion: HDD is the most cost effective option

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Non-Financial Criteria

Vulnerability	Weight	Owner	Alternative #1 HDD		Alternative #2 Microtunnel		Alternative #3 Aerial Pipeline		Alternative #4 Isolated Open Cut	
			Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Natural Hazards	10	Engineering	5	50	4	40	2	20	1	10
Construction Hazards	10	Engineering	3	30	3	30	3	30	3	30
Vandalism	10	Asset Mgmt	5	50	5	50	2	20	5	50
Safety	10	Asset Mgmt	2	20	2	20	3	30	3	30
Environmental	20	Env Affairs	5	100	5	100	2	40	1	20
Aesthetics	6	Comm Rel'ns	5	30	5	30	3	18	3	18
First Nations	8	Comm Rel'ns	5	40	5	40	2	16	1	8
Stakeholders	8	Comm Rel'ns	5	40	5	40	3	24	2	16
Land Issues	10	Property Svces	5	50	5	50	3	30	2	20
Operational Impact	8	Asset Mgmt	2	16	2	16	4	32	3	24
Totals	**100**			**426**		**416**		**260**		**226**
Ranking			**1**		**2**		**3**		**4**	

- Isolated Open Cut - difficult construction, inherently large footprint, significant environmental and stakeholder impacts.
- Aerial Bridge Crossing - highly visible, permanent above ground structure requiring long term O&M.

Conclusion: Trenchless (HDD and Microtunnel) are the most favourable options considering all non-financial factors

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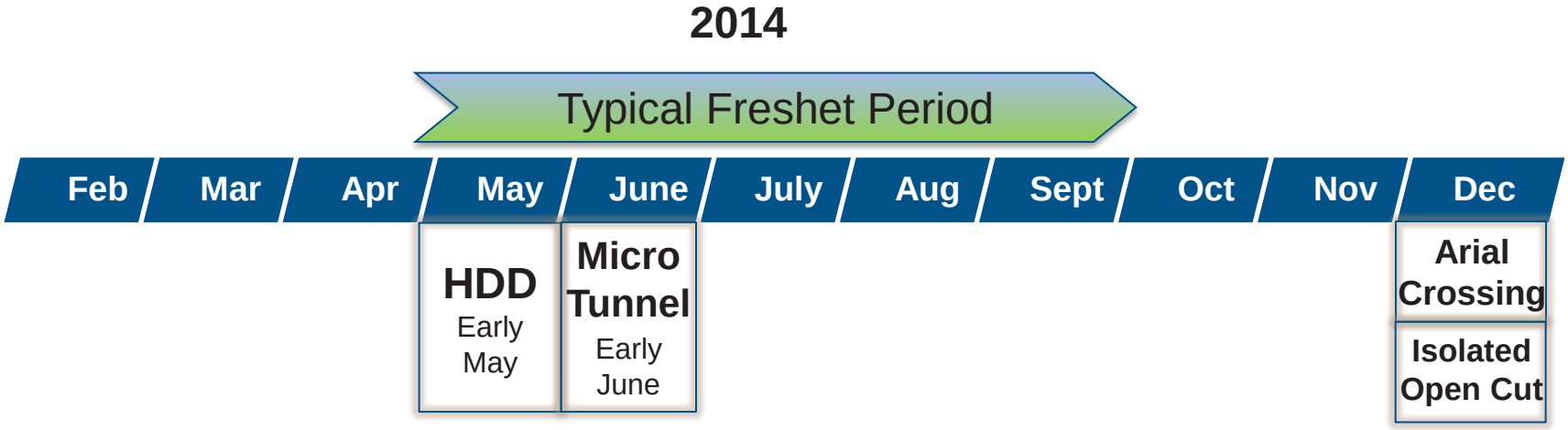
Timing Criteria



- A number of factors including snow pack, rate of melt and runoff, and precipitation, will dictate the timing and severity of the freshet.

Conclusion: HDD is the only alternative that meets the requirement of installing a new crossing prior to the freshet

HDD Risk Identification and Mitigation

- Jacobs Associates completed a formal risk workshop in Sept 2013 in conjunction with FEI stakeholders.
- A risk register was developed.
- Risks were assessed in terms of estimated likelihood and impact.
- Mitigation measures were identified to reduce the likelihood and/or impact.
- Risks were then reassessed in terms of reestimated likelihood and/or impact.
- Residual risk remained (could not be eliminated).
- Contingencies were estimated to offset the impact of realizing the residual risks.

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HDD Risk Control Summary

Key Risk	Mitigation Measures	Mitigated Likelihood	Mitigated Impact	Residual Risk
The gravel stratum is deeper than indicated in the geotechnical report.	Design: adequate geotechnical investigation, target thinnest gravel layer. Construction: use casing through gravels. Inspection: monitor cuttings, monitor for evidence of hydro fracture.	4 – likely	3 – moderate	Actual gravel layer is deeper than anticipated.
Damage to pipe coating (during pullback)	Design: tailored pipe coating specification, adequately clean borehole. Construction: maintain drill fluid pressure, keep hole open, ensure adequate swabbing of conductor casing pipe prior to pipe installation, spacers to offset gas pipe from casing pipe. Inspection: monitor hole, monitor pull-back forces, post pull-back visual inspection.	4 – likely	3 – moderate	Casings cannot be removed without damaging the gas pipeline coating.
Hole collapse	Design: limit overbore of hole, drilling fluid design, fluid testing. Construction: monitor starter casings depth and elevation, modify the drilling fluid specification. Inspection: monitor cuttings, continuous testing of drilling fluid.	3 –possible	3 – mode``rate	Pullback and initiate a new drill path.
Difficulty installing the casing	Design: adequate geotechnical investigation, identify and implement previous successful strategies, identify response plans, engage experienced HDD contractor. Construction: use casing through gravels, have plan, equipment, and tools available for adequate response. Inspection: monitor cuttings, monitor rate of penetration.	4 – likely	3 – moderate	Conductor casing must be installation by trenching instead of pneumatic hammer.
Hydro fracture/inadvertent return occurs during excavation	Design: adequate geotechnical investigation, limit drill face pressure, use deep tunnel profile, specify experienced/qualified operators, use casing. Construction: contractor to develop a contingency plan for frac-out, provide experienced operators, implement contractors contingency plan. Inspection: monitor drilling fluid pressure, visual surface monitoring.	4 – likely	3 – moderate	Frac-out occurs.
Remote location causes delays	Design: ensure contractor has experience working at remote sites, identify and plan for special project needs. Construction: identify sources for parts replacement, use two rigs.	5 – very likely	3 – moderate	Reduced production, additional equipment/materials/resources.

The estimate includes contingency to offset the impact of realizing the unmitigated residual risk associated with these key risks

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The Preferred Option is HDD

- Least cost technically acceptable solution
- Most favourable option considering non-financial needs
- Minimizes environmental impact
- Supported by FNFN
- Only feasible solution that meets the Project delivery timeframe

Risks:

- Subsurface gravels can present challenges for HDD
- Steps have been taken to quantify and mitigate risk to the extent reasonably possible
- The cost estimate includes contingency
- FEI will seek efficient allocation of residual risks with successful Contractor

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Project Costs and Customer Rate Impacts

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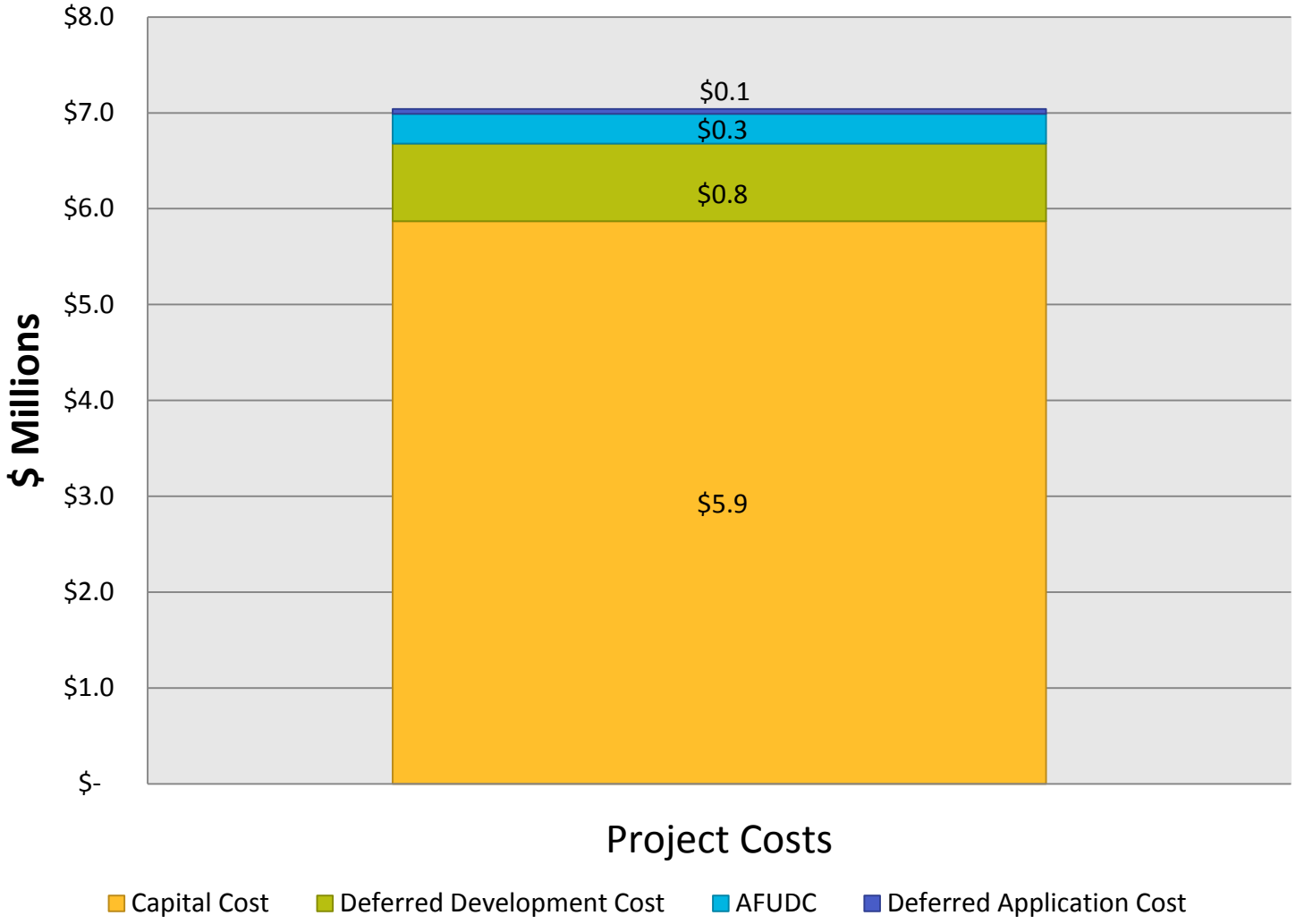
Estimated Project Cost



Reference: Table 6-4, Page 51

Accounting Treatment

- Capital costs of $5.9 million plus applicable AFUDC transferred to rate base with depreciation commencing January 1, 2015
- Development and application costs of $860 thousand captured in Muskwa River Crossing Project deferral account
  - Non-rate base deferral account, net-of-tax, attracting AFUDC
  - Transfers to rate base January 1, 2015
  - Recovered over three year period commencing January 1, 2015

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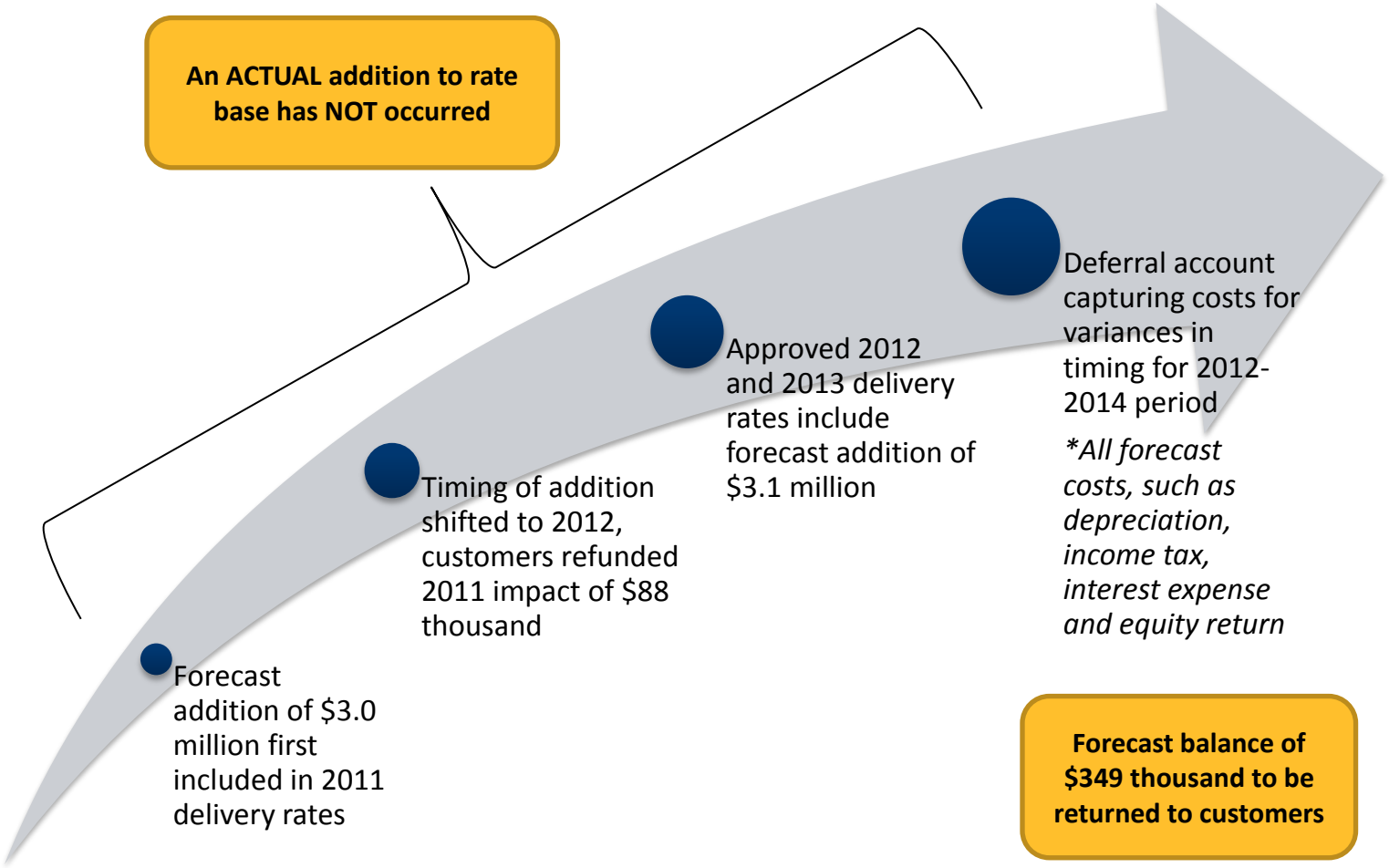
Existing Rates & Previous Approvals



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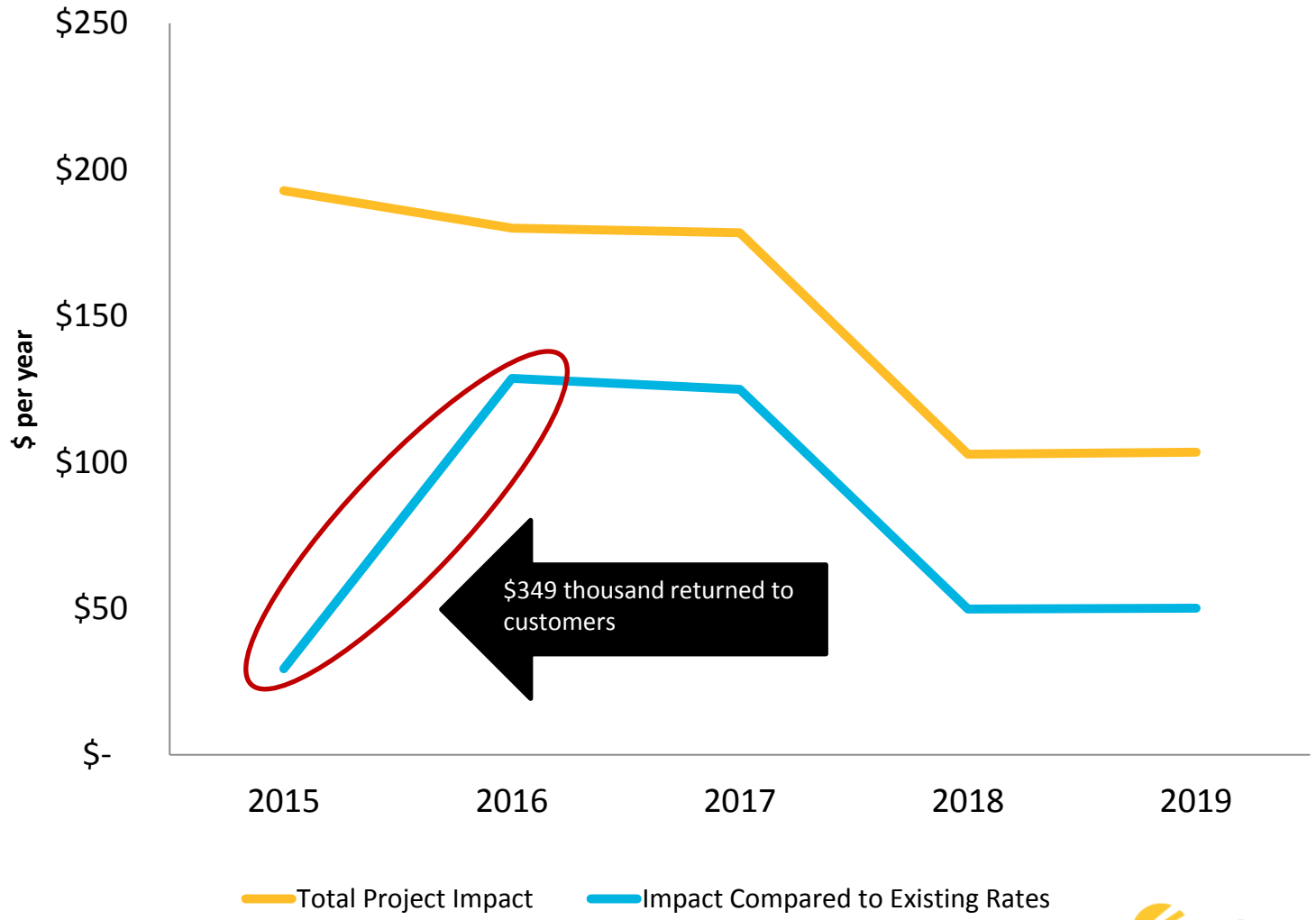
Forecast Residential Annual Bill Impact



Reference: BCUC IR 22 Series

Public Consultation and First Nations Engagement

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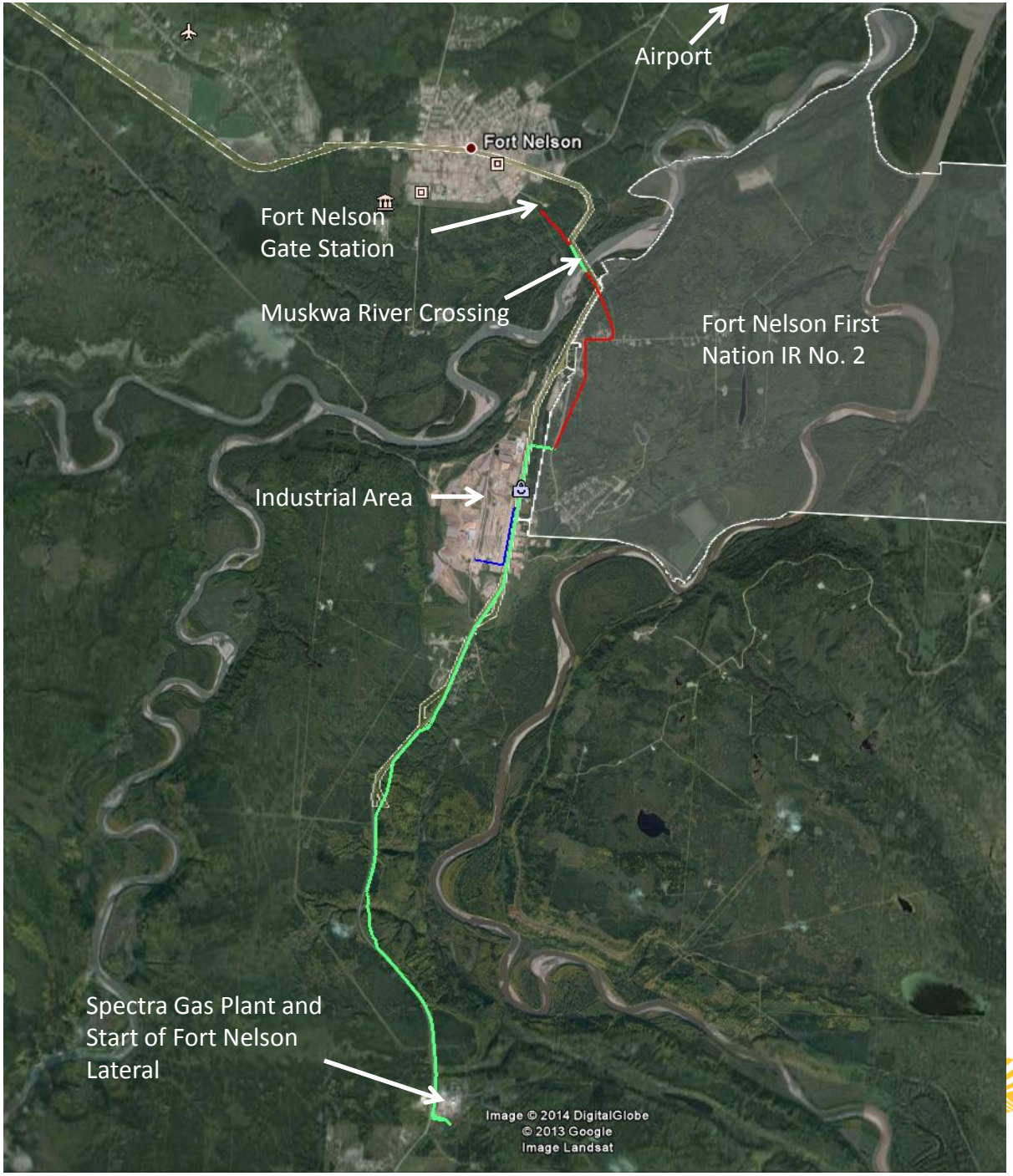
Airport
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Muskwa River Crossing
Fort Nelson First
Nation IR No. 2
Industrial Area
Spectra Gas Plant and
Start of Fort Nelson
Lateral
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First Nations Engagement

- The Fort Nelson First Nation was initially informed of the requirement to replace the Muskwa River natural gas line in 2012.
- When it became apparent that the preferred bridge crossing option would not receive approval from PWGSC, FEI and the Fort Nelson First Nation engaged in various meetings, information exchanges, presentations of remaining river crossing options.

The Fort Nelson First Nation has provided a letter supporting the HDD river crossing option (response to BCUC IR 1.30.1)

Fort Nelson Community Engagement

- When PWGSC would not issue the required permission to allow FEI to attach the pipeline to the bridge, FEI presented the remaining options to the Northern Rockies Regional Municipality and the Fort Nelson Chamber of Commerce.

- Mayor and Council did not indicate a specific river crossing preference or any specific concerns other than ensuring the future natural gas needs of the community would be met by a sufficient size pipe used in the crossing.

Fort Nelson NORTHERN ROCKIES Regional Municipality

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Fort Nelson Community Engagement

To address Fort Nelson's concerns:

- The NPS 6 crossing has sufficient capacity to deliver five times the present Fort Nelson demand.

- The NPS 6 crossing will not become a capacity bottleneck even if growth significantly exceeds forecasts.
  - Crossing location near the end of the lateral
  - Major industrial loads located upstream (south) of the crossing
  - NPS6 is equal to or larger than other portions of the lateral

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Next Steps

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Project Schedule for 2014

- January – BCUC SRP, OGC submission, RFQ release
- February – Bid analysis, contractor selection, financial approvals
- March – Mobilization
- April – HDD construction
- May – Crossing is commissioned
- Summer - restoration

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Conclusion

1. Replacement of the existing pipeline crossing is required
2. The HDD Option is the preferred crossing alternative considering technical, financial, non-financial and timing reasons
3. The HDD risks are managed with an appropriate risk mitigation plan
4. FNFN has specifically endorsed the HDD option
5. Community needs are met

Muskwa River Pipeline Crossing Project

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Questions and Answers

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