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April 30, 2015

**Via Email**  
**Original via Mail**

British Columbia Utilities Commission  
6<sup>th</sup> Floor, 900 Howe Street  
Vancouver, BC  
V6Z 2N3

Attention: Ms. Erica M. Hamilton, Commission Secretary

Dear Ms. Hamilton:

**Re: FortisBC Energy Inc. (FEI)**

**Application for a Certificate of Public Convenience and Necessity (CPCN) for Approval of the Lower Mainland Intermediate Pressure (IP) System Upgrade (LMIPSU) Projects (the Application)**

**Evidentiary Update dated April 30, 2015**

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On December 19, 2014, FEI filed the Application for the LMIPSU Projects with the British Columbia Utilities Commission (the Commission). The first round of Information Requests is complete with responses filed on March 12, 2015. A further regulatory review timetable has been established based on the filing of this Evidentiary Update on or before April 30, 2015. As detailed in this Evidentiary Update, in the Application and also in responses to Information Requests, FEI has informed the Commission and interveners of the purpose and scope of this Evidentiary Update.

FEI hereby files this Evidentiary Update to provide updates and evidence on the following two areas:

1. An analysis of the Lougheed Highway Route Option to determine if a route option along Lougheed Highway in Sections 5 and 6 is feasible and preferred; and
2. The results of FEI's review of the Fraser Gate IP Project seismic upgrade scope.

This Evidentiary Update includes three categories of changes to the Appendices:

1. New Appendices;
2. Revisions to certain Appendices which replace the currently filed versions; and
3. Addendums to certain Appendices which are added to and supplement currently filed versions.

The following list identifies the affected appendices included in this Evidentiary Update.

#### **New Appendices:**

- A-30 Golder Associates Limited – Update on Fraser IP Geotechnical Tests
- C-10-3 Email invitation to public info session: Highlawn residents
- C-10-4 Email invitation to public info session: Stakeholder list
- C-10-5 Email invitation to public info session: Lougheed Hwy businesses
- D-4-7 Email to Tsleil-Waututh First Nation April 22, 2015 regarding Lougheed Alignment and Archaeological **CONFIDENTIAL**
- D-5-4 Email to Squamish First Nation April 22, 2015 regarding Lougheed Alignment and Archaeological **CONFIDENTIAL**
- D-6-1 Email to Kwikwetlem First Nation dated April 22, 2015 regarding Lougheed Alignment and Archaeological
- E-4 Alternatives Cost Comparison

#### **Revised Replacement Appendices:**

- A-20-1 Project Schedule – Coquitlam Gate IP Project
- A-20-2 Project Schedule – Fraser Gate IP Project
- A-23 Basis of Estimate **CONFIDENTIAL**
- A-24 Pipeline Estimate **CONFIDENTIAL**
- A-29 Fraser Gate IP Detailed Route Map
- E-1-1 Preferred Alternative 6: Coquitlam Gate IP Project **CONFIDENTIAL**
- E-1-2 Preferred Alternative Fraser Gate IP Project **CONFIDENTIAL**
- E-2-1 Alternative 4: Coquitlam Gate IP Project 24 NPS at 2070 kPa **CONFIDENTIAL**
- E-2-2 Alternative 5: Coquitlam Gate IP Project 36 NPS at 1200 kPa **CONFIDENTIAL**
- E-3-1 Coquitlam Gate IP Project Execution Cost **CONFIDENTIAL**
- E-3-2 Fraser Gate IP Project Execution Cost **CONFIDENTIAL**

#### **Addendums to Supplement Existing Appendices**

- A-4 D.G. Honegger Consulting: Site-Specific Seismic Vulnerability Assessment – Fraser IP
- A-17 Coquitlam Gate IP Route Selection Details – Lougheed Alignment
- A-18-5 Lougheed Highway Alignment Traffic Impact – Lougheed Alignment
- B-1 Environmental Overview Assessment – Lougheed Alignment
- B-2 Archaeological Overview Assessment – Lougheed Alignment
- C-2 Summary of Public Consultation Activities – Lougheed Alignment
- C-4 Story Boards – Lougheed Alignment
- C-6 Postcard to Residents and Businesses – Lougheed Alignment Open House
- C-7 Publication in Local Papers – Lougheed Alignment Information Session
- D-1 First Nations Engagement Log – Update for Activities since Application Filed

As requested in the Application and for the reasons articulated in the cover letter to the Application, certain Appendices were filed on a confidential basis in accordance with the Commission's Confidential Filing Practice Directive. The following two new Appendices have also been filed on a confidential basis with this Evidentiary Update:

- D-4-7 Email to Tsleil-Waututh First Nation April 22, 2015 regarding Lougheed Alignment and Archaeological **CONFIDENTIAL**
- D-5-4 Email to Squamish First Nation April 22, 2015 regarding Lougheed Alignment and Archaeological **CONFIDENTIAL**

The basis for confidentiality of these two new Appendices is that they contain correspondence with the Squamish Nation and the Tsleil-Waututh First Nation, and these First Nations have expressed concerns regarding the public disclosure of correspondence with FEI. A description of the nature of the correspondence still appears in the publicly filed Application and Evidentiary Update.

In addition, as with the filing of the original Application, certain portions of Appendix C-2: Summary of Public Consultation Activities and C-10-3: Email Invitation to Highlawn Residents have been redacted to remove personal information.

Should parties that have chosen to register in the review of this Application require access to some or all of the information filed confidentially, if not already provided, parties are to submit, to FEI, an executed Undertaking of Confidentiality in the form provided in Appendix G-3 of the Application. As stated in the cover letter to the Application, FEI has no objection to providing certain confidential information to its customary and routine intervener groups representing customer interests. Should FEI have concerns with or object to releasing confidential information to any other registered party, FEI requests the opportunity to file comment.

FEI respectfully requests that the Commission hold the documents identified as confidential in this proceeding throughout the regulatory review process, and that all such information should remain confidential even after the regulatory process for this Application is completed.

Consistent with the previous practice, FEI proposes that all information requests relating to these confidential Appendices be filed separately from other information requests, with a copy circulated only to FEI and other parties that have signed Undertakings of Confidentiality.

If further information is required, please contact the undersigned.

Sincerely,

**FORTISBC ENERGY INC.**

***Original signed:***

Diane Roy

Attachments

cc (email only): Registered Parties



## **FORTISBC ENERGY INC.**

# **Application for a Certificate of Public Convenience and Necessity for the Lower Mainland Intermediate Pressure System Upgrade Projects**

## **Coquitlam Gate IP Lougheed Highway Alignment and Fraser Gate IP Scope**

### **Volume 6 – Evidentiary Update**

**April 30, 2015**

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- A-17:** Coquitlam Gate IP Route Selection Details – Lougheed Alignment **(Addendum)**
- A-18:** Traffic Management:
  - A-18-5:** Lougheed Highway Alignment Traffic Impact – Lougheed Alignment **(Addendum)**
- A-30:** Golder Associates Limited – Update on Fraser IP Geotechnical Tests **(New)**
- A-20:** Project Schedules
  - A-20-1:** Project Schedule – Coquitlam Gate IP Project **(Revised)**
  - A-20-2:** Project Schedule – Fraser Gate IP Project **(Revised)**
- A-23:** Basis of Estimate **CONFIDENTIAL (Revised)**
- A-24:** Pipeline Estimate **CONFIDENTIAL (Revised)**
- A-29:** Fraser Gate IP Detailed Route Map **(Revised)**

### **Appendix B – Environmental, Archaeological and Socio-Economic Assessments**

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- B-2:** Archaeological Overview Assessment – Lougheed Alignment **(Addendum)**

### **Appendix C – Public Consultation**

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## 1. EXECUTIVE SUMMARY

On December 19, 2014 FortisBC Energy Inc. (FEI or the Company) filed an application (the Application, Exhibit B-1) to the British Columbia Utilities Commission (BCUC or the Commission) to construct and operate two Intermediate Pressure (IP) pipeline segments (the Coquitlam Gate IP Project and the Fraser Gate IP Project) in the Lower Mainland of British Columbia to replace the existing pipeline segments.

In section 3.3.4.7 of the Application, FEI indicated that:

*“As part of the ongoing consultation with the City of Burnaby, at a meeting between FEI and the City on November 27, 2014, the City suggested that FEI reconsider routing the NPS 30 Coquitlam Gate IP pipeline in the Brentwood area of Burnaby along Lougheed Highway.*

*The City of Burnaby indicated that traffic impacts along Lougheed Highway should not be considered as a major issue when assessing route feasibility. The City stated that if a mutually agreeable route alignment can be determined along Lougheed Highway in Section 5 and Section 6, between approximately Bainbridge Avenue and Boundary Road, the City would support the route.*

*As a result of the feedback from the City, FEI, in conjunction with the City of Burnaby and in consultation with other stakeholders such as Translink, B.C. Hydro and MoTI, will conduct further analysis to determine if a route option along Lougheed Highway in Section 5 and 6 is feasible. It is anticipated that this analysis will be completed by early 2015. If the analysis shows that a route option along Lougheed Highway is technical[ly] feasible, constructible, that traffic issues can be managed with reasonable efforts and that the route option scoring and cost is comparable to the current preferred route alignment options, FEI will submit a revised route evaluation for the sections of route corridor through Burnaby to the BCUC for consideration.”*

On March 12, 2015, FEI filed responses to BCUC information request (IR) round 1. In response to BCUC IR 1.31.4 regarding the Fraser Gate IP Project, FEI stated that:

*“FEI has revisited its prior understanding of the specific area of seismic vulnerability.*

*Given the response to BCUC IR 1.31.2, FEI has assessed that further test holes are warranted to determine where the soil conditions change from the conditions at Fraser Gate station to those at Section B-B' (please see the response to BCUC IR 1.37.1). The Company expects that additional subsurface information will facilitate FEI's*

1            *optimization of the extent of the pipeline that needs to be replaced to meet the seismic*  
 2            *demand based on technical considerations.*

3            *FEI intends to conduct further test hole studies, and review and revise the scope and*  
 4            *estimate for the pipeline replacement in this area. The Company proposes to include*  
 5            *additional information on this scope optimization in the Evidentiary Update to be filed in*  
 6            *late April.”*

7  
 8            On March 26, 2015 in response to the BCUC’s Request for Submissions on Further Process  
 9            (Exhibit A-6), FEI indicated in its Reply Submission on Further Process (Exhibit B-8) that it  
 10           would file an Evidentiary Update on April 30, 2015. On March 31, 2015, the Commission issued  
 11           Letter Log. No. 49268 (Exhibit A-7) outlining that if an Evidentiary Update is filed by April 30,  
 12           2015, there is no need to suspend the regulatory process and the regulatory timetable would be  
 13           as follows:

ACTION	DATE (2015)
Commission Information Request No. 2	Tuesday, May 19
Intervener Information Request No. 2	Tuesday, May 26
FEI Response to Information Requests No. 2	Thursday, June 18
Written Submissions on Further Process (all parties)	Thursday, June 25
FEI Reply Submission on Further Process	Monday, June 29

15  
 16  
 17            The scope of this Evidentiary Update focuses on two areas that FEI has indicated that it would  
 18            update as noted above:

- 19  
 20            1. An analysis of the Lougheed Highway Route Option to determine if a route option along  
 21            Lougheed Highway in Section 5 and 6 is feasible and preferred; and  
 22            2. The results of FEI’s review of the Fraser Gate IP Project alignment and scope of the  
 23            seismic upgrade.

24  
 25            As a result of the re-evaluation of the Lougheed Highway route options for the Coquitlam Gate  
 26            IP Project, FEI has determined that the route option along the Lougheed Highway for Section 5  
 27            and Section 6 of the route corridor is feasible. FEI has updated its proposed route to follow  
 28            Lougheed Highway for Section 5 and Section 6 as the new preferred route. The capital cost  
 29            estimate has been updated accordingly and is detailed in section 2.8 of this Evidentiary  
 30            Update.  
 31

1 As a result of its review of seismic susceptibility at Test Hole AH95-2 subsequent to FEI's  
 2 Application, FEI has determined that earthquake-induced hazards do not pose a threat to the  
 3 Fraser Gate IP pipeline from the location of Test Hole AH95-2 onward to the west and north.  
 4 Additional test holes were conducted to determine where the soil conditions change from the  
 5 conditions at Fraser Gate station to those at Section B-B'. Together with the additional  
 6 subsurface information collected in March and April 2015, this information has enabled FEI to  
 7 optimize the extent of the pipeline that needs to be replaced to meet the seismic requirements  
 8 based on technical considerations. As a result, FEI now proposes to reduce the length of pipe  
 9 to be replaced to approximately 280 metres. The Project description, scope and capital cost  
 10 estimate have been updated accordingly and are detailed in section 3 of this Evidentiary  
 11 Update.

12  
 13 The total cost of the Projects is now forecast to be \$255.244 million, which is a reduction of  
 14 approximately \$10 million as compared to the Errata to the Application filed April 24, 2015<sup>1</sup>.  
 15 This reduction is primarily attributable to the reduced length of the Fraser Gate IP Project which  
 16 equates to a project cost reduction of approximately \$9.100 million. In addition, the change in  
 17 the proposed route alignment for the Coquitlam Gate IP Project results in a reduction to project  
 18 costs of approximately \$1.250 million as a result of lower construction costs. Finally, the  
 19 development costs have increased by approximately \$0.375 million. Please refer to Appendix  
 20 E-4 for comparative summary costs.

21  
 22 A summary of the revised total forecast capital costs, and 2019 average cost of service, is as  
 23 follows:

- 24  
 25 • Total Capital Cost (As-spent dollars) excluding AFUDC but including abandonment and  
 26 demolition cost is \$239.047 million (as compared to \$248.863 million filed in the Errata  
 27 update of April 24, 2015);
- 28 • When including AFUDC the As-spent cost is \$251.815 million (as compared to \$262.184  
 29 million filed in the Errata update of April 24, 2015); and
- 30 • 2019 Average Cost of Service Impact: \$0.124 / GJ (as compared to \$0.129 / GJ filed in  
 31 the Errata update of April 24, 2015).

32  
 33 For a typical FEI residential customer consuming 95 GJ per year in 2019, this would equate to  
 34 approximately \$12 per year and reflects an approximate increase of 3.23 percent on delivery  
 35 margin or an approximate increase of 1.3 percent on the burner tip (as compared to \$12 per  
 36 year, 3.36 percent on the delivery margin and 1.3 percent on the burner tip respectively as filed  
 37 in the Errata update of April 24, 2015).

38 The following table summarizes the total forecast capital and deferred costs for the Projects:

---

<sup>1</sup> Errata to the Application filed April 24, 2015, Page 9 Table 1-1 Total was \$265.235 million.

1 **Table 1-1: Summary of Forecast Capital & Deferred Costs (\$millions)<sup>2</sup>**

Particular	2014\$	As-Spent	AFUDC	Tax Offset	Total
Total Capital Cost	206.431	239.047	12.769		<b>251.815</b>
LMIPSU Development Cost	2.920	2.929	0.215	(0.762)	<b>2.382</b>
LMIPSU Application Cost	1.307	1.307	0.080	(0.340)	<b>1.047</b>
<b>Total</b>	<b>210.658</b>	<b>243.283</b>	<b>13.064</b>	<b>(1.102)</b>	<b>255.244</b>

2  
3  
4 Environmental and archeological assessments have been completed along the proposed  
5 Lougheed Highway routes as described in section 5 of this Evidentiary Update and conclude  
6 that the impacts associated with the Projects are expected to be minimal and can be mitigated  
7 through the implementation of standard best management practices and mitigation measures.  
8 The Socio-Economic Impact Assessment (Appendix B-3 to the Application) has also been  
9 reviewed and the potential economic impacts have been updated in section 5 of this Evidentiary  
10 Update to reflect the socio-economic impacts associated with the new proposed route  
11 alignment.

12  
13 The Company identified a number of Project stakeholders, including residents, businesses,  
14 government entities and First Nations that may be impacted by the route options along  
15 Lougheed Highway. Additional communications and consultations with the stakeholders about  
16 the Lougheed Highway route options have taken place and are further described in section 6  
17 (Public Consultation) of this Evidentiary Update.

18 FEI continues to consult with stakeholders regarding routing, the Projects' schedules, temporary  
19 construction space, Rights of Way (ROW), and public safety, and is committed to continuing  
20 consultation with Project stakeholders, ensuring that, as the Projects progress, stakeholders are  
21 kept informed and have opportunities to provide feedback to the Company.

22 As described in section 7 of this Evidentiary Update, the Company has informed First Nations  
23 about the Company's plan to construct a pipeline within the Lougheed Highway in Burnaby.

24  
25 Based on the information summarized above and provided in the Application and this  
26 Evidentiary Update, FEI continues to believe the Projects are in the public interest and should  
27 be approved.

---

<sup>2</sup> Table 4-1 in section 4 presents a detailed summary of the costs by Project and Table 4-2 provides the financial impacts associated with the completion of each of the two IP pipeline Projects, as well as a summary of the combined rate impacts. Both tables are based on detailed schedules for each pipeline segment as included in Appendix E-1.

## 2. COQUITLAM GATE IP UPDATE

As described in section 3.3.4.7 of the Application, during consultation in November 2014, the City of Burnaby indicated that traffic impacts from pipeline construction on Lougheed Highway should not be considered as a major issue when assessing route feasibility. Therefore, subsequent to the original Coquitlam Gate IP pipeline route alignment proposed in the Application, FEI has conducted additional analysis to re-examine route options along Lougheed Highway for Section 5 and 6, and presents the results in this Evidentiary Update. As referenced in FEI's response to BCUC IR 1.17.1 in this proceeding, the route option on Lougheed Highway for Section 4 is not included in this analysis.

The same route selection process as detailed in section 3.3.4 of the Application is applied in this analysis. Of the seven route corridor sections defined in Figure 3-7 of the Application only Section 5 and Section 6 are subject to change. The route options identified in section 3.3.4.4.5 of the Application for Section 5 are re-evaluated. Also, route options on Lougheed Highway for Section 6, which were ruled out during the initial routing screening process and not included in the original route selection, are also re-evaluated.

The Project description and cost estimate details presented in sections 3.3 and 3.4 of the Application, including information on Project components, schedule, resources requirements, risks and management and capital cost estimate are also reviewed and updated as part of the further routing analysis completed for this Evidentiary Update.

### 2.1 ORIGINAL PROPOSED COQUITLAM GATE IP ROUTE ALIGNMENT

Section 3.3.4 of the Application and supporting Appendix A-17 filed with the Application, describe the pipeline route evaluation process and the original proposed route alignment for the NPS 30 Coquitlam Gate IP pipeline. The routing process identified a route corridor based on the existing NPS 20 IP pipeline route alignment. An overview map of the route corridor (subdivided into seven Sections to facilitate the route evaluation process) is available in Exhibit B-1, Figure 3-7. The original proposed route aligns closely with the existing NPS 20 Coquitlam Gate IP pipeline, and the relative position of the original proposed route to the existing pipeline route is presented in Exhibit B-1, Table 3-11.

During the Application route selection process, FEI identified and evaluated Lougheed Highway as a feasible route option for Section 4 and 5 of the route corridor. A route option along Lougheed Highway for Section 6 was initially considered but screened out at an early stage.

Further to the request by the City of Burnaby made during consultation in November 2014 to reconsider Lougheed Highway as a potential route for the Coquitlam Gate IP pipeline through Burnaby, this Evidentiary Update addresses the following:

- 1       • Re-evaluates the route options for Section 5;
- 2       • Identifies and evaluates feasible route options on Lougheed Highway for Section 6;
- 3       • Presents the route evaluation results and makes recommendations where, as a result of
- 4       this further routing analysis, a re-route from the original proposed alignment to a new
- 5       alignment is warranted; and
- 6       • Reviews any potential impact to the proposed route in the adjacent route corridor for
- 7       Section 4 (to the east of Section 5) and Section 7 (to the west of Section 6).

## 8       **2.2    RATIONALE FOR RECONSIDERATION OF LOUGHEED HIGHWAY**

9       As described in section 3.3.4.7 of the Application, the City of Burnaby, during consultation in  
 10       November 2014, indicated that traffic impacts along Lougheed Highway should not be  
 11       considered as a major issue when assessing route feasibility. At that time the City of Burnaby  
 12       stated that if a mutually agreeable route alignment could be determined along Lougheed  
 13       Highway for Sections 5 and 6, the City would support the route. Since then, FEI has completed  
 14       further assessment of the potential traffic impacts from the proposed pipeline construction on  
 15       Lougheed Highway (refer to Appendix A-18-5 Addendum) and worked with City of Burnaby staff  
 16       to fully understand the potential impacts from construction. The City of Burnaby has filed  
 17       comments with the Commission (Exhibit C-5-2) on March 6, 2015 summarizing its  
 18       understanding of this collaborative approach as follows:

19               *“The City of Burnaby has been working with FEI who have now developed an alternative*  
 20               *alignment along Lougheed Highway that, subject to some further investigation by FEI,*  
 21               *promises to be an equal or better route to the alignment through the residential*  
 22               *neighbourhoods.*

23               *Following deliberation by City Council, the City has determined that the traffic disruptions*  
 24               *from the Lougheed Highway alignment are acceptable and wishes to advise that City*  
 25               *Council unanimously does not support the alignments for the replacement pipeline*  
 26               *through the City's residential neighbourhoods.*

27               *The City strongly encourages both FEI and the BC Utilities Commission to pursue and*  
 28               *support the alternative alignment for the replacement gas pipeline along Lougheed*  
 29               *Highway between Bainbridge Avenue and Madison Avenue.”*

30  
 31       The City of Burnaby's view that traffic disruption from a Lougheed Highway alignment is  
 32       manageable and therefore acceptable to the City has encouraged FEI to reconsider the  
 33       Lougheed Highway as a possible route.

34       FEI's initial route evaluation and original proposed route alignment took into account the  
 35       preliminary feedback from the City of Burnaby which occurred during the initial consultation  
 36       period and is summarized in section 3.3.4.6 of the Application. Of particular concern at that time

1 was the Lougheed Highway corridor in the vicinity of Brentwood Town Centre, where it was  
2 determined that pipeline construction would likely close multiple lanes on Lougheed Highway  
3 during construction. The traffic analysis completed at that time determined that total closure of  
4 all west bound lanes did not appear feasible. However, further analysis has determined that this  
5 area is undergoing redevelopment with multiple concurrent construction sites in operation. For  
6 instance, to the east of Brentwood Town Centre a new utility pipeline has recently been installed  
7 in the Lougheed Highway from Sperling Avenue to Holdom Avenue approximately. The pipeline  
8 construction closed two east bound lanes along Lougheed Highway for a number of months.  
9 Traffic disruption was minimized by temporarily shifting the traffic flow into the west bound lanes  
10 and maintaining three lanes in operation. This pipeline project has demonstrated that the traffic  
11 impacts from the Coquitlam Gate IP pipeline construction, which would be similar to the recent  
12 pipeline project, are manageable and support the City of Burnaby's acceptance of the potential  
13 traffic disruptions.

14 The City of Burnaby's experience in working with stakeholders to manage the traffic impacts  
15 informed the re-evaluation of the Lougheed Highway route option for Section 5 and evaluation  
16 of feasible route option(s) for Section 6. This experience will also facilitate the detailed traffic  
17 analysis and management process between FEI and the City of Burnaby should the new  
18 proposed pipeline route alignment be approved as described in the Application and updated in  
19 the Evidentiary Update. Notwithstanding, FEI's traffic studies indicate that the travelling public  
20 will be inconvenienced during pipeline construction along Lougheed Highway, and FEI will work  
21 cooperatively with City of Burnaby staff during the detailed Project planning over the next three  
22 years to better understand the nature of the impacts and to develop and implement a traffic  
23 management plan to mitigate the impacts.

## 24 **2.3 LOUGHEED HIGHWAY ROUTE SELECTION PROCESS**

25 The route evaluation process used in the Evidentiary Update is the same as the process  
26 described in section 3.3.4 and Appendix A-17, section 1 of the Application.

### 27 **2.3.1 Lougheed Highway Route Options Considered**

28 This routing analysis adopts the same route corridor sectionalization as illustrated in figure 3-7  
29 of the Application.

30 The route options detailed in section 3.3.4.4 of the Application evaluated a route option along  
31 Lougheed Highway for Sections 4 and 5 of the route corridor. As described in Appendix A-17,  
32 section 2.4 of the Application and in the response to BCUC IR 1.17.1, Route Option 1 along  
33 Broadway is the preferred route for Section 4.

34 This routing analysis will re-evaluate the Lougheed Highway route options for Section 5 and  
35 identify and evaluate feasible route options along Lougheed Highway for Section 6 of the route  
36 corridor.



### 1 **2.3.1.1 Section 5: Bainbridge Avenue to Springer Avenue**

2 This Section of the pipeline extends from Springer Avenue to Boundary Road in Burnaby. Three  
3 route options were initially analyzed within this pipeline Section of corridor for installation of the  
4 NPS 30 Coquitlam Gate IP pipeline, and the evaluation is included in Appendix A-17, Table 4 of  
5 the Application.

6 Route Option 3, which was considered in the initial evaluation, would involve a route along a  
7 residential street to the north of Broadway along Halifax Street. It would be significantly longer  
8 than the other options considered along Broadway and Lougheed Highway, would be more  
9 expensive to construct, and would have a greater overall impact; therefore, because this route  
10 option would offer no benefit, it has been excluded from this re-evaluation.

11 The following route options are evaluated and illustrated on the route options map in Appendix  
12 A-17 Addendum, section 1.1.

- 13 • **Original Preferred Option (Broadway):** From Bainbridge Avenue & Broadway to  
14 Springer Avenue & Broadway.
- 15 • **Lougheed Highway Option:** From Broadway south on Bainbridge Avenue, west on  
16 Lougheed Highway to Springer Avenue.

### 17 **2.3.1.2 Section 6: Springer Avenue to Boundary Road**

18 This Section of the pipeline extends from Springer Avenue to Boundary Road. Five route  
19 options were initially evaluated within this Section of corridor for installation of the NPS 30  
20 Coquitlam Gate IP pipeline, and the evaluation outcome is included in Exhibit B-1-1, Appendix  
21 A-17, Table 5.

22 The Original Preferred Option (the selected route from the previous evaluation) involves a route  
23 along residential streets one to two streets north of the existing NPS 20 IP pipeline alignment to  
24 avoid the Brentwood Town Centre routing constraints. Lougheed Highway was considered as a  
25 potential route option at that time but screened out during the initial route option identification  
26 process due to potential traffic impacts.

27 This route option analysis will compare and evaluate the Original Preferred Option and two new  
28 route options along Lougheed Highway, identified as Option A and Option B and described  
29 below. The evaluation and a map of the route options for this Section of the pipeline are  
30 presented in Appendix A-17 Addendum, section 1.2.

- 31 • **Original Preferred Option:** From Springer Avenue at Broadway, north along Springer  
32 Avenue, west along Halifax Street, north along Delta Avenue, west along Highlawn Drive  
33 and Midlawn Drive, south along Fairlawn Drive, west along Brentlawn Drive and  
34 Graveley Street to Boundary Road.

- 1       • **New Lougheed Highway Option A:** From Springer Avenue & Lougheed Highway, west  
2       along Lougheed, north along Madison Avenue to Halifax Street, north along Douglas  
3       Road to Graveley Street, west along Graveley Street to Boundary Road.
- 4       • **New Lougheed Highway Option B:** From Springer Avenue & Lougheed Highway, west  
5       along Lougheed, north along Boundary Road to East 1st Avenue.

### 6       **2.3.2 New Proposed Route Evaluation and Selection Summary**

7       The overall objective of the routing process is to identify and select the route option that  
8       minimizes potential impacts on the community, stakeholders and the environment while meeting  
9       safety requirements and allowing a constructible and economic route. As described in section  
10      3.3.4.2 of the Application, pipeline routing is an iterative process which develops in step with the  
11      overall Project development phases. Ongoing consultation is a key aspect of the Project  
12      development, and meetings with the City of Burnaby in late 2014 and early 2015 have resulted  
13      in this Evidentiary Update which presents the results of the Lougheed Highway route analysis  
14      for Section 5 and Section 6 route corridors. The result is a new preferred route option in each  
15      section and a new proposed Coquitlam Gate IP pipeline route alignment which is presented  
16      here in summary and in detail in the Route Selection Report (Appendix A-17 Addendum).

17     The routing process adopts the same route corridor between Coquitlam Gate station in  
18     Coquitlam and East 2nd & Woodland station in Vancouver, and the same route corridor  
19     sectionalization based on the locations of lateral offtakes from the existing NPS 20 Coquitlam  
20     Gate IP pipeline. As a result of this further routing analysis, twenty six route options (ranging  
21     from two to seven for each section) within the corridor have been evaluated. This approach has  
22     enabled FEI to determine a feasible route option along Lougheed Highway for Section 6 while  
23     ensuring routing efficiency in interfacing with the existing IP network was maintained.

24     The new proposed route aligns closely with the existing NPS 20 Coquitlam Gate IP pipeline.  
25     The relative position of the selected route to the existing Coquitlam Gate IP pipeline is detailed  
26     in Table 2-1.

27                      **Table 2-1: Coquitlam Gate IP Project New Proposed Pipeline Route Details**

Section	Existing NPS 20 Coquitlam IP route	New Proposed NPS 30 Coquitlam IP route	Relative Position
1	Como Lake Avenue	Como Lake Avenue	Parallel in same road
2	Como Lake Avenue	Como Lake Avenue	Parallel in same road
3	Como Lake Avenue and Broadway	Como Lake Avenue and Broadway	Parallel in same road
4	Broadway	Broadway	Parallel in same road
5	Broadway	Lougheed Highway	Parallel (offset one street south)

Section	Existing NPS 20 Coquitlam IP route	New Proposed NPS 30 Coquitlam IP route	Relative Position
6	Springer Avenue, Halifax Street, Brentlawn Drive, Lane adjacent to Brentwood Town Centre, Halifax Street, 2 <sup>nd</sup> Avenue	Lougheed Highway, Madison Avenue, Douglas Road, Graveley Street	Parallel (within a few blocks)
7	East 2 <sup>nd</sup> Avenue	East 1 <sup>st</sup> Avenue	Parallel Street (offset one street north)

1

2 **2.3.2.1 Sections 1 to 4: Mariner Way (Coquitlam) to Bainbridge Avenue**  
 3 **(Burnaby)**

4 The proposed route detailed in section 3.3.4.6 and Appendix A-17 of the Application, and BCUC  
 5 IR 1.17.1 for route corridor sections 1 to 4 has not been impacted by this further analysis and  
 6 remains as detailed in Table 3-11 of the Application.

7 **2.3.2.2 Section 5 - Bainbridge Avenue to Springer Avenue (Burnaby)**

8 The route evaluation detailed in section 3.3.4.6 and section 2.5 of Appendix A-17 of the  
 9 Application, for route corridor Section 5 analyzed three route options including Lougheed  
 10 Highway, but selected the Broadway Option as the preferred route option.

11 Further routing analysis re-evaluated the route option along Lougheed Highway, primarily in  
 12 terms of reduced traffic disruption considerations and the impact on the socio-economic criteria.  
 13 Relative to the socio-economic score presented in section 2.5.1.2 of the Application, the  
 14 Lougheed Highway route option is now considered to have a moderate impact (good route  
 15 choice) compared to the very high negative impact (unviable route choice) score originally  
 16 assigned which was based on the understanding, at that time, that full closure of the west bound  
 17 lanes would not be feasible due to significant deterioration in traffic performance.

18 The re-evaluation also updated the environmental and archaeological constraint studies for the  
 19 Lougheed Highway corridor. This resulted in a higher environmental impact assessment due to  
 20 the presence of more potential contaminated sites in Section 5 than originally considered and  
 21 reduced the ecology criteria score to a moderate impact (good route choice), compared to the  
 22 score presented section 2.5.2.1 of the Application.

23 Overall the route re-evaluation increased the Lougheed Highway technical (non-financial) score  
 24 from 310 (Appendix A-17 Table 4 of the Application) to 335 (Evidentiary Update, Appendix A-17  
 25 Addendum, Table 1-1), which now results in the Lougheed Highway route option ranking first.

26 As detailed in Exhibit B-1, section 2.5.4 and Table 4, the Lougheed Highway route option is less  
 27 expensive to construct compared to the Broadway route. This re-evaluation confirmed that the

1 Lougheed Highway route option is the least expensive to construct and ranks first in terms of  
 2 relative cost.

3 As a result of the re-evaluation, Lougheed Highway ranks first in both the technical (non-  
 4 financial) and financial analysis and is selected as the new preferred route option for Section 5.

5 **2.3.2.3 Section 6 - Springer Avenue to Boundary Road (Burnaby)**

6 The route evaluation detailed in section 3.3.4.6 and Appendix A-17, section 2.6 of the  
 7 Application analyzed five route options for Section 6 but originally excluded the Lougheed  
 8 Highway route option from the analysis. The route re-evaluation presented in this Evidentiary  
 9 Update considers two additional route options along Lougheed Highway (Option A and B) and  
 10 evaluates them against the Original Preferred Option which is located along residential streets  
 11 north of Brentwood Town Centre. The Lougheed Highway route options are located to the  
 12 south of the Brentwood Town Centre along a denser urban corridor which results in different  
 13 impact characteristics.

14 Lougheed Highway Route Option A and Option B, which is illustrated in Figure 1-2 in Appendix  
 15 A-17 Addendum, share the same alignment from Springer Avenue to Madison Avenue.  
 16 Lougheed Highway Option A continues north west along Madison Avenue and Douglas Road  
 17 prior to intersecting the Original Preferred Option at Graveley Street and continuing west along  
 18 the same alignment to Boundary Road. Lougheed Highway Option B continues west along  
 19 Lougheed Highway from Madison Avenue to Boundary Road and then north along Boundary to  
 20 East 1<sup>st</sup> Avenue. Lougheed Highway Option B would involve challenging road crossing  
 21 construction at the intersection of Boundary Road and East 1<sup>st</sup> Avenue, which resulted in  
 22 relatively high Engineering/Technical criteria impacts; this resulted in Lougheed Highway Option  
 23 B scoring lowest overall and ranking last in the technical (non-financial) evaluation.

24 In terms of the three broad technical (non-financial) categories, the Original Preferred Option  
 25 scored higher than Lougheed Highway Option A and B in the Community/Stakeholder category;  
 26 however, Lougheed Highway Option A scored highest in the Environmental and  
 27 Engineering/Technical categories. The relative overall scores of the Lougheed Highway Option  
 28 A and the Original Preferred Option are 340 and 335 respectively; the small margin  
 29 differentiating these options indicates that they are both very similar in terms of overall impact  
 30 considerations. The score for Lougheed Highway Option B was much lower.

31 The financial analysis was also re-evaluated to determine the comparative construction cost for  
 32 the Original Preferred Option and Lougheed Highway Option A and B. The main difference  
 33 between these options, in terms of construction costs, relates to the higher relative rate of  
 34 construction (construction productivity) achievable on Lougheed Highway Option A. In  
 35 summary, the Original Preferred Option is approximately 10 percent more expensive than  
 36 Lougheed Highway Option A but is less expensive than Lougheed Highway Option B. As a

1 result of the financial analysis, Lougheed Highway Option A, the Original Preferred Option and  
 2 Lougheed Highway Option B rank first, second and third, respectively.

3 Based on the outcome of the technical and financial analysis, Lougheed Highway Option A is  
 4 now selected as the new preferred route option for Section 6 of the pipeline alignment.

5 **2.3.2.4 Section 7 - Boundary Road to Woodland Drive**

6 The proposed route detailed in section 3.3.4.6 and Appendix A-17 of the Application for route  
 7 corridor Section 7 has not been impacted by this further analysis and remains as detailed in  
 8 Exhibit B-1, Table 3-11.

9 **2.4 CONSTRUCTION, INSTALLATION AND COMMISSIONING**

10 The following information with respect to the construction of a route option remains the same as  
 11 those described in section 3.3.5 and 4.3.5 of the Application:

- 12
- 13 • Methods of construction;
- 14 • Construction activities;
- 15 • Construction plan and execution; and
- 16 • Traffic control.

17 **2.5 PROJECT SCHEDULE**

18 As a result of the Company conducting further analysis to determine if route options along  
 19 Lougheed Highway for Sections 5 and 6 are feasible, and as indicated in response to CEC IR  
 20 1.46.1, the Company understands that Commission approval can no longer be anticipated by  
 21 August 31, 2015. In section 1.4 of the Application, FEI recognized the routing component of  
 22 the Coquitlam Gate IP pipeline may temporarily impact certain residents and/or communities  
 23 and could be of particular interest; therefore FEI indicated it would be agreeable to an oral  
 24 hearing limited to routing if the Commission believed this would be of value. With the evidence  
 25 provided in this Evidentiary Update, which presents the results of the Lougheed Highway route  
 26 analysis for Section 5 and Section 6 route corridors, and the recommendation of Lougheed  
 27 Highway as the preferred route for Sections 5 and 6, FEI believes the routing concerns as  
 28 previously identified have been addressed. Further the City of Burnaby has filed with the  
 29 Commission a letter of support for Lougheed Highway. Therefore, FEI believes a written  
 30 hearing process would provide for an appropriate and efficient review for the balance of the  
 31 regulatory review process for the Project. The project schedule has been revised and is  
 32 provided in Appendix A-20-1. Please note that this revised schedule reflects the latest possible  
 33 approval date that facilitates replacement of the pipeline without introducing a one-year delay.

## 1 **2.6 OTHER APPLICATIONS FOR APPROVAL**

2 Locating the pipeline in the new proposed Lougheed Highway route alignment in proximity to  
3 the Brentwood Skytrain station will require TransLink permits to be prepared and submitted for  
4 approval.

## 5 **2.7 RISK ANALYSIS AND MANAGEMENT**

6 Section 3.3.9 of the Application presents details regarding the risk assessment prepared for the  
7 Project to determine the technical and non-technical risks associated with the Coquitlam Gate  
8 IP pipeline. The risk assessment established a risk management framework which will be  
9 updated throughout the Project lifecycle. The risk assessment has been reviewed and  
10 determined to adequately reflect the risks associated with the new proposed route alignment.

## 11 **2.8 PROJECT COST ESTIMATE**

12 The Company prepared a revised Project cost estimate based on AACE International  
13 Recommended Practice No. 17R-97 (AACE) Class 3 specifications, in accordance with the  
14 CPCN Guidelines. This section discusses:

- 15
- 16 • The Project cost estimate details; and
- 17 • The financial impacts.

### 18 **2.8.1 Cost Estimate Details**

19 The total capital cost of the Coquitlam Gate IP Project, filed confidentially in Appendix E-3-1, is  
20 forecast to be \$242.825 million in as spent dollars (including AFUDC of \$12.351 million and  
21 abandonment/demolition costs of \$4.169 million)<sup>3</sup>.

#### 22 **2.8.1.1 Basis of Estimate**

23 The following cost estimate supporting documents have been revised and are provided in  
24 Appendices A-23 and A-24:

- 25 • Basis of Estimate; and
- 26 • Pipeline Basis of Estimate.

27

---

<sup>3</sup> Of the total \$242.825 million dollars, \$226.306 million of capital and \$12.235 million of AFUDC is charged to Gas Plant in Service, \$4.169 million abandonment / demolition costs plus \$0.115 million of AFUDC is charged Negative Salvage Deferral Account. The total AFUDC charged to Gas Plant in Service and to Negative Salvage Deferral Account is \$12.351 million.

1 The Project Class 3 capital cost estimate has been revised to reflect the new selected preferred  
2 route options for Section 5 and Section 6, and new proposed Coquitlam Gate IP pipeline  
3 alignment. The new route alignment has resulted in an overall reduction in the Class 3 capital  
4 cost estimate which has impacted owner's costs, materials, and construction costs.

#### 5 **2.8.1.1.1 OWNER'S COSTS**

6 FEI owner's capital cost has increased due to additional project management, internal  
7 engineering and communication effort. FEI project management costs have increased to  
8 include the following:

- 9 • Additional work plans required to identify and sequence construction activities;
- 10 • Additional work plans and quality assurance required for the increase to the  
11 environmental scope (contaminated sites); and
- 12 • Additional key stakeholder (internal and external) coordination (primarily businesses).

13  
14 FEI internal engineering oversight costs have also increased to reflect the following:

- 15 • Additional liaison effort with the City of Burnaby, BC Hydro and TransLink;
- 16 • Additional pipeline integrity engineering input during the detailed design and routing  
17 process;
- 18 • TransLink pipeline impact study for Brentwood Skytrain station and elevated guideway;  
19 and
- 20 • BC Hydro pipeline impact study for Lougheed electrical substation.

21  
22 FEI communication costs have increased with regard to additional responsibilities associated  
23 with necessary communications with local residents, businesses and commuters along the new  
24 Lougheed Highway route. The Company increased its communications budget to:

- 25 • enable production and execution of the required items to engage and inform the public  
26 before, during and after construction;
- 27 • cover increased costs associated with securing advertising; and
- 28 • development of additional materials, and supplemental resourcing costs to support these  
29 additional requirements.

30  
31 There were 3 low risk Areas of Potential Environmental Concern (APECs) on the original  
32 proposed alignment for Section 5 and 6. The new proposed alignment on Lougheed Highway  
33 includes 9 low risk and 8 med-high risk APECs. This has resulted in increased owner's costs  
34 associated with:

- 1 • permitting, management, sampling, handling and disposal of contaminated soil along
- 2 Lougheed Highway, Madison Avenue and Douglas Road; and
- 3 • archaeological potential surrounding three creeks along Lougheed Highway.

4

5 **2.8.1.1.2 MATERIALS**

6 There is a marginal increase in the pipeline length which has resulted in a minimal change to

7 the materials estimates.

8 **2.8.1.1.3 CONSTRUCTION**

9 The pipeline direct and indirect construction costs have reduced due to the construction

10 efficiencies from the proposed new alignment on Lougheed Highway for Section 5 and Section

11 6.

12 **2.8.1.1.4 PROJECT CONTINGENCY AND MONTE CARLO ANALYSIS**

13 Section 3.4.1.4.3 of the Application presents the Project contingency and quantitative risk

14 analysis using the Monte Carlo method (@Risk software) applied to the AACE Class 3 base

15 cost estimate prepared for the original proposed route alignment. The Project contingency was

16 selected and was validated as prudent selection through the Monte Carlo P50 value. The new

17 proposed route alignment cost estimate would involve the same risk profile; therefore, the same

18 contingency is applied to the updated Class 3 cost estimate.

19 **2.9 FINANCIAL CONSIDERATIONS**

20 The financial evaluation considers both the capital cost<sup>4</sup> and the present value of increased

21 operating costs associated with additional stations and increased pressure. FEI also undertook

22 a financial operational risk evaluation which was added to the financial evaluation to determine

23 the preferred alternative. FEI evaluated the incremental cost of service, cash flow and rate

24 impacts associated with Alternatives 4, 5 and 6 from the Application, but based on the cost

25 associated with the new preferred Lougheed Highway route alignment, over a 60 year period.

26 The 60 year time horizon was chosen to be consistent with the assumed useful life of the

27 assets. The incremental cost of service estimates are based on FEI’s currently approved capital

28 structure, cost of capital and tax treatment. Alternative 4 is a 24 NPS pipeline operating at 2070

29 kPa, Alternative 5 is a 36 NPS pipeline operating at 1200 kPa and Alternative 6 (the preferred

30 alternative) is a 30 NPS pipeline operating at 2070 kPa. For purposes of evaluation, the capital

31 cost estimates for the alternatives were developed to an AACE Class 4 level of project definition

---

<sup>4</sup> Includes project management, engineering, permits, materials procurement, construction, commissioning and contingency. For purposes of comparing alternatives, the development costs and application costs have been excluded from the capital costs in Table 2-2. These costs are the same in Alternative 4, 5 and 6 and are fully amortized before 2019 and do not impact the 2019 and 60 year average Levelized rate impact.



1 and are stated in 2014 dollars. The capital cost estimate for the NPS 30 pipeline was  
 2 developed to an AACE Class 3 level of project definition.

3 The following Table 2-2 provides a summary of the financial comparison.

4 **Table 2-2: Updated Coquitlam Gate IP Project Financial Comparison<sup>5</sup>**

	Alternative 4 Install NPS 24 pipeline at 2070 kPa Lougheed Route	Alternative 5 Install NPS 36 pipeline at 1200 kPa Lougheed Route	Alternative 6 Install NPS 30 pipeline at 2070 kPa Lougheed Route
<b>AACE Estimate Accuracy</b>	<b>Class 4</b>	<b>Class 4</b>	<b>Class 3</b>
Total Direct Capital Cost excl. AFUDC & includes Abandonment / Demolition (2014 \$millions)	179.671	205.836	199.053
Total Direct Capital Cost excl. AFUDC (As-spent \$millions)	207.958	238.747	230.474
AFUDC (as spent \$millions)	11.254	12.177	12.351
Total As-spent includes Abandonment / Demolition & AFUDC (\$millions)	219.212	250.924	242.825
Annual incremental gross O&M (2014 \$millions)	0.055	0.020	0.055
Levelized Rate Impact – 60 Yr. (\$ / GJ)	0.090	0.103	0.100
PV Incremental Cost of Service – 60 Yr. (\$millions)	266.379	306.928	297.183

5  
 6 As shown in the above table, Alternative 4 (NPS 24 at 2070 kPa) is less expensive than  
 7 Alternative 6 (NPS 30 at 2070 kPa). The pipeline materials and construction costs are the  
 8 largest components of the capital costs comprising 80 to 90 percent of the total. Therefore, the  
 9 NPS 24, with the smallest diameter, is the less expensive pipeline to construct because of  
 10 increased construction productivity and lower pipe steel costs. However, during review of the  
 11 original Alternative 4 cost estimate, for the new proposed Lougheed Highway alignment, the  
 12 allowance for contractors' overhead and markup was determined to be too low. Therefore, the  
 13 revised Alternative 4 estimate has been amended to reflect the appropriate estimated amount  
 14 for contractors' overhead and markup. As a result, Alternative 4 is still less than the revised  
 15 Alternative 6, but the cost difference between these two alternatives has reduced. Detailed  
 16 financial schedules for Alternative 4 are included in Confidential Appendix E-2-1.

17  
 18 Similar to the results in the Application filed in December, 2014 and in the Errata to the  
 19 Application filed on April 24, 2014 and now in the above table Alternative 5 is the most  
 20 expensive in terms of the capital cost, PV of the revenue requirements and rate impact.

<sup>5</sup> Comparative figures are in Appendix E-4 showing the values filed in the Errata to the Application compared to the values in Evidentiary Update Table 2-2

1 To reach a conclusion on a preferred alternative between Alternative 4 with the lowest cost of  
 2 service and Alternative 6 with the next lowest cost of service, a calculation of the present value  
 3 of operational risk was conducted on these two alternatives to determine the differential  
 4 between the two alternatives in terms of a 60 year levelized cost when the impact of operational  
 5 risk reduction is taken into account. The present value of the operational risk was added to the  
 6 present value of the cost of service to provide an overall present value comparison, which is  
 7 summarized in Table 2-3 below. Operational risk is a measure of loss-of-service impact, and is  
 8 defined as the sum of the quantitative risk value of each pipeline section per year of operation,  
 9 based on failure frequency per year and financial cost per event associated with the loss-of-  
 10 service. The calculation of the annual risk reduction of \$2.456 million associated with the  
 11 proposed Alternative 6 is included in Appendix A-10 of the Application. The calculation of the  
 12 annual risk reduction associated with Alternative 4 is \$0.352 million<sup>6</sup>.

13

14 **Table 2-3: Updated Coquitlam Gate IP Project Financial and Operational Risk Comparison<sup>7</sup>**

		Alternative 4 Install NPS 24 Pipeline at 2070 kPa Lougheed Route	Alternative 6 Install NPS 30 Pipeline at 2070 kPa Lougheed Route
1	Potential Operational Risk Reduction Per Appendix A-10 (2014 \$millions/year)	2.456	2.456
2	Operational Risk Reduction (Coquitlam Gate IP Pipeline and Cape horn to Coquitlam TP complete) (2014 \$millions/year)	0.352	2.456
3	Operational Risk Reduction (%)	14.34%	100.0 %
4	Remaining Operational Risk (2014 \$millions/year)(line 1-Line2)*	2.104	0
5	PV Remaining Operational Risk – 60 Yr (\$millions)	33.307	0
6	PV Incremental Cost of Service – 60 Yr (\$millions)	266.379	297.183
7	PV Remaining Operational Risk + PV Incremental Cost of Service – 60 Yr (\$millions)	299.686	297.183

15 \* Based on potential operational risk in line 1

16

17 As shown in Table 2-3 above, the difference in operational risk reduction for Alternative 6 (NPS  
 18 30 Lougheed Highway Route) compared to Alternative 4 (NPS 24 Lougheed Highway Route) is  
 19 85.66 percent.

20 Referring to line 5 of Table 2-3, the benefit of the PV operational risk differential for a 60 year  
 21 period utilizing the Company’s 6.14 percent weighted average cost of capital (WACC) for

<sup>6</sup> See FEI’s response to BCUC IR 1.22.7 dated March 12, 2015, Page 117 - 120.

<sup>7</sup> Comparative figures are provided in Appendix E-4 showing the values filed in the Errata to the Application to those shown in Evidentiary Update Table 2-3.

1 Alternative 6 (NPS 30 Lougheed Highway Route) compared to Alternative 4 (NPS 24 Lougheed  
2 Highway Route), was calculated to be \$33.307 million.

3 Referring to line 7 of Table 2-3, where the 60 year PV Incremental Cost of Service and PV  
4 Operational Risk are added, Alternative 6 (NPS 30 Lougheed Highway Route) is \$2.503<sup>8</sup> million  
5 less than Alternative 4 (NPS 24 Lougheed Highway Route).

6 An analysis of the PV of the 60 year cost of service shows that Alternative 4 (NPS 30 Lougheed  
7 Highway Route) is \$30.804 million<sup>9</sup> less than Alternative 6 (NPS 24 Lougheed Highway Route)  
8 and that the differential in terms of a 60 year Levelized Rate Impact between the two is \$0.010  
9 per GJ. Based on an average annual consumption of 95 GJ per residential customer, this would  
10 result in an annual cost difference between the two alternatives of \$0.95 per customer.

11 In summary, when taking into account the reduction in operational risk provided by Alternative 6  
12 (NPS 30 Lougheed Highway Route) compared to Alternative 4 (NPS 24 Lougheed Highway  
13 Route), and that Alternative 6 is the only alternative which meets all of the stated objectives FEI  
14 has selected, Alternative 6 is the preferred alternative.

## 15 **2.10 COQUITLAM GATE IP SUMMARY**

16 As a result of the analysis and the re-evaluation of the Lougheed Highway route options that  
17 has taken place since the filing of the Application, FEI has determined that route options along  
18 Lougheed Highway for Section 5 and Section 6 of the route corridor are feasible. FEI has  
19 updated its preferred route to follow Lougheed Highway for Section 5 and Section 6.  
20

21 The revised route has resulted in a minor reduction in the Project cost and has mitigated  
22 concerns raised by the City of Burnaby and residents of the neighbourhood through which the  
23 Original Route Option progressed. The financial evaluation has resulted in a revised Project  
24 Estimate of \$230.474 million (As-spent excluding AFUDC).  
25

26 The Coquitlam Gate IP Project will eliminate the elevated reliability, safety and regulatory risk  
27 posed by the existing Coquitlam Gate IP pipeline as a result of the known corrosion mechanism  
28 and resulting unacceptable projected leak frequency. It will provide sufficient operational  
29 flexibility to permit planned maintenance and repair of the Fraser Gate IP pipeline and it will  
30 provide full system resilience in conjunction with the Cape Horn to Coquitlam Transmission  
31 Pressure pipeline reinforcement, to fully supply the Coquitlam Gate IP pipeline and the Fraser  
32 Gate IP pipeline from either the Fraser Gate station or the Coquitlam Gate station on any day of  
33 the year and therefore reduce the potential consequences of a failure upstream, at, or  
34 downstream of either gate station.  
35

---

<sup>8</sup> Alternative 6 \$297.183 million – Alternative 4 \$299.686 million.

<sup>9</sup> Alternative 4 \$266.379 million – Alternative 6 \$297.183 million.

1 **3. FRASER GATE IP SCOPE**

2 The original Fraser Gate IP Project scope, presented in section 4.3 of the Application, involved  
 3 the replacement of approximately 500 metres of NPS 30 pipeline operating at 1200 kPa and  
 4 extending from Fraser Gate station at the 2700 block of East Kent Avenue to the corner of East  
 5 Kent Avenue & Elliott Street.

6  
 7 FEI has undertaken further study of soil conditions and seismic analysis since filing its March  
 8 12, 2015 responses to Commission IR1, as indicated in the response to BCUC IR 1.31.4.

9  
 10 Based on additional review of seismic susceptibility with experts at Test Hole AH95-2, FEI has  
 11 determined that earthquake-induced hazards do not pose a threat to the pipeline from the  
 12 location of Test Hole AH95-2 onward to the west and north. As a result, further test holes were  
 13 conducted to determine where the soil conditions change from the conditions at Fraser Gate  
 14 station to those at Section B-B'. FEI also initiated further seismic analysis to determine the  
 15 length of pipeline replacement necessary within the competent soil zone such that an  
 16 unacceptable stress is not incurred at the transition between the new and existing pipe. Further  
 17 described in section 3.1, the pipe replacement for planning purposes was extended 80 metres  
 18 into the competent soil zone to maintain stresses within acceptable limits.

19  
 20 The additional subsurface information collected in March and April 2015 in conjunction with the  
 21 seismic analysis enabled a subsequent optimization of the extent of the pipeline that needs to  
 22 be replaced to meet the seismic demand based on technical considerations. As a result of this  
 23 new information, FEI has updated the Project description, scope and capital cost estimate.  
 24 The revised Fraser Gate IP Project scope presented in this Evidentiary Update now involves the  
 25 replacement of approximately 280 metres of NPS 30 pipeline operating at 1200 kPa.

26 **3.1 RATIONALE FOR RECONSIDERATION OF FRASER GATE IP PROJECT SCOPE**

27 The rationale for revising the scope has been based on the following third party expert studies  
 28 and reviews:

- 29  
 30 1. Estimates of the Extent of Fraser IP Pipeline Replacement Required Beyond the Zone of  
 31 Ground Displacement (D.G. Honegger Consulting). See Appendix A-4 Addendum.

32 This technical memorandum, dated April 1, 2015, summarizes the analysis to define the  
 33 extent of Fraser Gate IP replacement required outside of the zone of lateral spread  
 34 ground displacement to assure that the existing pipeline is not overstressed from axial  
 35 loads developed as a result of the ground displacement.  
 36

1           The analysis recommended that the length of necessary pipeline replacement, for  
 2           planning purposes, should be taken as 80 m from the boundary of lateral spread ground  
 3           displacement.

4  
 5           As this analysis was completed independently from and prior to the determination of the  
 6           boundary of lateral spread ground displacement, Figure 2 of Appendix A-4 Addendum  
 7           illustrates the extent of pipe replacement relative to a hypothetical boundary rather than  
 8           the actual boundary.

9  
 10          2. Depth to Non-Liquefiable Hard Ground along Fraser Gate IP Pipeline, Vancouver, BC  
 11          (Golder Associates Ltd.). See Appendix A-30.

12           This report, dated April 16, 2015, outlines the process and result of additional subsurface  
 13           investigations completed in late March and early April 2015. The eastern boundary of  
 14           “good ground conditions” is indicated at test hole location AH/DCPT15-14 in Figure 1  
 15           “Testhole Location Plan”, Project No. 07-1411-0027, Phase 5039, Rev.A.

16  
 17           Therefore, applying this result in combination with the above D.G. Honegger Consulting  
 18           memorandum, the tie-in point for the replacement pipe has been taken as 80 metres  
 19           west of that boundary.

20          **3.2    REVISED PROJECT SCOPE**

21           As the boundary of lateral spread ground displacement was determined at a point greater than  
 22           80 metres east of the location of Test Hole AH95-2, it was deemed feasible to optimize the  
 23           scope compared to what was originally applied for in the Application. The new proposed scope  
 24           of the Fraser Gate IP Project involves the replacement of approximately 280 metres of NPS 30  
 25           pipeline operating at 1200 kPa and extending from Fraser Gate station at the 2700 block of East  
 26           Kent Avenue to a point 30 metres east of where the existing NPS 30 pipeline turns north to  
 27           cross beneath the CP Rail line. This pipeline will replace the section of the existing NPS 30  
 28           pipeline which does not meet FEI’s seismic criteria for resistance to a 1:2475 year event.

29          **3.2.1   New Proposed Pipeline Route**

30           Section 4.3.4 of the Application initially considered three route options based on the original  
 31           Project scope which are illustrated in figure 4-3 of the Application. Section 4.3.4.6 of the  
 32           Application selected Route Option 1 as the original preferred route option.

33  
 34           Since the length of pipe that now requires replacement has been reduced, it has eliminated the  
 35           need to install new pipeline under the CP Rail line which would have required trenchless  
 36           construction.

1 Route Option 1, as originally considered, has been reduced to approximately 280 metres as  
 2 shown in Figure 3-1 as the new proposed Project scope has significantly reduced the  
 3 replacement pipeline length. Route Option 2 and Route Option 3, due to their configuration,  
 4 cannot be reduced in length accordingly. They would incur significant additional impacts and  
 5 costs, due to their additional length and construction effort, when compared to the reduced  
 6 Route Option 1. Therefore, they are no longer practical route options. As a result, the margin  
 7 between the relative impact scoring would increase significantly compared to that presented in  
 8 section 4.3.4.7 of the Application and as a consequence confirms Route Option 1 as the  
 9 preferred route.

10 **Figure 3-1: New Proposed Fraser Gate IP Pipeline Replacement Scope**



11  
12

13 **3.3 PIPELINE ROW**

14 Section 4.3.3.6 of the Application presented the Fraser Gate IP pipeline ROW requirements  
 15 pertaining to the original Fraser Gate IP Project scope. Further to the new proposed Project  
 16 scope the reduced pipeline route length will not fall within Gladstone Park or neighboring  
 17 properties. The replacement pipeline will be located within existing road allowance; therefore,  
 18 new land or access rights will not be required.

19 **3.4 PROJECT SCHEDULE**

20 As a result of the Company conducting further test hole studies to determine where soil  
 21 conditions change and as indicated in response to CEC IR 1.46.1, the Company no longer  
 22 anticipates Commission approval by August 31, 2015. The project schedule assumes that the

1 Fraser Gate IP Project planning is coordinated with the Coquitlam Gate IP Project planning and  
2 is provided in Appendix A-20-2.

### 3 **3.5 RISK ANALYSIS AND MANAGEMENT**

4 Exhibit B-1, section 4.3.9 presents details regarding the risk assessment prepared for the  
5 Project to determine the technical and non-technical risks associated with the Fraser Gate IP  
6 pipeline. The risk assessment established a risk management framework which will be updated  
7 throughout the project lifecycle. The risk assessment has been reviewed and determined to  
8 adequately reflect the risks associated with the new proposed route alignment.

### 9 **3.6 PROJECT COST ESTIMATE**

10 The Company prepared a revised Project cost estimate based on AACE Class 3 specifications,  
11 in accordance with the CPCN Guidelines. This section discusses:

12

- 13 • The Project cost estimate details; and
- 14 • The financial impacts.

15

#### 16 **3.6.1 Cost Estimate Details**

17 The total capital cost of the Fraser Gate IP Project, filed confidentially in Appendix E-3-2 is  
18 forecast to be \$8.990 million in as spent dollars (including AFUDC of \$0.419 million)<sup>10</sup>.

##### 19 **3.6.1.1 Basis of Estimate**

20 The following cost estimate supporting documents have been revised and are provided in  
21 Appendices A-23 and A-24:

- 22 • Basis of Estimate; and
- 23 • Pipeline Basis of Estimate.

24

25 The Project Class 3 capital cost estimate has been revised to reflect the reduced scope of the  
26 Fraser Gate IP pipeline replacement project. The changes to the main cost elements are  
27 described in the following sections.

1    **3.6.1.1.1    OWNER’S COSTS**

2    FEI owner’s costs have decreased due to the reduced Project scope which has resulted in  
3    reduced costs for environmental compliance and inspection during construction.

4    **3.6.1.1.2    MATERIALS**

5    The material costs for the Fraser Gate IP Project have decreased significantly due to the  
6    reduction in the length of the Project.

7    **3.6.1.1.3    CONSTRUCTION**

8    The construction costs have also decreased, mainly due to the decrease in Project length, and  
9    the elimination of the proposed trenchless crossing of the CP Rail line.

10   **3.6.1.1.4    PROJECT CONTINGENCY AND MONTE CARLO ANALYSIS**

11   Section 4.4.1.4.3 of the Application presents the Project contingency and quantitative risk  
12   analysis using the Monte Carlo method (@Risk software) applied to the AACE Class 3 base  
13   cost estimate prepared for the original proposed route alignment. The new proposed Project  
14   scope cost estimate would involve a similar risk profile; therefore, the same contingency is also  
15   applied to the updated Class 3 cost estimate.

16   **3.7    *FINANCIAL CONSIDERATIONS***

17   The preferred route option that was previously selected based on technical and capital cost  
18   considerations is Route Option 1. The scope of Route Option 1 has been reduced to 280  
19   metres, and the financial evaluation of the reduced scope route has been completed.

20  
21   The financial evaluation of the preferred alternative consists of the following components, and  
22   its impact on the levelized rates and incremental cost of service:

- 23       1. Capital costs, estimated by an independent engineering firm; and  
24       2. Present value of operating costs.

25  
26   FEI evaluated the incremental cost of service, cash flow and rate impacts associated with the  
27   reduced scope of Alternative 2 – Route Option 1 over a 60 year period. The 60 year time  
28   horizon was chosen to be consistent with the assumed useful life of the assets. The  
29   incremental cost of service estimates are based on FEI’s currently approved capital structure,  
30   cost of capital and tax treatment.

31   The following table provides a summary of the financial evaluation conducted.



1

**Table 3-1: Updated Fraser Gate IP Project Financial Analysis**

	Reduced Scope Alternative 2 – Route Option 1 – East Kent Ave South
Estimate Accuracy	Class 3
Total Direct Capital Cost excl. AFUDC (2014 \$millions)	7.378
Total Direct Capital Cost excl. AFUDC (As-spent (\$millions))	8.572
AFUDC (as spent (\$millions))	0.419
Total As-spent (\$millions)	8.990
Annual Gross O&M (2014 \$millions)	0.001
Levelized Rate Impact \$ / GJ – 60 Yr.	0.004
PV Incremental Cost of Service – 60 Yr. (\$millions)	10.764

2 **3.8 FRASER GATE IP SUMMARY**

3 It was determined subsequent to FEI's Application that earthquake-induced hazards do not pose  
 4 a threat to the pipeline from the location of Test Hole AH95-2 onward to the west and north. As  
 5 a result, further test holes were conducted to determine where the soil conditions change from  
 6 the conditions at Fraser Gate station to those at Section B-B'.

7  
 8 The additional subsurface information collected in March and April 2015 enabled a subsequent  
 9 optimization of the extent of the pipeline that needs to be replaced to meet the seismic demand  
 10 based on technical considerations.

11  
 12 The revised scope of the Fraser Gate IP Project involves the replacement of approximately 280  
 13 metres of NPS 30 pipeline extending west from Fraser Gate station. The reduction of the Project  
 14 scope has not resulted in changes to the non-financial evaluation of the route options, and the  
 15 financial evaluation has resulted in a revised Project Estimate of \$8.572 million (As-spent  
 16 excluding AFUDC).

17  
 18 The Fraser Gate IP Project will replace the section of pipeline that is vulnerable to a 1:2475 year  
 19 seismic induced earth movement event. It will reduce the probability of pipeline failure which, in  
 20 turn, will reduce the safety risk, the loss of gas supply risk and economic risk to approximately  
 21 171,000 customers. The preferred alternative will satisfy all the objectives and requirements  
 22 outlined in section 4.2.1 of the Application.

23

1 **4. PROJECT COSTS AND ACCOUNTING TREATMENT**

2 **4.1 SUMMARY OF CAPITAL COSTS, INCREMENTAL COST OF SERVICE AND**  
 3 **AVERAGE LEVELIZED COST**

4 Details of the updated Coquitlam Gate IP Project capital costs can be found in Confidential  
 5 Appendix E-1-1, Schedule 6, and in Confidential Appendix E-3-1. Updated Fraser Gate IP  
 6 Project costs can be found in Confidential Appendix E-1-2, Schedule 6, and in Confidential  
 7 Appendix E-3-2.

8 Based on the Projects' costs, Table 4-1 below presents an updated summary of the total  
 9 forecast project costs and Table 4-2 presents the updated financial impacts associated with the  
 10 completion of each of the two IP pipeline Projects as well as a summary of the combined rate  
 11 impacts. Both tables are based on detailed schedules for each pipeline segment as included in  
 12 Confidential Appendices E-1-1 and E-1-2. The impact to customer rates in 2019 (when the  
 13 asset enters rate base) is approximately \$0.124 per GJ and levelized over the 60 year analysis  
 14 period is approximately \$0.104 per GJ. For a typical FEI residential customer consuming an  
 15 average 95 GJ per year, in 2019, this would equate to approximately \$11.80 per year. The  
 16 annual impact to customers from the Coquitlam Gate IP Project in 2019 would be approximately  
 17 \$11.40 per year and from the Fraser Gate IP Project would be approximately \$0.40 per year.

18 **Table 4-1: Updated Summary of Forecast Capital and Deferred Costs (\$millions)**

Particular	2014\$	As- Spent	AFUDC	Tax Offset	Total
Coquitlam Gate IP Project	195.517	226.306	12.235		<b>238.541</b>
Fraser Gate IP Project	7.378	8.572	0.419		<b>8.990</b>
Total Addition to Plant	202.895	234.878	12.654		<b>247.531</b>
Abandonment/Demolition Costs <sup>11</sup>	3.536	4.169	0.115		<b>4.284</b>
Total Projects Capital Cost	206.431	239.047	12.769		<b>251.815</b>
LMIPSU Development Cost	2.920	2.929	0.215	(0.762)	<b>2.382</b>
LMIPSU Application Cost	1.307	1.307	0.080	(0.340)	<b>1.047</b>
<b>Total</b>	<b>210.658</b>	<b>243.283</b>	<b>13.064</b>	<b>(1.102)</b>	<b>255.244</b>

19

<sup>11</sup> Abandonment and demolition costs will be charged to the Negative Salvage Deferral Account in accordance with BCUC Order G-44-12.

1 **Table 4-2: Updated Summary of Capital Costs, Revenue Requirements and Rate Impacts of the**  
 2 **Projects Reinforcements**

AACE Class 3	Coquitlam Gate IP	Fraser Gate IP	Combined <sup>12</sup>
Total Charged to GPIS (\$millions)	238.541	8.990	247.531
Abandonment / Demolition Costs (\$millions) <sup>13</sup>	4.284		4.284
Total Capital Costs including Abandonment / Demolition (\$millions)	242.825	8.990	251.815
2019 Rate Impact (\$ / GJ)	0.120	0.004	0.124
Levelized Rate Impact 60 Years (\$ / GJ)	0.100	0.004	0.104
Levelized Incremental Revenue Requirement (\$millions) <sup>14</sup>	18.783	0.751	19.534
Incremental Revenue Requirement PV 60 Years (\$millions)	297.183	10.764	307.947
Net Cash Flow NPV 60 Years (\$millions)	2.443	0.115	2.558
2019 Incremental Rate Base (\$millions)	239.128	8.874	248.002

3

4 **4.1.1 Negative Salvage**

5 The abandonment / demolition costs are forecast to be \$3.536 million (2014 dollars) or in as-

6 spent dollars to be \$4.284 million (including a WACC return totalling \$0.115 million). These

7 costs are identified in Confidential Appendix E-3-1.

8 Charges for abandonment and demolition costs as well as the negative salvage provision are

9 shown in Confidential Appendix E-1-1 Schedule 9 for the Coquitlam Gate IP Project and in

10 Confidential Appendix E-1-2, Schedule 9 for the Fraser Gate IP Project (there are no

11 abandonment or demolition costs for the Fraser Gate IP Project).

12 **4.1.2 LMIPSU Development Costs**

13 The pre-tax development costs are forecast to be \$2.920 million (2014 dollars) or in as-spent

14 dollars to be \$3.144 million (including a WACC return totalling of \$0.215 million). Of this amount,

15 93 percent is attributable to the Coquitlam Gate IP Project and 7 percent is attributable to the

<sup>12</sup> Numbers in rows may not add exactly due to rounding.

<sup>13</sup> Abandonment and demolition costs will be charged to the Negative Salvage Deferral Account in accordance with BCUC Order G-44-12.

<sup>14</sup> Levelized Rate Impact for 60 Years x 187,832 TJ / 1,000; The volume of 187,832 TJ is from FEI's compliance filing for Common Rates, dated October 31, 2014, Appendix A, Schedule 5, Column 2, Row 28 (Total Non-Bypass Sales and Transportation Service Volumes).

1 Fraser Gate IP Project.<sup>15</sup> The Development costs allocated by project are detailed in the  
 2 following table:

3 **Table 4-3: Updated Forecast Deferred Development Costs (\$millions)**

Projects	Allocation	As-Spent	WACC return	Total Before Tax Offset	Tax Offset	Total	Annual Amortization
Coquitlam Gate IP Project	93%	2.719	0.202	2.921	(0.707)	2.214	0.738
Fraser Gate IP Project	7%	0.210	0.013	0.223	(0.055)	0.168	0.056
<b>Total</b>	<b>100%</b>	<b>2.929</b>	<b>0.215</b>	<b>3.144</b>	<b>(0.762)</b>	<b>2.382</b>	<b>0.794</b>

4  
 5 As shown in Table 4-3 above, the December 31, 2015 net-of-tax balance in the LMIPSU  
 6 Development Costs deferral account is forecast to be \$2.382 million; this is an approximate  
 7 \$0.375 million increase from what was filed in the Application. The reason for the increase was  
 8 for the additional cost related to examine the Lougheed Highway route alignment (approximately  
 9 \$400 thousand before tax offset) and the change in scope for the Fraser Gate IP Project  
 10 described in Section 3 (approximately \$85 thousand before tax offset).

11

---

<sup>15</sup> Initial allocation was based on the relative length of IP pipeline segments replaced (95% & 5%) but with incremental development costs associated with the Lougheed Highway alignment and change in scope for the Fraser Gate IP Project the relative proportions have changed from 95% to 93% for the Coquitlam Gate IP Project and from 5% to 7% for the Fraser Gate IP Project.

1 **5. ENVIRONMENTAL, ARCHEOLOGICAL AND SOCIO-ECONOMIC**  
 2 **ASSESSMENTS**

3 FEI retained Dillon Consulting (Dillon)<sup>16</sup> to conduct a preliminary environmental assessment of  
 4 two route options; Lougheed Highway Route Option A and Option B. The assessment is based  
 5 on both a desktop review of available information and initial field investigations. The  
 6 assessment was undertaken to identify and describe the potential impacts to the biophysical  
 7 environment from the Lougheed Highway Route Option A and Option B and to provide a basis  
 8 for the completion of detailed assessments and preparation of environmental management  
 9 plans to be completed once Commission approval of this Application is received and prior to  
 10 construction commencement.

11  
 12 Based on this preliminary assessment, the environmental risk of the Lougheed Highway Route  
 13 Option A and Option B is low and any potential environmental impacts from the Lougheed  
 14 Highway Route Option A and Option B can be mitigated through standard environmental  
 15 protection and mitigation measures.

16 **5.1.1 Preliminary Environmental Assessment**

17 The results of the work undertaken by Dillon are outlined in the FEI – Lower Mainland Natural  
 18 Gas System Upgrades: Lougheed Highway Route Assessment report (Environmental Overview  
 19 Assessment or EOA), a copy of which is attached as Appendix B-1 Addendum. The  
 20 assessment included the following areas:

- 21
- 22 • Current Land Use;
  - 23 • Soils and Surficial Geology;
  - 24 • Contaminated Sites;
  - 25 • Natural Environment; and
  - 26 • Species at Risk.

27  
 28 The EOA identified natural features that could potentially be impacted by the Lougheed  
 29 Highway Route Option A and Option B construction as well as areas of potential contamination  
 30 that could impact the Lougheed Highway Route Option A and Option B construction, costs and  
 31 timelines. These potential impacts are summarized below.

32  
 33 The EOA identifies significant natural features such as fish, wildlife, and terrestrial habitat along  
 34 Lougheed Highway Route Option A and Option B that could be impacted during construction.

---

<sup>16</sup> Dillon is a multi-discipline consulting firm that has provided planning, engineering, environmental sciences and management services to the private and public services since 1946.

1 The EOA also identifies ways to minimize the impacts through implementation of standard best  
2 management practices. These natural features can be summarized into the following  
3 categories:

- 4
- 5 • Watercourses crossed by or in close proximity to the pipeline alignments;
  - 6 ○ Option A – 11; and
  - 7 ○ Option B – 12;
  - 8 ○ Note that because the eastern portions of Option A and B are the same, 11 of the
  - 9 watercourses are found on both options;
- 10 • Parks, conservation areas and cemeteries crossed by or in close proximity to the
- 11 pipeline alignments;
  - 12 ○ Option A –3; and
  - 13 ○ Option B –1;
  - 14 ○ Note that because the eastern portions of Option A and B are the same, one park
  - 15 is found on both options;
- 16 • Species at risk potentially found on or in close proximity to the pipeline alignments;
  - 17 ○ There are 7 species that have the potential to be found on both Option A and B.

18

19 Table 15 of the Environmental Overview Assessment (Appendix B-1 Addendum, pages 56-57)  
20 identifies proposed best management practices to minimize impacts to the significant natural  
21 features.

22

23 In addition, the EOA identified locations with a high potential of encountering soil or groundwater  
24 contamination within the Lougheed Highway Route Option A and Option B area which may  
25 impact the construction, costs and timelines. These areas of high potential are called Areas of  
26 Potential Environmental Concern (APECs). The EOA recommended that low risk APECs be  
27 managed during construction but medium-high risk APECs should have further assessment  
28 through the use of subsurface soil and water investigation prior to construction. The APECs  
29 found within each pipeline segment are as follows:

- 30
- 31 • Option A – 9 low risk APEC and 8 medium to high risk APEC; and
- 32 • Option B – 11 low risk APECs and 11 medium to high risk APECs.
- 33 • Note that because the eastern portions of Option A and B are the same, 9 low risk
- 34 APECs and 7 medium to high risk APECs are found on both options.

35

36 FEI will be undertaking further assessment of medium to high risk APECs during the detailed  
37 engineering phase of the Project to minimize the risk of these APECs on the Project costs and

1 timelines. On page 58, the Environmental Overview Assessment (Appendix B-1 Addendum)  
 2 summarizes that within the Lougheed Route Option A and Option B:

- 3
- 4 • There is a high potential for encountering soil or groundwater contamination;
- 5 • Given the proposed construction methodology, there is no requirement for regulatory
- 6 permitting but if the installation methods change to require instream work there will be a
- 7 requirement for Water Act and potentially Fisheries Act permitting or review;
- 8 • The construction activities in natural areas should take place during the window of least
- 9 risk (i.e. fisheries window or bird nesting window) to minimize any potential impact; and
- 10 • The potential environmental impacts associated with construction can be avoided or
- 11 mitigated by following applicable provincial and federal guidelines and through the
- 12 application of standard best management practices and mitigation measures.

13  
 14 Table 15 (pages 56 to 57) in the EOA report (Appendix B-1 Addendum) outlines the relevant  
 15 best management practices and mitigation measures to minimize and avoid potential effects of  
 16 construction on the natural environmental features within the pipeline route. Examples of best  
 17 management practices and mitigation measures are:

- 18
- 19 • Ground and surface water management;
- 20 • Minimizing vegetation removal;
- 21 • Erosion and sediment controls;
- 22 • Adherence to fish and bird timing windows;
- 23 • Soil handling procedures; and
- 24 • Spill response procedures.

25  
 26 FEI will follow the best management practices and mitigation measures during construction.

27  
 28 Based on the preliminary environmental assessment work completed by Dillon and the  
 29 proposed construction methodology, the Lougheed Highway Route Option A and Option B will  
 30 not likely require provincial or federal permitting/authorization. Upon Commission approval and  
 31 during the detailed engineering phase, FEI will undertake a detailed environmental assessment  
 32 to confirm permitting requirements and apply for the required permits for the Coquitlam Gate IP  
 33 Project.

### 34 **5.1.2 Further Plans**

35 Environmental constraints and potential environmental impacts related to the Lougheed Re-  
 36 route will be further documented during the Detailed Environmental Assessment, which will

1 include vegetation, fish and wildlife and their habitat, and surface/ground water resources. A  
 2 major component of the Detailed Environmental Assessment will be further assessments  
 3 through the use of subsurface soil and water investigation of the medium to high risk APEC  
 4 sites.

5  
 6 Site specific mitigation strategies will be developed to offset any potential negative impacts  
 7 associated with the Lougheed Highway Route Option A and Option B or from the environment  
 8 on the Lougheed Highway Route Option A and Option B. All required environmental permits  
 9 and approvals for the Lougheed Highway Route Option A and Option B will be identified and  
 10 applied for during the detailed engineering phase of the Coquitlam Gate IP Project.

11  
 12 Detailed environmental specifications will be prepared as part of the Project tendering process  
 13 to ensure that contractors are aware of the Coquitlam Gate IP Project's environmental  
 14 requirements in addition to FEI's internal environmental standards. An Environmental  
 15 Management Plan specific to the Project will be developed by successful contractors prior to  
 16 commencement of the Project. Environmental monitoring will be undertaken during all sensitive  
 17 aspects of the work program and the designated environmental monitor will have "stop work  
 18 authority" in the event that works underway have the potential to impact the natural  
 19 environment.

20 **5.2 ARCHAEOLOGY**

21 An Archaeological Overview Assessment (AOA) (Appendix B-2 Addendum, Archaeological  
 22 Overview Assessment) of two route options; Lougheed Highway Route Option A and Option B  
 23 was undertaken by Stantec Consulting Ltd. (Stantec)<sup>17</sup> to assess the potential for archaeological  
 24 and/or cultural heritage resources within the Lougheed Highway Route Option A and Option B  
 25 area and to determine the requirements for archaeological monitoring during construction or an  
 26 Archaeological Impact Assessment (AIA) prior to ground disturbing activities.

27  
 28 The AOA is based on a desktop review of available information. The AOA concluded that the  
 29 majority of the Lougheed Highway Route Option A and Option B is considered to have low  
 30 archaeological potential due to the amount of previous disturbance by development activities.  
 31 The areas surrounding streams were determined to have high archaeological potential and  
 32 therefore were recommended for archaeological monitoring during construction.

33 **5.2.1 Archaeological Overview Assessment**

34 As noted above, the results of the work undertaken by Stantec are outlined in the AOA.  
 35

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<sup>17</sup> Stantec is a multi-discipline consulting firm that has provided a variety of professional services including archaeological, planning, engineering, and environmental services since 1954.



1 The report (page ii-iii) indicates that for the Lougheed Highway Route Option A and Option B:

2

- 3 • There are no recorded archaeological sites within 1 kilometre;
- 4 • Most of the area was evaluated as having low archaeological potential and therefore not
- 5 requiring any further archaeological assessment; and
- 6 • Three creek crossings (Beecher Creek, Crab-apple Creek and Pollywog Creek) have
- 7 high archaeological potential, and therefore require archaeological monitoring during
- 8 construction.

9

10 Based on the preliminary AOA, a permit will be required under the Heritage Conservation Act in  
 11 order to undertake archaeological monitoring of the above mentioned creek crossings.

12 **5.2.2 Further Plans**

13 All archaeological permits will be obtained during the detailed engineering phase of the  
 14 Coquitlam Gate IP Project. An archaeological monitoring program will be developed to ensure  
 15 monitoring of construction activities at the Beecher Creek, Crab-apple Creek and Pollywog  
 16 Creek crossings.

17

18 Detailed archaeological specifications will be prepared as part of the Project tendering process  
 19 to ensure that contractors are aware of the Project’s archaeological requirements. As described  
 20 above, a Coquitlam Gate IP Project specific Environmental Management Plan, including  
 21 protection of archaeological and cultural resources, will be developed by the successful  
 22 contractors prior to commencement of the Project. Archaeological monitoring will be  
 23 undertaken during all sensitive aspects of the work program (i.e. around the three creek  
 24 crossings) and the designated archaeological monitor will have “stop work authority” in the  
 25 event that works underway have the potential to impact archaeological or cultural resources.

26 **5.3 SOCIO-ECONOMIC ASSESSMENT**

27 Section 6.3 and Appendix B-3 of the Application presents details regarding the social-economic  
 28 impact prepared for the Projects.

29

30 The Socio-Economic Overview Assessment (Appendix B-3 of the Application) indicates the  
 31 Projects have the potential to result in a net positive impact to residents and businesses through  
 32 the creation of additional employment and economic spinoffs for local business owners.  
 33 Improving the long-term natural gas supply to the area also has positive economic benefits.  
 34 Any short-term disruption effects of the Projects are expected to be temporary and generally  
 35 minor should the recommended mitigation measures be implemented. No long term negative  
 36 effects are expected to result.

1 As part of the Evidentiary Update, the Socio-Economic Overview Assessment has been  
 2 reviewed and updated to reflect the socio-economic impacts associated with the revised cost of  
 3 the new proposed route alignment. The potential economic benefits have been updated in  
 4 Table 5.1 below to reflect the change in Project cost.

5  
 6 **Table 5-1: Revised Potential Economic Benefits – Coquitlam Gate IP (\$millions – 2014 dollars)**

Cost	Lower Mainland	All BC (except Lower Mainland)	Canada (except BC)	Outside Canada	Sub-Total
Materials		1.682		31.949	33.631
Construction	104.170		44.644		148.815
Owner	16.607				16.607
<b>Totals</b>	120.777	1.682	44.644	31.949	199.053

7  
 8 **Table 5-2: Revised Potential Economic Benefits – Fraser Gate IP (\$millions – 2014 dollars)**

Cost	Lower Mainland	All BC (except Lower Mainland)	Canada (except BC)	Outside Canada	Sub-Total
Materials		0.037		0.700	0.736
Construction	3.685		1.579		5.265
Owner	1.377				1.377
<b>Totals</b>	5.062	0.037	1.579	0.700	7.378

## 1 6. PUBLIC CONSULTATION

### 2 6.1 *SUMMARY OF CONSULTATIVE ACTIVITIES AND INPUT RECEIVED AND* 3 *ADDRESSED*

4 The Projects are designed to deliver continued safe and reliable supply of natural gas to FEI  
5 customers in the Lower Mainland. Residents, businesses, commuters, transit operators, and  
6 companies that move goods stand to be disrupted by any construction in road rights of way or  
7 neighborhoods.

8  
9 Public consultation and communication are integral components of FEI's project development  
10 process. As a result of its consultation process FEI was encouraged to consider realigning the  
11 route for the Coquitlam IP Project along Lougheed Highway between Bainbridge and Boundary  
12 Roads.

13  
14 When it was determined that there was a feasible alternative to the proposed alignment for  
15 Sections 5 and 6 of the route corridor along Lougheed Highway, additional public consultation  
16 was planned.

17  
18 FEI made a presentation to Burnaby City Council and had several discussions with City staff in  
19 late 2014 and early 2015. FEI began planning a public information meeting and identified  
20 approximately 14,000 residents within a 500 metre corridor of the proposed Lougheed Highway  
21 Alignment Options A and B reroutes who would be invited. FEI visited businesses along the  
22 proposed realignment to inform them about the Project, discuss plans to mitigate impacts to  
23 their daily operations and invite them to the public information meeting.

24  
25 A summary of this engagement follows.

#### 26 6.1.1 **Municipal government engagement**

27 FEI informed the City of Burnaby in late 2014 that it would re-evaluate the potential alignment  
28 for a portion of the route with input from BC Hydro, TransLink and the municipality, and that the  
29 analysis would be filed with the Commission and form part of the evidence for Commission  
30 review.

31  
32 A summary of discussions and contact with the City of Burnaby is listed below in Table 6-1.  
33 Engagement activities undertaken prior to the CPCN filing are also included in the following  
34 table to provide context:

1

**Table 6-1: Summary of Municipal Government Consultation**

Municipality	Summary of discussion, issues raised	Next steps/follow up
<p><b>Burnaby</b></p>	<p>Met with Leif Bjorseth, Assistant Director Engineering and Development Services on January 27, 2014; Planning and Building staff on February 4, 2014; the Director of Engineering and Deputy City Manager on May 1, 2014; Mr. Bjorseth again on May 6, 2014; and Mayor Derek Corrigan on May 20, 2014. To review details of pipeline routing and general engineering issues.</p>	<p>Reviewed details of pipeline routing and general engineering issues.</p>
	<p>City staff requested FEI import trench material and install the pipe at least two metres below surface, and encouraged FEI to pursue a bike path legacy. In response, FEI confirmed it would import engineered trench backfill material and that the pipe will be installed according to minimum pipeline depth of cover specifications.</p>	<p>Opportunities for bike path legacies will be discussed as the Project moves into the completion and remediation phase.</p>
	<p>FEI invited Highlawn Drive residents to a meeting to discuss the route selection and consultation process. The group requested Mr. Bjorseth from the City attend. Mr. Bjorseth agreed to be present but only as an observer.</p>	<p>FEI met with Mr. Bjorseth on October 27, 2014 to update him on FEI's ongoing discussions with the Highlawn Drive residents at his request.</p> <p>FEI met with Highlawn Drive residents on October 29, 2014 to review route selection and the public consultation process. Mr. Bjorseth attended as an observer.</p>
	<p>At the request of the City, FEI appeared before Council and senior staff during a meeting that preceded its regular Council meeting, on November 24, 2014.</p> <p>FEI met with Engineering and Planning staff on November 27, 2014 to follow up on the meeting with Council and senior staff.</p>	<p>Route selection process and construction practices for the Burnaby west area were reviewed. Council asked FEI to update Council on the project in the near future.</p> <p>Engineering and Planning staff suggested that FEI reconsider routing the Project in Burnaby along Lougheed Highway, possibly from Bainbridge to Boundary Road, and suggested FEI should not consider traffic impacts as a major issue when assessing route feasibility.</p> <p>FEI agreed to conduct further analysis, in conjunction with the City of Burnaby and in consultation with other stakeholders such as TransLink, B.C. Hydro and MoTI, and report back to City Council before the end of January 2015.</p>

Municipality	Summary of discussion, issues raised	Next steps/follow up
	<p>FEI met with representatives of the Highlawn Residents group on December 5, 2014.</p> <p>At the request of the City, FEI appeared before Council and senior staff during a meeting that preceded its regular Council meeting, on December 8, 2014.</p>	<p>FEI updated residents with regards to direction provided by the City.</p> <p>Council members received an update from City staff and FEI on the route feasibility work that would be undertaken, with a commitment to report back before the end of January 2015.</p>
	<p>FEI met with Mr. Bjornson to provide an update the evaluation of potential gas line alignments undertaken on February 18, 2015.</p> <p>FEI presented the results of the evaluation to Burnaby Council on March 2, 2015. A motion was tabled by the Mayor, and approved by Council, that the City would provide FEI with a letter stating that the City does not support the residential gas line routing north of Brentwood, but will support a route along the Lougheed Highway. During the presentation, Mayor Corrigan informed FEI that the City had not participated in the BCUC regulatory process because it was confident FEI was studying the Lougheed Highway option.</p>	<p>FEI followed up with a letter to Leon Gous, Director of Engineering, on February 25, 2015.</p>

1 **6.1.2 Consultation with Residents, Businesses and Community Associations**

2 A direct mail ‘ad card’ (Appendix C-6 Addendum) and mailing list (Appendix C-7 Addendum)  
 3 were developed and a newspaper ad (Appendix C-7 Addendum) created to invite business and  
 4 homeowners to the April 21, 2015, public information session.

5  
 6 The cards were distributed to over 14,000 houses, apartments and businesses that were  
 7 located within approximately 500 metres north and south of the proposed Lougheed Highway  
 8 Route Option A and Option B. After considering the feedback received from residents who were  
 9 invited to the 2014 sessions (many of whom reported discarding the letters mailed to them  
 10 unopened) FEI chose to mail a meeting information card that was not enclosed in an envelope.

11  
 12 Story boards (Appendix C-4 Addendum), key messages and a fact sheet in English, Chinese  
 13 and Korean were updated to reflect new route information, and advertisements about the April  
 14 21, 2015, public information session were placed in the Burnaby NOW and Burnaby / New West  
 15 News Leader newspapers on April 8 and April 15, 2015.

16  
 17 The following is a summary of the public information session and its outcome:  
 18

1

**Table 6-2: Summary of Public Information Session**

Date	Community	Response
April 21, 2015	Burnaby Executive Suites Hotel 4201 Lougheed Highway Burnaby	20 local residents attended the public information session and had a variety of general interest questions dealing with construction methods and speed of construction, communication of traffic management, routing, regulatory process and safety. Several guests were from the Highlawn Drive neighbourhood, who were pleased to see the new preferred route along the Lougheed Highway.

2

3 FEI has also maintained communication with the residents of Highlawn Drive in Burnaby who  
4 had expressed concerns about the proposed pipeline route between Springer and Willingdon,  
5 keeping them up to date with regards to regulatory proceedings and discussions with the City of  
6 Burnaby. They were invited to the public information session in an email dated April 9, 2015  
7 (see Appendix C-10-3).

8

9 FEI has completed an inventory of businesses along the proposed Lougheed Highway route  
10 that could be impacted by construction, and invited them to the public information session on  
11 April 21, 2015 in an email dated April 13, 2015 (see Appendix C-10-5).

12

13 As noted in the Application, FEI has engaged with a number of business groups and community  
14 associations. These groups and associations were also invited to the public information session  
15 in an email dated April 9, 2015 (see Appendix C-10-4).

16

17 Since the CPCN filing, one additional group has sought information about the proposed  
18 Lougheed Highway route. The following is a summary of that consultation:

19

20

**Table 6-3: Summary of Business Groups & Community Associations Consultation**

Group	Summary of discussion, issues raised	Next step/follow up
<b>Burnaby Merchants Association</b>	Executive Director Isabel Kosic opined that any increase in traffic along Hastings Street, as a result of realigning the pipeline along Lougheed Highway, could be looked upon favourably by members. Ms. Kosic noted that businesses on Hastings Street find the route is treated as a secondary highway because of the HOV lanes. More traffic could potentially slow down the pace of vehicular traffic, an outcome that the merchants would look upon favourably.	This group was invited to attend the public information session on April 21, 2015.

21

1 **6.2 CONCLUSION**

2 FEI believes that the public consultation activities undertaken as a result of the new proposed  
3 route alignment have been sufficient and appropriate. FEI will continue to consult with  
4 stakeholders regarding route issues, the schedule for the Projects, plans to mitigate traffic  
5 disruption, and public safety. Another series of public information sessions is planned prior to  
6 start of construction, with the goal of informing residents and the public about construction  
7 activities, traffic issues and mitigation strategies.

8  
9 As stated in the Application, a comprehensive Communications Plan will be developed prior to  
10 the start of construction and will detail the methods FEI will utilize to keep customers, residents,  
11 land owners, business owners and other interested parties informed about access and  
12 mitigation measures, services and goods required, project timelines and opportunities to  
13 communicate with FEI. Communication and Consultation methods include:

- 14
- 15 • Emails to stakeholders who have signed up (web portal will be established as the  
16 Projects proceed);
  - 17 • Updated information on FEI’s website;
  - 18 • Letter drop offs;
  - 19 • Articles and stories in the media – both proactive and reactive;
  - 20 • Meetings on request; and
  - 21 • Presentations on request.

22  
23 FEI is committed to continuing consultation with stakeholders and will continue to work with  
24 known stakeholders and affected parties to ensure that they are informed and engaged as the  
25 Projects progress.

26

1 **7. FIRST NATIONS CONSULTATION**

2 **7.1 *ENGAGEMENT ACTIVITIES***

3 On April 22, 2015, the Company provided an update to First Nations that had previously  
4 expressed interest in the Projects (Tsleil-Waututh Nation, Kwikwetlem First Nation and  
5 Squamish Nation) of the proposed changes to the preferred Coquitlam Gate IP Project route  
6 alignment along Lougheed Highway. FEI emailed a brief description of the change to the route,  
7 as well a high-level map with a corresponding fact-sheet to the three First Nations. The  
8 Company also informed these First Nations that the preferred route alignment would be part of  
9 an Evidentiary Update to be submitted to the Commission in the coming weeks. Please refer to  
10 Appendices D-1 Addendum, D-4-7, D-5-4, and D-6-1) for the log and correspondence. At the  
11 time of filing, FEI has received no feedback from these First Nations regarding the changes.  
12



1 **8. CONCLUSION**

2 **8.1 COQUITLAM GATE IP PROJECT LOUGHEED HIGHWAY ALIGNMENT**

3 As a result of the re-evaluation of the Lougheed Highway route options, FEI has determined that  
 4 route options along the Lougheed Highway for Section 5 and Section 6 of the route corridor are  
 5 feasible and has updated its proposed route to include route options on Lougheed Highway for  
 6 Section 5 and Section 6 as the new preferred route options. The capital cost estimate and  
 7 financial analysis have been updated accordingly and a comparison to the Errata filed April 24,  
 8 2015, Exhibit B-1-4) is provided below in Table 8-1.

9  
 10 **Table 8-1: Coquitlam Gate IP Project Financial Comparison**

	Alternative 6 Install NPS 30 pipeline at 2070 kPa Original Route (Errata)	Alternative 6 Install NPS 30 pipeline at 2070 kPa Lougheed Route
AACE Estimate Accuracy	<b>Class 3</b>	<b>Class 3</b>
Total Direct Capital Cost excl. AFUDC & includes Abandonment / Demolition (2014 \$millions)	200.080	199.053
Total Direct Capital Cost excl. AFUDC (As-spent \$millions)	231.632	230.474
AFUDC (as spent \$millions)	12.444	12.351
Total As-spent includes Abandonment / Demolition & AFUDC (\$millions)	244.076	242.825
Annual incremental gross O&M (2014 \$millions)	0.055	0.055
Levelized Rate Impact – 60 Yr. (\$ / GJ)	0.100	0.100
PV Incremental Cost of Service – 60 Yr. (\$millions)	298.714	297.183

11

12 **8.2 FRASER GATE IP PROJECT SCOPE**

13 As a result of its review of seismic susceptibility at Test Hole AH95-2 with experts subsequent to  
 14 the Application, FEI has determined that earthquake-induced hazards do not pose a threat to  
 15 the pipeline from the location of Test Hole AH95-2 onward to the west and north. Additional test  
 16 holes were conducted to determine where the soil conditions change from the conditions at  
 17 Fraser Gate station to those at Section B-B', together with the additional subsurface information  
 18 collected in March and April 2015 has enabled FEI to optimize the extent of the pipeline that  
 19 needs to be replaced to meet the seismic demand based on technical considerations. This  
 20 new information has allowed FEI to revise the length of pipe to be replaced from approximately

1 500 meters to approximately 280 meters. The Fraser Gate IP Project capital cost estimate and  
 2 financial analysis has been updated accordingly and is presented in table 8-2 below.

3  
 4

**Table 8-2: Fraser Gate IP Project Financial Comparison**

	Original Scope Alternative 2 – Route Option 1 – East Kent Ave South	Reduced Scope Alternative 2 – Route Option 1 – East Kent Ave South
<b>Estimate Accuracy</b>	<b>Class 3</b>	<b>Class 3</b>
Total Direct Capital Cost excl. AFUDC (2014 \$millions)	14.855	7.378
Total Direct Capital Cost excl. AFUDC (As-spent (\$millions))	17.231	8.571
AFUDC (as spent (\$millions))	0.876	0.419
Total As-spent (\$millions)	18.107	8.990
Annual Gross O&M (2014 \$millions)	0.001	0.001
Levelized Rate Impact \$ / GJ – 60 Yr.	0.007	0.004
PV Incremental Cost of Service – 60 Yr. (\$millions)	21.654	10.764

5

6 **8.3 LMIPSU PROJECTS SUMMARY**

7 The above noted proposed changes in the Coquitlam Gate IP Project preferred route option for  
 8 Section 5 and Section 6 of the pipeline route corridor and the reduction in scope of the Fraser  
 9 Gate IP Project has resulted in changes to the overall cost of the LMIPSU Projects. The  
 10 proposed changes also required FEI to undertake further environmental and archaeological  
 11 assessments, review its previously completed Socio-Economic Overview Assessment  
 12 (Appendix B-3 of the Application) and conduct further First Nations and public consultations.

13

14 A summary of the total updated forecast capital costs for the Projects, and 2019 average cost of  
 15 service, is as follows:

16

- 17 • Total Capital Cost (As-spent dollars) excluding AFUDC but including abandonment and  
 18 demolition cost is \$239.047 million (including AFUDC the As spent cost is \$251.815  
 19 million), and
- 20 • 2019 Average Cost of Service Impact - \$0.124 / GJ.

1 For a typical FEI residential customer consuming 95 GJ per year in 2019, this would equate to  
2 approximately \$12 per year and reflects an approximate increase of 3.23 percent on delivery  
3 margin or an approximate increase of 1.3 percent on the burner tip.<sup>18</sup>  
4

5 As noted above, in order to ensure the overall feasibility of the proposed Lougheed Highway  
6 route options the Company has undertaken further environmental and archaeological  
7 assessments, reviewed its previously completed socio-economic assessment and conducted  
8 further First Nations and public consultations. A summary of the assessments and consultations  
9 are outlined below.  
10

11 The Company identified a number of Project stakeholders, including residents, businesses,  
12 government entities and First Nations that will be affected by the route options on Lougheed  
13 Highway. Communications and consultations with the stakeholders have taken place as  
14 outlined in section 6 (Public Consultation) of this Evidentiary Update. FEI continues to consult  
15 with stakeholders regarding routing, the Project schedule, temporary construction space, Rights  
16 of Way, and public safety. FEI is committed to continuing consultation with Project stakeholders  
17 and will continue to ensure that stakeholders are kept informed and have ways to provide  
18 feedback to the Company as the Projects progress.

19 As further explained in section 7 of this Evidentiary Update, the Company has informed First  
20 Nations about the Company's plan to construct pipelines within Lougheed Highway in Burnaby.  
21

22 Environmental and archeological assessments have been completed along the proposed  
23 Lougheed Highway routes and conclude that the impacts are expected to be minimal and can  
24 be mitigated through the implementation of standard best management practices and mitigation  
25 measures.  
26

27 The Socio-Economic Impact Assessment that was previously completed for the Application has  
28 also been reviewed and updated to reflect the socio-economic impacts associated with the new  
29 proposed route alignment.  
30

31 The Company has concluded that the Projects as proposed are the most prudent solutions to  
32 the concerns identified by FEI regarding the Coquitlam Gate IP pipeline and the Fraser Gate IP  
33 pipeline and therefore believes the Projects as proposed are in the public interest and should be  
34 approved.  
35

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<sup>18</sup> Approximate burner tip impact calculated based on a Residential customer's annual bill of \$922 as of January 1, 2015