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December 5, 2018

City of Coquitlam c/o Lawson Lundell LLP Suite 1600 Cathedral Place 925 West Georgia Street Vancouver, B.C. V6C 3L2

Attention: Mr. Ian Webb

Dear Mr. Webb:

Re: FortisBC Energy Inc. (FEI)

Project No. 1598963

Application for Use of Lands under Sections 32 and 33 of the *Utilities Commission Act* in the City of Coquitlam (the City) for the Lower Mainland Intermediate Pressure System Upgrade Projects (the Application) – Phase Two

FEI Response to the City of Coquitlam (City) Information Request (IR) No. 1

On June 28, 2018, FEI filed the Application referenced above. In accordance with Commission Order G-190-18 setting out the Regulatory Timetable for the review of the Application, FEI respectfully submits the attached response to City Phase Two IR No. 1.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary Registered Parties



1 1. **Reference:** FEI Phase 2 - Supplemental Evidence, Section 2. Paving Work for 2 the **Project**

- 3 On page 3, FEI describes that:
- 4 FEI's NPS 30 IP gas line trench construction activities will be confined to less 5 than two lanes of Como Lake Avenue. Further, during the decommissioning and 6 abandonment of the NPS 20 IP gas line, FEI will excavate a small 3 metre by 3 7 metre bell hole1 approximately every 300 metres within a third lane.
- 8 Under section 8 of the Operating Agreement, FEI is required at its cost to 9 reinstate the paving or surface on public property which it has disturbed in as 10 good a state of repair as it was prior to its disturbance and in accordance with 11 reasonable specifications, and subject to the supervision of, the Municipal 12 Engineer.
- 13 FEI is committed to repairing any damage to Como Lake Avenue resulting from the Project in accordance with the Operating Agreement, and in particular, in 14 accordance with the City's Paving Specifications... 15

16 Reference: FEI Phase 2 - Supplemental Evidence, Section 2.1 Baseline Survey of 17 Existing Road Condition

- 18 On page 4, FEI describes that:
- 19 To summarize, the WSP Report confirms many existing pavement distresses 20 especially in the curb or outside lanes of Como Lake Avenue and Spuraway 21 Avenue, and that several sections of these roadways will likely need a full width 22 rehabilitation treatment or extensive repairs within the next five to ten years.
- 23 Reference: FEI Phase 2 - Supplemental Evidence, Section 2.4 Paving Scenarios
- 24 On page 9, FEI describes that:
- 25 Below FEI has outlined the costs and schedule impacts associated with three 26 different scenarios. The scenarios are intended to demonstrate the implications 27 associated with different road remediation and paving requirements.
- 28 The three scenarios are as follows:
- 29 Scenario 1: Paving and Restoration of the Trench and Asphalt Key (Operating Agreement and additional Asphalt Key depth); 30
- 31



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- Page 2
- Scenario 2: Paving Over and Repair of Four Lanes (City Demand); and

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Scenario 3: Two Lane Paving (Scenario 1 with Additional Paving over Two Full Lanes).

Please confirm or explain otherwise that FEI or its contractors will be operating

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large excavators and other heavy construction equipment on the curb and outside lanes of Como Lake Avenue.

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8 Response:

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9 FEI's construction contractor will be performing gas line locate and installation (operating heavy construction equipment) activities for the NPS 30 IP gas line within the construction workspace, 10 11 which is essentially defined as the two inside lanes of Como Lake Avenue and not the curb and 12 outside lanes of Como Lake Avenue. FEI does not anticipate that its construction contractors 13 will cause wear and tear on the curb and outside lanes. For those locations required to 14 implement the Traffic Management Plans, which extend outside of the two inside lanes required 15 for construction workspace, FEI is committed to restoring these locations in accordance with the 16 Operating Agreement and the City's Paving Specifications.

17 Similar to City utility work, standard heavy equipment such as dump trucks, hydrovacs and 18 excavators will be used. To prevent and minimize surface damage to the pavement, the 19 excavators will be fitted with rubber tracks. The curb lanes will be open to allow traffic flow and 20 access along Como Lake Avenue. The curb lanes will be used by FEI's construction contractor 21 to enter and exit the construction workspace. In addition, the curb lanes will continue to be used 22 by other heavy vehicles unrelated to the Project such as transit buses, garbage trucks, and 23 other large commercial and construction vehicles.

Work to support the implementation of the Traffic Management Plans, including temporary civil works (modifications to curbs and turning lanes), modifications to the traffic signal loops, installation of traffic delineation equipment, etc., may extend outside the two lanes of construction workspace, and will be completed by FEI's construction contractor's subcontractors. The subcontractors will not be using large excavators and other heavy construction equipment as large equipment is not needed to complete the implementation of the Traffic Management Plans.

Abandonment activities for the existing NPS 20 IP gas line will primarily occur outside of the construction workspace for the installation of the NPS 30 IP gas line, however there could be some overlap as the two lines are in close proximity in some locations. The curb lanes (primarily the southern curb lane) would be impacted by the abandonment activities. The abandonment activities are scheduled to start in 2020, and would involve similar sized equipment as the installation activities for the NPS 30 IP gas line, however their use would be limited to the immediate vicinity of the bell hole locations.



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- 1.2 Please confirm or explain otherwise that FEI or its contractors will be making lateral cuts, including cuts for relocation of lateral utilities and water service connections, on the curb and outside lanes of Como Lake Avenue. Please provide FEI's best estimate of the number of lateral cuts FEI or its contractors will make across the curb and outside lanes of Como Lake Avenue, and include in the response all assumptions made in calculating the estimate.
- 9 10

11 Response:

12 The NPS 30 IP gas line will cross approximately 842 lateral utilities along Como Lake Avenue 13 (see Table 1) which can be placed into the following sub-categories:

- 14 A. Water services lines; and
- B. Non-water service lines (water mains, storm, sanitary, electrical, telecommunications and other).
- 17

Table 1: Summary of Utilities Crossed by the NPS 30 IP Gas Line

Owner	Utility Type	Material	Quantity
City of Coquitlam	Water Main	Cast Iron	28
City of Coquitlam	Water Main	Other	15
City of Coquitlam	Water Service	Various	143
City of Coquitlam	Storm	Various	163
City of Coquitlam	Sanitary	Various	65
City of Coquitlam	Street Lights	Various	11
City of Coquitlam	Road & Right of Way	N/A	38
City of Coquitlam	Schoolhouse Creek Culvert Various		1
		CoC Total	464
BC Hydro	Electric	Various	175*
FEI	Gas	Various	149
Shaw	Telecom	Various	7
Translink	Skytrain	Overpass	1
Telus	Telecom	Various	46
		Other Total	378
		Total	842

*Includes overhead wires



1 A. Water Service Lines

FEI estimates that along Como Lake Avenue, the NPS 30 IP gas line will cross approximately
143 water service lines that run north off the water main out of the approximately 842 lateral
utility crossings. The NPS 30 IP gas line is located north of the water main and therefore will
not cross the water services that run south off the water main.

6 Although there are 143 water service lines that will be crossed by the construction of the NPS 7 30 IP gas line, under the construction contract, it is at the discretion of FEI's construction 8 contractor to determine if it will temporarily cut a particular water service line or if the 9 construction contractor will place the NPS 30 IP gas line beneath the water service line without 10 cutting it. If the construction contractor determines that it will be necessary to temporarily 11 relocate a water service line and cuts to the water service lines are required, FEI anticipates that 12 work on the service lines will be completed within the trench area and as such FEI does not 13 anticipate that the construction contractor will be making cuts wherein the curb and outside 14 lanes of Como Lake Avenue will be impacted.

15 There are three locations where FEI is aware that the water service line will have to be cut to 16 accommodate the trenchless road crossing entry and exit pits as follows:

- Como Lake Avenue & Clarke Road;
- 18 Como Lake Avenue & Blue Mountain Street; and
- Como Lake Avenue & Poirier Street.

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FEI's construction contractor will not be able to cross over or below the water services at these locations due to the presence of the temporary walls for the bore pit, which then requires the utilities to be temporarily cut or relocated. As noted above, work on the service lines will be completed within the trench area and as such FEI does not anticipate that it will be making lateral cuts or impacting the curb and outside lanes of Como Lake Avenue.

26 B. Non-water Service Lines

In addition to the water services lines, there are three storm lines, one water main, and one buried street light cable that are anticipated to be temporarily relocated or removed to accommodate the trenchless crossing entry and exit pits at the three locations noted above. FEI anticipates that the work for these lateral utility crossings will be completed within the two lanes of construction working space and as such FEI does not anticipate that it will be making lateral cuts or impacting the curb or outside lanes of Como Lake Avenue.

FEI anticipates that the work related to the other lateral utilities crossings (water mains, storm,
 sanitary, sewer and various) will be completed within the current defined construction work



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1 space (one or two inside lanes) and as such FEI does not anticipate that it will be making lateral 2 cuts or impacting the curb and outside lanes of Como Lake Avenue.

- 6 1.3 Please reconcile the WSP Report's finding that existing pavement distresses 7 exist in the curb or outside lanes of Como Lake Avenue, to the extent that 8 several sections of these roadways will likely need a full width rehabilitation 9 treatment or extensive repairs within the next five to ten years, with FEI's position 10 in Scenario 1 that FEI's Project will not do any damage to the curb and outside 11 lanes.
- 12

13 Response:

14 Please refer to FEI's response to City Phase 2 IR 1.1.1. FEI does not anticipate additional 15 damage to the curb and outside lanes with the exception of the bell holes for the abandonment 16 of the existing NPS 20 IP gas line and implementation of the Traffic Management Plans 17 approved by the City. The existing condition of the pavement is not a determining factor in FEI's 18 decision to undertake full width rehabilitation treatment or extensive repairs; the relevant 19 consideration is whether FEI causes damage to the pavement. FEI will be responsible for any 20 damage that is directly attributed to the Project construction activities.

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- 24 1.4 Please describe how FEI will address long term degradation of Como Lake 25 Avenue caused by excessive wear and tear from FEI's large excavators and 26 other heavy construction equipment on the curb and outside lanes. How are 27 these costs reflected in FEI's pavement restoration cost estimates in Scenarios 28 1-3? If they are not reflected, what is a reasonable estimate for these additional 29 costs?
- 30

31 **Response:**

32 FEI's obligation and responsibility is to repair any damage caused by the Project in accordance 33 with the Operating Agreement. In order to complete the Project, FEI believes that the City's 34 Paving Specifications (including the 50 millimetre Asphalt Key) provide for reasonable 35 restoration of the pavement after the completion of construction work and once completed fulfil 36 FEI's responsibility.

37 Please refer to the response to City Phase 2 IR 1.1.1.



1 The WSP report (page 9) observed degradation in the curb lanes:

2 The curb lane pavements generally were observed to have more areas of fatigue 3 type distresses and medium or high severity distresses recorded. This would be 4 expected as these travel lanes typically experience more loading from heavier 5 vehicles, such as transit buses.

FEI does not anticipate that its construction contractors will cause long term degradation from
wear and tear on the curb and outside lanes that will be any different than other users of Como
Lake Avenue. As such FEI did not include a cost estimate to address long term degradation of
the curb and outside lanes of Como Lake Avenue in FEI's pavement restoration cost estimates
in Scenarios 1, 2 and 3.

Large excavators and other heavy construction equipment will be transported to and from the construction work space via licensed rubber tire trailers, no different than the transit buses and similar large gross weight industrial or commercial vehicles that currently use Como Lake Avenue on a daily basis.

Long term degradation to pavement will occur regardless of FEI's work for the Project, and the result of FEI's repaving will be newer asphalt than is currently in place.

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- 20 1.5 It is well established that patching a pavement cut does not restore the pavement 21 to previous condition. Once the pavement is cut it ceases to act as an integrated 22 unit and overall pavement life is shortened. This is evident in the WSP Report of 23 existing conditions which reflect previous pavement cuts for utility work. The 24 deterioration observed by WSP will only be accelerated by the cuts that will be 25 made for the Project. Please describe how FEI will address the long term 26 degradation of Como Lake Avenue caused by the lateral cuts, cuts for relocation 27 of lateral utilities, removal and replacement of traffic loops, and the main trench. 28 How are these costs reflected in FEI's pavement restoration cost estimates in 29 Scenarios 1-3? If they are not reflected, what is a reasonable estimate for these 30 additional costs?
- 31

32 **Response:**

FEI's obligation and responsibility is to repair any damage caused by the Project in accordance with the Operating Agreement. FEI plans on conducting repaving following lateral cuts, cuts for relocation of lateral utilities within the main trench and removal and replacement of traffic loops

36 using the City's Paving Specifications. In order to complete the Project, FEI believes that the



1 City's Paving Specifications provide for reasonable restoration of the pavement after the 2 completion of construction work and once completed fulfil FEI's responsibility.

FEI does not have any reason to believe that these activities will result in long term degradation of Como Lake Avenue. As such, FEI did not include a cost estimate to address long term degradation of the curb and outside lanes of Como Lake Avenue in FEI's pavement restoration

6 cost estimates in Scenarios 1, 2 and 3.

Long term degradation to pavement will occur regardless of FEI's work for the Project, and theresult of FEI's repaying will be newer asphalt than is currently in place.

- 9 Please also refer to FEI's response to BCUC Phase 2 IR 2.12.1.
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131.6Please describe how FEI will address long term degradation of Como Lake14Avenue caused by the multiple bell hole patches. How are these costs reflected15in FEI's pavement restoration cost estimates in Scenarios 1-3? If they are not16reflected, what is a reasonable estimate for these additional costs?

1718 <u>Response:</u>

FEI's obligation and responsibility is to repair any damage caused by the Project in accordance with the Operating Agreement. FEI plans on conducting the bell hole repaving following decommissioning of the NPS 20 IP gas line in accordance with the City's Paving Specifications. In order to complete the Project, FEI believes that the City's Paving Specifications provide for reasonable restoration of the pavement after the completion of construction work and once completed fulfil FEI's responsibility.

The abandonment of the NPS 20 IP gas line will be limited to a bell hole within a single lane approximately every 300 metres. FEI estimates there will be fewer than 20 bell holes over the 5.5 kilometre length of Como Lake Avenue in Coquitlam.

FEI does not have any reason to believe that restoration and repaving of the bell holes according to the City's Paving Specifications will result in long term degradation of Como Lake Avenue. As such, FEI did not include a cost estimate to address long term degradation of Como Lake Avenue in FEI's pavement restoration cost estimates in Scenarios 1-3.

- Long term degradation to pavement will occur regardless of FEI's work for the Project, and the result of FEI's repaving will be newer asphalt than is currently in place.
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FortisBC Energy Inc. (FEI or the Company) Application for Use of Lands under Sections 32 and 33 of the <i>Utilites Commission Act</i> in the City of Coquitlam for the Lower Mainland Intermediate Pressure System Upgrade Projects (the Application)	Submission Date: December 5, 2018
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1.7 Please explain how FEI will repair pavement damage caused by removal and
 reinstatement of traffic loops. How are these costs reflected in FEI's pavement
 restoration cost estimates in Scenarios 1-3? If they are not reflected, what is a
 reasonable estimate for these additional costs?

6 7 **<u>Response:</u>**

8 FEI will repair pavement damage caused by removal and reinstatement of traffic loops in 9 accordance with the City's Paving Specifications. The three scenarios assume 16 traffic loops in 10 each scenario. The cost of pavement restoration for traffic loops is consistent with FEI's practice 11 and the costs FEI incurred for similar work in the City of Vancouver and the City of Burnaby and 12 is estimated at \$1 thousand per traffic loop.

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- 1.8 Please explain how FEI's Scenario 1 addresses the ongoing costs for crack filing,
 patching, and premature pavement grinding and overlay.

18 19 **Response:**

FEI's obligation and responsibility is to repair any damage caused by the Project in accordance with the Operating Agreement. FEI plans on conducting repaving using the City's Paving Specifications. FEI's Scenario 1 cost estimate does not include ongoing costs for crack filing, patching and pavement grinding and overlay after the completion of the Project.

FEI believes that the City's Paving Specifications provide for reasonable restoration of the pavement after the completion of construction work and once completed fulfils FEI's responsibility. Maintenance (e.g., crack filing, patching and pavement grinding and overlay) as required from time to time is the City's responsibility.

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- 321.9If temporary patches were made instead of permanent restoration work along the335.5 km section of Como Lake Avenue, what would the total estimated costs34savings be?
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1 Response:

FEI is interpreting the question to be asking if the cost to apply a temporary asphalt patch along
the trench following installation of the NPS 30 IP gas line is less expensive than permanent
restoration work once the NPS 30 IP gas line has been completed.

5 FEI has not estimated the cost to apply temporary asphalt as it is planning to complete 6 permanent restoration work immediately following installation of the NPS 30 IP gas line and in 7 accordance with the City's Paving Specifications and the Operating Agreement.

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 11 1.10 Please explain FEI's plan regarding temporary pavement markings during and after construction. How will FEI ensure pavement markings are clear such that
- when the permanent markings are put back in place, motorists are not confused
 by the remnants or abrasions that are left from the removal of temporary
 markings?
- 16

17 Response:

18 It is standard practice for temporary pavement markings to be removed using hydro-blasting or 19 surface grinding after completion of construction projects such as the NPS 30 IP gas line 20 installation and removal of the NPS 20 IP gas line. This is done so that motorists are not 21 confused by the remnants or abrasions that are left from the removal of temporary markings. 22 New pavement markings will be applied in accordance with the City's specifications for 23 application, type, and quality.



1 2. **Reference:** FEI Phase 2 - Supplemental Evidence, Section 2.3: Increasing City 2 **Demands for Paving and Road Remediation**

- On page 6, FEI describes that:
- 4 At the 30 percent review stage on October 12, 2016, the City increased its 5 requirements for pavement restoration beyond the City's Paving Specifications 6 by requiring the depth of asphalt restoration in the Asphalt Key to be increased 7 from 35 millimetres to 50 millimetres. The City provided a marked up copy of 8 FEI's Engineering Drawings and set out its increased paving requirements on a 9 typical trench drawing (see Appendix D). As part of FEI's ongoing efforts to 10 obtain the City's approval of the Engineering Drawings, FEI increased the 11 asphalt depth to 50 millimetres in the Asphalt Key on the portion of Como Lake 12 Avenue that FEI anticipated would be disturbed by the construction activities as 13 shown below in Figure 2-2 (reproduced as Appendix E).
- 14 2.1 The City's published Supplemental Specifications to Master Municipal 15 Construction Documents state that 50 millimetre thickness is the requirement for the depth of the asphalt key for arterial roads, such as Como Lake Avenue. 16 17 Please review the City's published Specifications (specifically, section 3.6-18 Surface Restoration) and clarify what FEI means by "the City increased its 19 requirements for pavement restoration."
- 20

21 Response:

22 Upon review, FEI agrees that drawing number COQ-G4 is further clarified in the City's Supplementary Specifications to the Master Municipal Construction Documents Clause 3.6.7.5 23 24 which sets out: "Permanent restoration to existing asphalt thickness (minimum of 75 millimetre) 25 with a 35 millimetre key where existing thickness permits. A 50 millimetre key is required on Arterial and Collector Roadways." With this, FEI agrees that the City's Paving Specifications 26 27 require a 50 millimetre Asphalt Key for an arterial roadway such as Como Lake Avenue and that 28 there is no increase in the City's requirements for pavement restoration as a result of the 29 specification of a 50 millimetre Asphalt Key.



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13.Reference:FEI Phase 2 - Supplemental Evidence, Section 2.4.1 Scenario 1"2Paving and Restoration of the Trench and Additional Asphalt Key3Depth

- 4 On page 9, FEI describes that:
- 5 ...This scenario is based on FEI's expectation that the construction impact to 6 pavement will be limited to the trench...
- 7 3.1 Please clarify how construction impact to pavement will be limited to the trench,
 8 taking into consideration the findings in the WSP Report and the effect of lateral
 9 cuts, heavy construction equipment and excavation and repair of bell holes to the
 10 pavement of the curb lanes.
- 11

12 **Response:**

13 Please refer to FEI's response to BCUC Phase 2 IR 2.13.1.



14.Reference:FEI Phase 2 - Supplemental Evidence, Section 2.4.1.1 Technical2Explanation, Section 2.4.2.1 Technical Explanation, and Section32.4.3.1 Technical Explanation

4 On pages 10-11, FEI provides Figure 2-3 and Figure 2-4:



Figure 2-3: Scenario 1: Cross Section Drawing

FORTIS BC	FortisBC Energy Inc. (FEI or the Company) Application for Use of Lands under Sections 32 and 33 of the <i>Utilites Commission Act</i> in the City of Coquitlam for the Lower Mainland Intermediate Pressure System Upgrade Projects (the Application)	Submission Date: December 5, 2018
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Figure 2-4: Scenario 1 Plan View Drawing

On page 13, FEI provides Figure 2-5:









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Figure 2-7: Scenario 3: Cross Section Drawing





Figure 2-8: Scenario 3: Plan View Drawing

4.1 Please clarify these diagrams to show the various layers of the paving process. Please also fix the scale of the elements included (i.e. to be proportional).



1 Response:

2 The diagrams are only intended to provide an illustrative view of FEI's workspace, the existing 3 NPS 20 IP gas line, future NPS 30 IP gas line, and potential paving scenarios in conjunction 4 with the City's Paving Specifications. The diagrams are not intended to replace the detailed 5 aspects of the City's Paving Specifications. FEI notes that for all scenarios, if the Project results 6 in damage beyond the space reflected in a scenario, FEI is committed to repairing any damage 7 to Como Lake Avenue resulting from the Project in accordance with the City's Paving 8 Specifications and the Operating Agreement. As such, FEI does not consider there to be value 9 in producing detailed diagrams at this time and declines to do so.



15.Reference:FEI Phase 2 - Supplemental Evidence, Section 2.4.1.2 Cost Estimate,2Schedule and Assumptions

On page 11, FEI describes that:

4 The estimated capital cost of Scenario 1 is approximately \$601,000 and is based 5 upon the schedule below in Table 2-1. The schedule for the paving activities (mill 6 and pave) associated with the NPS 30 IP gas line construction (items 1 and 2 in 7 Table 2-1) is based on the Traffic Management Plans (TMPs) forming part of the 8 Final Agreement Terms and Conditions.9 The abandonment in place of the NPS 9 20 IP gas line (item 3 in Table 2-1) would be undertaken in 2020 and the 10 schedule for the paving activities (mill and pave) will depend, in part, on the TMPs for the work. 11

Table 2-1: Scenario 1 Schedule Milestone Summary

Milestone	Forecasted Date
Start Paving Coquitlam	March 1, 2019
Complete Paving Coquitlam	September 30, 2019
Complete Bell Hole Paving Coquitlam	December 31, 2020

Please provide full details of the methodology FEI followed to arrive at the cost

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- estimate of approximately \$601,000. Include the breakdown of costs, including
 traffic control, mobilization, and demobilization costs.
- 15 16

17 <u>Response:</u>

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The details of the method FEI followed to arrive at the cost estimate of \$601 thousand considers paving of the trench to full depth with a 50 millimetre depth Asphalt Key that extends 200 millimeters horizontally on either side of the trench. Paving unit prices were obtained from subcontractors. Additional traffic control is not included in the estimate as the construction workspace for construction of the NPS 30 IP would already be set up and therefore no additional paving mobilization and demobilization costs are included for Scenario 1. A breakdown of the costs is as follows:

25

Table 1: Breakdown of Cost Estimate for Scenario 1

	Quantity	Unit Of Measurement	Un	it Price	Тс	otal Price
Mill, Load, Haul, Dispose 200mm wide existing Asphalt either side of trench - 50mm	3,318	m2	\$	6.00	\$	19,908
Supply And Place Final Lift Asphalt - 50mm	17,143	m2	\$	14.00	\$	240,002



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Table 2-1 indicates continuous paving from March 1, 2019 until September 30,

2019. Please clarify this timeline. Provide details about any breaks in this period

	Quantity	Unit Of Measurement	Unit Price	Т	otal Price
Supply And Place Trench Base Asphalt - 75mm	13,825	m2	\$ 20.00	\$	276,500
Tack Coat	17,143	m2	\$ 0.50	\$	8,571
Standard MMCD Testing	1	Lump Sum	\$ 20,000.00	\$	20,000
Detection Loops	16	Each	\$ 1,000.00	\$	16,000
Pavement Markings	1	Lump Sum	\$ 20,000.00	\$	20,000
Total				\$	600,981

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- 8 Response:

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9 The paving of Como Lake Avenue under Scenario 1 would be performed in intermittent

and a comparison to the NPS 30 IP gas line installation schedule.

10 segments between March 1, 2019 and September 30, 2019 and will correspond with traffic 11 management plans implemented (including any agreed upon revisions) for the NPS 30 IP gas

line installation. As referenced on pages 9 and 10 of Exhibit B-12, FEI's Phase 2 Evidence, the 12

restoration and paving will be completed immediately following the installation of the NPS 30 IP 13

14 gas line and before re-opening the road to general traffic to minimize disruption to the residents

15 and businesses in the City and those travelling through the community.



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16.Reference:FEI Phase 2 - Supplemental Evidence, Section 2.4.2 Scenario 2:2Paving Over and Repair of Four Lands (City Demand)

- 3 On page 12, FEI describes that:
- 4 Scenario 2 exceeds FEI's obligations under the Operating Agreement and the 5 Agreed Expanded Paving Specifications because it requires FEI to undertake 6 restoration beyond areas which are expected to be damaged by the Project.
 - 6.1 Please describe what areas are not expected to be damaged by the Project, and why not.

10 Response:

11 FEI is not expecting to damage significant portions of the two lanes Como Lake Avenue that are

12 not within the excavation trench. FEI is committed to repairing any damage to Como Lake

Avenue resulting from the Project in accordance with the City's Paving Specifications and the Operating Agreement. Please refer to FEI's response to BCUC Phase 2 IR 2.13.1 and to City

15 Phase 2 IR 1.11.1 for additional information.

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1 7. **Reference:** FEI Phase 2 - Supplemental Evidence, Section 2.4.2.2 Cost Estimate, 2 Schedule and Assumptions

On page 14, FEI describes:

4	The estimated capital cost of Scenario 2 is approximately \$4,573,000 and is
5	based upon the schedule below in Table 2-2. The schedule for the paving
6	activities (mill and pave) associated with the NPS IP 30 gas line construction
7	(Items 1 and 2 in Table 2-2) is based upon the TMPs that form part of the Final
8	Agreed Terms and Conditions. The abandonment in place of the NPS 20 IP gas
9	line (item 3 in Table 2-2) will be undertaken in 2020 and the schedule will
10	depend, in part, on the traffic management plans developed by FEI for review
11	and acceptance by the City. Similarly, the schedule for the paving activities
12	associated with the full curb to curb paving of all four lanes of Como Lake
13	Avenue (items 4 and 5 in Table 2-2) would depend, in part, on the TMPs for the
14	work.

- 15 7.1 Please provide full details of the methodology FEI followed to arrive at the cost estimate of approximately \$4,573,000. Include the breakdown of costs, including 16 17 traffic control, mobilization, and demobilization costs.
- 18

19 **Response:**

20 The cost estimate of \$4.573 million considers that the trench excavation has already been 21 permanently restored during the NPS 30 IP gas line construction (Scenario 1) and thus trench 22 restoration costs were not included in the Scenario 2 cost estimate. The method FEI used to 23 arrive at the cost estimate was to obtain paving unit prices from subcontractors and factor the 24 pricing to account for increased costs due additional traffic control, mobilization and 25 demobilization costs to complete final paving after decommissioning of the NPS 20 IP gas line. Contingency was included within each unit rate. Costs were included to mill and pave the 26 27 remaining lanes to full depth using two layers of asphalt; a 75 millimetre base course and a 50 28 millimetre upper course. A breakdown of the costs including traffic control, mobilization and demobilization costs is as follows: 29

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Table 1: Breakdown of Cost Estimate for Scenario 2

	Quantity	Unit of Measurement	Unit Price (\$)	Tot	al Price (\$)
Item	1	Lump Sum	600,981	\$	600,981
Mobilization/Demobilization	1	Each	15,000	\$	15,000
Mill, Load, Haul, Dispose And Sweep Of Existing Asphalt Concrete Pavement To A Depth Of 125mm	85,876	M2	10	\$	858,760



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	Quantity	Unit of Measurement	Unit Price (\$)	Tof	tal Price (\$)
Supply And Place Final Lift Asphalt - 50mm	85,876	m2	14	\$	1,202,264
Supply And Place Trench Base Asphalt - 75mm	85,876	m2	20	\$	1,717,520
Tack Coat	85,876	m2	0.50	\$	42,938
Standard MMCD Testing Not Inclusive Of Coring	1	Lump Sum	50,000	\$	50,000
Detection Loops	16	Each	1,000	\$	16,000
Pavement Markings	1	Lump Sum	70,000	\$	70,000
Traffic Control	1	Each	75,000	\$	75,000
Total				\$	4,573,463



18.Reference:FEI Phase 2 - Supplemental Evidence, Section 2.4.3 Scenario 3: Two2Lane Paving (Scenarios 1 with Additional Paving Over Two Full3Lanes)

- On pages 15-16, FEI describes that:
- 5 ...This scenario is similar to the approach FEI negotiated with the City of 6 Vancouver and the City of Burnaby in respect of the construction of the NPS 30 7 IP gas line. In the City of Vancouver, where damage was limited to one lane, only 8 one full lane width was repaved. Where damage occurred to two lanes, FEI paid 9 for the cost to repave both lanes. In the City of Burnaby, where damage occurred 10 as a result of the NPS 30 IP gas line construction, FEI paid to repave one or two 11 lanes depending on the area impacted.
- 12 ...This scenario is more costly and slightly more disruptive to the residents and
 13 businesses in the City and to commuters travelling through the community than
 14 Scenario 1 as it will take more time to complete the paving and restoration work.
- 8.1 Please list and describe the roads involved in the LMIPSU Project within the City of Burnaby and the City of Vancouver, and include for each road: (1) whether the road impacted is a major arterial corridor for the region; (2) the level of utility congestion in the underground area beneath the road; (3) the number of lateral cuts outside the main trench; (4) whether the main trench is in unpaved boulevard; (5) the length of road that has been repaved from curb to curb.

22 <u>Response:</u>

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- The tables below provide a list of the roads involved in the Project within the City of Burnaby and the City of Vancouver where the gas line installation has been completed to date including:
- whether the road impacted is a major arterial corridor for the region (Item 1 in the IR);
- the level of utility congestion in the underground area beneath the road (Item 2 in the IR);
- the number of lateral cuts outside the main trench (Item 3 in the IR);
- whether the main trench is in unpaved boulevard (Item 4 in the IR); and
- the length and width of road (i.e. number of lanes) that has been repayed to date (Item 5 in the IR).

Paving arrangements in the City of Vancouver and the City of Burnaby were part of an overall
 resolution of outstanding issues in order to obtain the permits and approvals for the construction
 of the Project, as described further in FEI's response to BCUC Phase 2 IR 2.12.4.1.



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City of Vancouver

Road Description	Type of Road	Start KP	End KP	Length (m)	Utility Congestion	Re-paving
Fact 1st Average to Fact 2nd Average	Callester/Designated Biles					2 lanes paved (1 lane re-based and
elana Waadland Drive	Collector/Designated Bike	19+897.0	19+725.0	172	High	paved by contractor, 1 lane re-
along woodland Drive	Path, Paved					surfaced by contractor)
Nanaima Streat to Woodland Drive				1,225	Moderate	4 lanes paved (1 lane re-based and
	Major Arterial, Paved	19+725.0	18+500.0			paved by contractor, 3 lanes re-
along East 1st Avenue						surfaced by city)
						2 east bound lanes paved (1 lane re-
Rupert Street to Nanaimo Street	Major Arterial, Paved	18+500.0	16+835.0	1,665	Moderate	based and paved by contractor, 1 lane
along East 1st Avenue						re-surfaced by contractor)
	Major Arterial, Paved	16+835.0	16+225.0	610	Moderate	2 east bound lanes paved (1 lane re-
Variant Street to Rupert Street along						based and paved by contractor, 1 lane
East 1st Avenue						re-surfaced by city)
						2 lanes paved (1 lane re-based and
Boundary Road to Valiant Street	Collector, Paved	16+125.0	16+000.0	125	Moderate	paved by contractor, 1 lane re-
along Graveley Street						surfaced by contractor)
Additional details:						
1. The entire length of gasline installe	ed (3.8km) in City of Vancou	ver was in pa	aved roadway			
2. No lateral cuts outside the trench v	vidth.					
3. Contractor was responsible for con	structing (re-base) width of	asphalt cut (avg 4,4m) plu	s any other da	amage outside the t	rench width, including curb and

sidewalk damage.

4. City of Vancouver re-surfaced (milling and filling) the remaining asphalt as part of their own restoration program.

City of Burnaby

Road Description	Type of Road	Start KP	End KP	Length (m)	Utility Congestion	Re-paving
						2 lanes paved (1 lane re-based and
Boundary Road to Gilmore Avenue	Collector, Paved/Unpaved	16+000.0	15+300.0	700	Low	paved by contractor, 1 lane re-
along Graveley Street						surfaced by contractor)
						2 lanes paved (1 lane re-based and
Develop Deed to Carloton Avenue		15+300.0		170	Moderate	paved by contractor, 1 lane re-
along Gilmore Avenue/Escala	Collector, Paved/Unpaved		15+130.0			surfaced by contractor (includes 60m
						of unpaved surface through Escala
						Development)).
Carleton Avenue to Halifax Street	Collector, Paved/Unpaved	15+130.0	14+830.0	300	High	1 lane paved (1 lane re-based and
along Douglas Road						paved by contractor)
Madican Avanua ta Kansingtan	Major Arterial, Paved	14+650.0		3,100	Moderate	2 west bound lanes paved (1 lane re-
			11+550.0			based and paved by contractor, 1 lane
overpass along Lougneed Highway						re-surfaced by contractor)

Additional details:

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1. The entire length of gasline installed (4.3km) in City of Burnaby was in paved roadway except for the 300m portion between Ingleton Avenue and Boundary Road along Graveley Street because the gas line installation is not yet complete.

2. No lateral cuts outside the trench width.

3. Contractor responsible for all pavement restoration (re-base, re-surface) and any damage to the sidewalks and curbs outside the trench width.



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8.2 Is FEI funding upgrade roadworks along approximately 2 kilometres of Broadway Avenue in the City of Burnaby? Please fully explain what works FEI is doing/funding at Broadway Avenue, and why.

5 **Response:**

- 6 Please refer to the response to BCUC Phase 2 IR 2.12.4.1.
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 8.3 For its entire length within the City's limits, the NPS 20 pipe is in the same corridor as the planned NPS 30 IP gas line. Please explain how this compares to the relative location of each of these gas lines within the City of Vancouver and City of Burnaby's city limits, respectively.
 14
 15 Response:
- 16 Please refer to the response to BCUC Phase 2 IR 2.12.4.2.



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Page 24

19.Reference:FEI Phase 2 - Supplemental Evidence, Section 3 NPS 20 IP Removal2Cost: Cost Allocation

- On page 20, FEI describes that:
- 4 ... FEI is willing to remove this portion of the NPS 20 IP gas line, however its
 5 position remains that the cost of such removal should be allocated between FEI
 6 and the City in accordance with the Operating Agreement.
- 9.1 Please explain the intended rational for relocation formulae in operating
 agreements generally. Specifically, please explain the intended rationale for the
 use of a time-based formula.
- 10

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11 Response:

The *Gas Utility Act*, R.S.B.C. 1996, c. 170 (GUA) affirms FEI's right as a public utility to operate within a municipality under its certificate of public convenience and necessity. The GUA contemplates a public utility agreeing with a municipality as to the conditions of the use of public spaces. An operating agreement is the typical form of agreement between FEI and a municipality as to the conditions of use of public spaces. An operating agreement documents terms and conditions that a municipality and FEI have agreed will govern FEI's use of public spaces.

19 The majority of FEI's operating agreements, including the Operating Agreement with the City of 20 Coquitlam, contain a provision addressing the allocation of costs incurred by FEI as a result of a 21 municipality's request to remove FEI infrastructure from its existing location. However, the cost 22 allocation provision is not the same in every operating agreement and while some contain a 23 time-based formula for apportioning costs as between the municipality and FEI, others do not.

24 Time-based formulae result in the cost apportionment between the parties changing over time. 25 In the case of the Operating Agreement, the City is not required to contribute as much toward 26 the costs incurred by FEI to remove its facilities that have depreciated over time. The Interior 27 and Vancouver Island operating agreements provide that, with respect to allocation of costs, 28 where the municipality requires a change to FEI's facilities, the municipality is responsible for 29 100 percent of the costs related to such changes. In a reciprocal manner, if FEI requires 30 municipal infrastructure to be moved, such as water or sewer mains, FEI is required to pay 100 31 percent of the relocation costs.

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9.2 Does FEI agree that under time-based relocation formulae generally, the municipality's share of gas line relocation costs should decrease over time to zero at the end of the formula time period? If not why not?

5 **Response:**

6 FEI does not agree that under time-based formulae the municipality's share of the costs for 7 removal of FEI's facilities at the request of the municipality should decrease to zero over some 8 period of time. There are costs associated with the relocation of FEI facilities regardless of 9 when it occurs, and the alternative is to leave FEI's facilities in their current previously approved 10 location.

The inclusion of a provision addressing the allocation of costs between the municipality and FEI in an operating agreement reflects the negotiated agreement of both parties. From FEI's perspective, the inclusion of a cost allocation provision balances FEI's objective of discouraging a municipality from making unnecessary requests for removal of FEI facilities from existing approved locations with the municipality's objective of facilitating development and growth within the municipality.

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- 9.3 A relocation formula is typically intended to reflect a fair distribution of costs for
 premature relocation of infrastructure, before the end of life of that infrastructure.
 Please explain how a typical relocation formula can reasonably be applied to
 decommissioned and abandoned infrastructure.
- 24

25 **Response:**

Please refer to FEI's response to BCUC Phase 2 IR 2.8.1 regarding the application of the
 Operating Agreement to decommissioned and abandoned infrastructure.

FEI disagrees with the premise that a relocation formula is typically intended to reflect a fair distribution of costs only for "premature relocation of infrastructure, before the end of life of that infrastructure".

Please refer to FEI's response to City Phase 2 IR 1.9.2 regarding the purpose of a provision addressing the allocation of costs between a municipality and FEI where a municipality requests that FEI remove its infrastructure from a municipally approved location. In addition, a cost allocation formula can apply to decommissioned or abandoned infrastructure in the same way as it is applied to infrastructure that is still in use. However, when applying the formula to decommissioned or abandoned infrastructure, the expected cost to the municipality would be



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significantly less because the costs imputed into the formula do not include the construction ofnew infrastructure at a different location.

9.4 Does FEI agree that the application of such a relocation formula in the case of an abandoned pipe, in effect, transfers liability for the abandoned pipe from FEI ratepayers to municipal taxpayers? If not, why not?

10 Response:

FEI does not agree that the application of such a relocation formula in the case of an abandoned pipe transfers liability for the abandoned pipe from FEI ratepayers to municipal taxpayers. The inclusion of a provision addressing the allocation of costs in an operating agreement between FEI and a municipality reflects a negotiated agreement between the parties with respect to liability for such costs as described in FEI's response to City Phase 2 IR 1.9.2.

The abandoned gas line remains the property of FEI and not the municipality. FEI is not required by law to remove abandoned gas lines and the applicable legislation contemplates abandonment in place and imposes requirements on FEI with respect to abandonment as described in FEI's response to BCUC Phase 2 IR 2.8.1.



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Page 27

110.Reference:FEI Phase 2 - Supplemental Evidence, Section 3.1.1 5.5 Kilometre2Removal Scope

- On page 24, FEI describes that:
- From Coquitlam Gate Station to Poirier Street, a section which is
 approximately 2.2 kilometres in length, there is an existing 300 millimetre
 diameter cast iron water main and an existing 200 millimetre diameter cast iron
 water main that run parallel to the NPS 20 IP gas line on both sides. The offset
 between the water mains paralleling the NPS 20 IP gas line is such that the
 water mains would require removal in order to remove the NPS 20 IP gas line;
- 1010.1Please describe why it would be necessary to remove these two water mains as11part of the removal of the decommissioned NPS 20 pipe.
- 12

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13 **Response:**

From Coquitlam Gate Station to Poirier Street, a section which is approximately 2.2 kilometres
in length, the existing 200 millimetre diameter cast iron water main and the 300 millimetre
diameter cast iron water main closely parallel the NPS 20 IP gas line.

17 FEI's engineering records indicate that the horizontal separation distance between the water 18 mains and from the water mains to the NPS 20 IP gas line varies continuously along the 2.2 19 kilometre section. At some locations the 200 millimetre cast iron water main is very close or 20 directly on top of the NPS 20 IP gas line, and in other locations the 300 millimetre cast iron 21 water main is very close to being located directly on top of the NPS 20 IP gas line. Because the 22 200 millimetre cast iron water main or the 300 millimetre cast iron water main was observed to 23 overlap directly with the NPS 20 IP gas line at different locations along the 2.2 kilometre section, 24 FEI has assumed that the NPS 20 IP gas line is buried deeper than the water mains.

The construction methodology to remove this section of the NPS 20 IP gas line, including protecting the NPS 20 IP gas line pipe coating from damage during the excavation process and then safely de-coating, cutting, and sectionalizing the gas line prior to removal, would require the excavation of a 2 metre to 3 metre wide trench.

Consequently, because the 200 millimetre cast iron water main and the 300 millimetre cast iron 29 30 water main is right beside, or directly on top, of the NPS 20 IP gas line along the 2.2 kilometre 31 section from Coquitlam Gate Station to Poirier Street, it would be physically impossible to 32 access the NPS 20 IP gas line for removal without first causing damage to the two cast iron 33 water mains. Therefore, FEI believes that the 2.2 kilometres of 200 millimetre cast iron water 34 main, and the 2.2 kilometres of 300 millimetre cast iron water main (4.4 kilometres of water main 35 in total) would have to be removed and relocated permanently, or relocated temporarily and 36 then reinstated, as part of the removal of the decommissioned NPS 20 IP gas line pipe.



1 This is among the reasons that abandoning the NPS 20 IP gas line in place would be 2 significantly less impactful than unnecessarily removing the approximately 5.5 kilometres of the 3 NPS 20 IP gas line from Coguitlam Gate Station to North Road.

- 5 6 7 8 On page 25, FEI describes that: 9 The removal of the NPS 20 IP gas line would require an open cut construction 10 method to expose and remove the gas line and therefore these intersections 11 would be shut down and closed to all traffic. Of these 35 intersections, the 12 following five are major north-south arterial road intersections: 13 Como Lake Avenue & Poirier Street; 14 2. Como Lake Avenue & Gatensbury Street; 15 3. Como Lake Avenue & Blue Mountain Street; 16 4. Como Lake Avenue & Clarke Road; and 17 5. Como Lake Avenue & North Road. 18 The City did not want these major intersections to be closed to traffic during 19 construction of the NPS 30 IP gas line. The City's concerns were accounted for 20 in FEI's construction execution plans and TMPs for the construction of the NPS 21 30 IP gas line. FEI plans to utilize trenchless crossing methodologies for the 22 construction of the NPS 30 IP gas line at these five major arterial road 23 intersections.
- 2410.2The City understands that trenchless crossing methodologies are not feasible at25the Como Lake Avenue & Clarke Road intersection due to the depth of the NPS2630 IP gas line. Please reconcile this understanding with FEI's evidence.

28 Response:

27

The City states in the above IR that it "... understands that trenchless crossing methodologies are not feasible at the Como Lake Avenue & Clarke Road intersection due to the depth of the NPS 30 IP gas line".

FEI would like to clarify the apparent misunderstanding on the part of the City and confirms that
 a trenchless crossing method is feasible at the Como Lake Avenue & Clarke Road intersection.
 FEI's Issued for Construction (IFC) design drawing for this intersection was previously shared
 with the City and is based on the use of a conventional track bore pipe installation technology to



trenchlessly install the NPS 30 IP gas line through the intersection of Como Lake Avenue &
 Clarke Road.

This also aligns with FEI's evidence that describes FEI's construction execution plans to use track bore pipe installation technology to trenchlessly install the NPS 30 IP gas line at the other major intersections listed in the above City Phase 2 IR 1.10.2. The use of trenchless crossing will address the City's concerns regarding traffic closures and minimizes impacting the traffic at these major intersections during construction of the NPS 30 IP gas line.

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12 On page 26, FEI describes that:

...The construction process to expose and remove the NPS 20 pipe would consist of open trenching up to 500 metres at a time and to a width adequate to safely expose the gas line without striking the NPS 20 pipe or damaging the gas line coal tar enamel protective coating material.

17 10.3 Please explain in detail the reasons for removing the decommissioned NPS
 18 pipe using this methodology, and specifically why such a long open trench is
 19 proposed.

21 Response:

In order to remove the NPS 20 IP gas line from its current location under Como Lake Avenue, it would first be necessary to cut and remove the existing road paving asphalt, and then excavate and remove the remaining existing consolidated backfill material from on top in order to physically access the gas line and remove it. FEI is not aware of any other means or methods that could be employed to remove the NPS 20 IP gas line.

Please also refer to FEI's response to BCUC Phase 2 IR 2.9.4 for a further description of theexcavation procedure.

29 FEI described in Section 3.1 of Exhibit B-12 that removal of the NPS 20 IP gas line would be a 30 complex project. In general the approach to remove the NPS 20 IP gas line would be similar to 31 that required for the construction of a new large diameter gas line such as the NPS 30 IP gas 32 line. However, instead of installing new pipe in the open trench excavation, the exposed NPS 20 33 IP gas line would be cut and sectioned into pieces. In addition, the NPS 20 IP removal 34 construction process and activities would be further complicated by the presence of existing 35 parallel utilities that would have to be temporarily or permanently relocated as part of the works. 36 In Section 3.1.1 of Exhibit B-12, FEI detailed the extent of the third party utilities adjacent to the



NPS 20 IP gas line that would have to be removed or relocated prior to removing the NPS 20 IP
 gas line.

3 Therefore, FEI estimated that in order to remove the 5.5 kilometres of NPS 20 IP gas line from 4 Como Lake Avenue in one year that it would be necessary to establish construction work zones 5 of approximately 500 metres in length. This would facilitate the various construction processes 6 and procedures associated with the third party utility removal/relocation scope of work and the 7 NPS 20 IP gas line removal to progress in a linear sequential fashion and achieve the 8 necessary productivity to meet the one year schedule. It would be possible to reduce the length 9 of the work zones and the open trench sections, but this would reduce the overall schedule 10 efficiency, construction productivity, and subsequently increase the duration of time to remove 11 the 5.5 kilometres of NPS 20 IP gas line.

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- On page 26, FEI describes that:
- 17 ...Based on the above high-level analysis of the NPS 20 pipe removal, FEI
 18 anticipates that scope and construction impacts would exceed those of the NPS
 19 30 IP gas line installation.
- The NPS 20 IP gas line is coated in coal tar enamel that may contain low levels of asbestos. This will require special handling and disposal techniques for cutting, handling and disposal of this pipe to ensure that any material removed from the pipe is done in a controlled process, and is collected and disposed of in a manner that protects workers and others from potential asbestos exposure.
- 2510.4The City understands constructing a new utility line is more complex than26removing a decommissioned line. Specifically, the new NPS 30 IP gas line will be27installed much deeper than the abandoned NPS 20 pipe and the new NPS 30 IP28gas line is larger than the abandoned NPS 20 pipe. Please reconcile this29understanding with FEI's statement that the scope of removal of the abandoned30NPS 20 pipe would exceed the scope of installation of the new NPS 30 IP gas31line.
- 32
- 33 Response:

The City is correct in its understanding that the NPS 30 IP gas line will be installed deeper in certain locations as compared to the NPS 20 IP gas line, and that the NPS 30 IP gas line has a larger diameter than the NPS 20 IP gas line. As a result, additional complexity could manifest from these differences due to a slightly wider and deeper trench at those locations where the



NPS 30 IP gas line will be installed. However, these differences would result in additional cost
and would not add additional scope, i.e., in each case the scope is similar in that a trench must
be excavated to either install the new NPS 30 IP gas line or remove the old NPS 20 IP gas line.

FEI stated in Section 3.1 of Exhibit B-12 that removal of the 5.5 kilometre length of the NPS 20 IP gas line would be a complex project. The approach to remove the NPS 20 IP gas line would be similar to that required for the construction of a new large diameter gas line such as the NPS 30 IP gas line. However, instead of installing new pipe in the open trench excavation, the exposed NPS 20 IP gas line would be cut and sectioned into pieces so they could be safely removed from the trench and hauled offsite for disposal. Therefore, in general, the NPS 30 IP gas line installation and the NPS 20 IP gas line removal would have some similar activities.

In Section 3.1.1 Exhibit B-12, FEI's Phase 2 Evidence, FEI identifies the following scope items,
which would pertain to the NPS 20 IP gas line removal, but would not apply to the NPS 30 IP
gas line installation :

- From Coquitlam Gate Station to Poirier Street, a section which is approximately 2.2 kilometres in length, there is an existing 300 millimetre diameter cast iron water main and an existing 200 millimetre diameter cast iron water main that run parallel to the NPS 20 IP gas line on both sides. The offset between the water mains paralleling the NPS 20 IP gas line is such that the water mains would require removal in order to remove the NPS 20 IP gas line;
- From Poirier Street to Dogwood Street, a section that is approximately 2.6 kilometres in length, there is an existing 200 millimetre diameter cast iron water main that closely parallels the NPS 20 IP gas line. The water main may be difficult to protect during removal of the NPS 20 IP gas line and, therefore, may require removal prior to removal of the NPS 20 IP gas line and reinstatement thereafter;
- At several locations, existing utility storm mains are parallel to the NPS 20 IP gas line
 and would be disturbed during removal of the NPS 20 IP gas line;
- Between Dogwood Street and the intersection of Como Lake Avenue and Clarke Drive,
 the NPS 20 IP gas line passes under the south sidewalk along Como Lake Avenue.
 There is an existing overhead 60 kV transmission power line in this location that would
 severely restrict FEI's ability to access and remove the NPS 20 IP gas line;
- 5. At the major intersections such as Como Lake Avenue and Clarke Road, the density of large diameter utilities parallel to and crossing overhead the NPS 20 IP gas line will require significant effort and involve slow and challenging construction means and methods to successfully remove the NPS 20 IP gas line without impacting the operation of the adjacent utilities; and



- In contrast to the NPS 30 IP gas line which will utilize a less impactful trenchless
 installation methodology, removal of the NPS 20 IP gas line would require an open cut
 construction method to expose and remove the gas line at the following five major north south arterial road intersections:
- 5 Como Lake Avenue & Poirier Street;
- 6 Como Lake Avenue & Gatensbury Street;
- 7 Como Lake Avenue & Blue Mountain Street;
- 8 Como Lake Avenue & Clarke Road; and
- 9 Como Lake Avenue & North Road.

Further to Item 1 above, FEI has described in response to the City's Phase 2 IR 1.10.1 the rationale for the scope of work to remove 2.2 kilometres of 200 millimetre cast iron water main and 2.2 kilometres of 300 millimetre of cast iron water main. This is one example of a scope item that the NPS 20 IP gas line removal would include but would not be required for the NPS 30 IP gas line installation.

16 Therefore, considering Items 1 through 5 above, and FEI's description on page 26 of the of the 17 Coquitlam Phase 2 Supplementary Evidence, Exhibit B-12, FEI anticipates that the scope and 18 construction impacts from removal of the NPS 20 IP gas line would exceed those of the NPS 30 19 IP gas line installation.

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- 21 22
- 23 10.5 Has FEI considered the risks to FEI (in terms of liability) and to the public and 24 workers (in terms of exposure) of leaving such contaminated material in the 25 ground to decompose in a busy urban area? If so, please explain the risks. If not, 26 please explain why FEI has not considered and included these risks in its 27 analysis. In the response, please specifically consider the proximity of the 28 contaminated material to water mains, and the risk to workers and the public of 29 inadvertent disturbance of the coating during future work, including emergency 30 repairs to adjacent utilities. Please also provide the dimensions of a safety zone 31 FEI would propose to impose around the abandoned NPS 20 pipe that would 32 need to be observed for future City and third party works. 33



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1 Response:

2 FEI has considered the risks of abandoning the NPS 20 IP gas line in place and considers these

3 risks as low and manageable.

4 The existing NPS 20 IP gas line carries sweet, dry natural gas, and has throughout the entirety 5 of its operating service life. Since no liquid hydrocarbons have been transported in this pipeline, 6 the potential sources of soil and groundwater contamination are limited to the coatings and their 7 degradation products, and the potential for corroded pipe to act as a conduit to transport any 8 contaminants present in the surrounding soil to other points along the pipeline. To minimize 9 these risks, after commissioning of the NPS 30 IP gas line, FEI is planning to cut the NPS 20 IP gas line into shorter segments which would then be cleaned, filled with a structural grout 10 11 material, and capped and sealed. In addition, filling the gas line in segments and capping and 12 sealing open ends will mitigate erosion risks resulting from water entering the gas line and 13 exiting at new locations and soil subsidence resulting from gas line collapse.

The NPS 20 IP gas line is a steel pipe and the external coating of the pipe body (excluding construction girth weld regions) is a factory-applied coal tar enamel, and the construction girth welds are field coated with coal tar enamel.

17 Coal tar enamel pipe coating was used on FEI's steel gas lines that were installed prior to 1980. 18 Generally, the coal tar enamel pipe coating on FEI's buried steel gas lines remains stable and 19 intact and does not decompose. However, FEI has observed that third party liquid hydrocarbon 20 contamination in the soil surrounding a gas line can damage the coal tar enamel pipe coating. 21 Specifically, significant concentrations of hydrocarbon contamination in the surrounding soil may 22 degrade the pipe coating causing it to soften and disbond from the pipe surface. This risk 23 applies to both operating and abandoned gas lines. However, FEI is not aware of a situation 24 where tar from the coal tar enamel pipe coating has broken down and migrated into the 25 surrounding soil and created a risk to the environment or City infrastructure. Therefore, no 26 offset is required from operating or abandoned gas lines to adjacent third party utility 27 infrastructure such as water mains because the pipe is coated with coal tar enamel. However, 28 pursuant to section 76 of the Oil and Gas Activities Act a person may not undertake a ground 29 disturbance to a depth of greater than 30 centimetres within 30 metres of FEI's high pressure 30 gas lines without FEI's prior written agreement absent an order from the Oil and Gas 31 Commission. Where a third party utility installation is planned in close proximity to FEI's gas 32 line, FEI imposes conditions in granting permission for the installation, including a separation 33 between its gas line and a third party underground utility and other fixed and buried objects such 34 as utility poles or bridge abutments. FEI's internal standard recommends minimum separation 35 of 300 millimetres between the gas line and the other underground utility, however, in certain 36 circumstances and on a case by case basis, a smaller separation may be acceptable.

Coal tar enamel pipe coating may also contain low levels of asbestos. FEI crews and itscontractors follow an FEI asbestos handling procedure when cutting through coal tar enamel



1 coating on its gas lines. In the event the City were to cut or otherwise disturb FEI's coal tar 2 coated gas lines, FEI anticipates the City would follow its own internal standard for working with 3 asbestos containing material. Therefore, the risk to FEI, City workers, and the public is 4 mitigated through the implementation of safe work practices. In addition, FEI would remove any 5 portion of the NPS 20 gas line at the City's request in accordance with sections 4 and 5 of the 6 Operating Agreement.

FEI is required to comply with federal and provincial regulatory requirements including
WorkSafeBC, the *Environmental Management Act* and *Oil and Gas Activities Act* and
associated regulations in carrying out its activities.

The risk of inadvertent disturbance of the gas line coating during future work is mitigated by requirements of section 76 of the *Oil and Gas Activities Act*. The risk of inadvertent disturbance of a gas line coating by the City or third party works is also mitigated through the BC One Call Before You Dig Program whereby FEI provides information relating to the presence of its gas lines prior to any person excavating in the vicinity of an FEI gas line.

Therefore, due to the relatively inert nature of the coal tar enamel coating, and the above risk management processes and mitigating factors that would effectively establish a controlled safety zone around the abandoned NPS 20 IP gas line, FEI does not believe that a further safety zone around the abandoned NPS 20 IP gas line pipe that would need to be observed for future City and third party works would be necessary.



Response to City of Coquitlam (the City or Coquitlam) Information Request (IR) No. 1

Page 35

111.Reference:FEI Phase 2 - Supplemental Evidence, Section 3.3.1 5.5 Kilometre2Removal Cost Estimate

On page 29, FEI describes that:

. . .

FEI prepared an AACE Class 5 cost estimate for the removal of the 5.5 kilometres of NPS 20 IP gas line in an ungrouted and grouted condition. The main cost estimate components are detailed in Table 3-3. The construction component comprises the largest percentage of the total cost and was based on a semi-detailed bottom-up approach having consideration for the following removal construction considerations:

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Table 3-3: 5	5 Kilomet	tre Removal Cost Estim	ate Summary	(Ungrouted)
	Item	Description	\$ millions	
	1	Owners Costs	5.8	
	2	EPCM	5.4	

0.4

0.7

36.0 12.0

60.3

Property and ROW

Inspection

Construction

Contingency Total

11

12 The cost estimate for the removal of the 5.5 kilometres of NPS 20 IP gas line in a 13 grouted condition was also developed utilizing the same basis of estimate as the 14 ungrouted condition. The construction cost estimate was increased to account for 15 the extra effort to remove the heavier pipe due to the presence of the grout 16 material contained within. The other cost estimate line items were escalated to 17 account for the slightly higher estimated construction cost. Overall the cost 18 estimate to remove the NPS 20 IP gas line with grout is \$64 million, which is \$4 19 million more compared to the ungrouted cost estimate.

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11.1 Please explain in detail the methodology used to determine a \$4 million dollar
 differentiation between removal of the NPS 20 pipe, abandoned in a grouted
 condition, versus the NPS 20 pipe in an ungrouted condition. Please provide all
 assumptions made.

25 **Response:**

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Removal of the NPS 20 IP gas line abandoned in a grouted condition would involve handling heavier pipe. Therefore, FEI assumed that the NPS 20 IP gas line would be cut into smaller sections prior to removal from the excavated trench to facilitate safe lifting and handling activities within the confines of the constrained workspace along Como Lake Avenue. The increase in the cost estimate between the NPS 20 IP gas line abandoned in a grouted condition,



versus the NPS 20 IP gas line abandoned in an ungrouted condition, is to account for the
additional time and effort to:

- Cut the NPS 20 IP gas line into smaller pieces in the trench prior to removal;
- Lift and handle more pipe pieces from the trench and place them on haulage vehicles;
- Haul more pieces of pipe from the construction workspace along Como lake Avenue to
 the disposal facility; and
 - More effort to dispose of pipe with grout at the disposal facility.

8



112.Reference:FEI Phase 2 - Supplemental Evidence, Section3.4.2 Application of2the Operating Agreement Cost Allocation Formula

On page 33, FEI provides Table 3-6:

Table 3-6: Estimation of Original Cost, Number of Years Since Installation, Removal Costs and Cost Allocation

		High	Cost	Low Cost		
		5.5 km	380 m	5.5 km	380 m	
1	Original Installed Cost 2018\$ millions	\$25.1	\$1.7	\$14.1	\$1.0	
2	Original Installed Cost 1957\$ millions	\$2.8	\$0.2	\$1.6	\$0.1	
3	No. of Years: Year of Removal minus Year of Installation	67 Years	64 Years	67 Years	64 Years	
4	Removal Costs 2021		\$9.4		\$9.4	
5	Removal Costs 2024	\$77.5		\$77.5		
6	FEI's Allocation ¹⁷	\$3.8	\$0.2	\$2.1	\$0.1	
7	City Allocation	\$73.7	\$9.2	\$75.4	\$9.3	

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12.1 Please explain how the estimated removal costs of the abandoned NPS 20 pipe is \$77.5 million (in 2018 dollars) whereas the estimated cost of installation of that same gas line is \$25.1 million (in 2018 dollars).

9 **Response:**

10 In Section 3.1 of Exhibit B-12, FEI's Phase Evidence, FEI outlined that the removal of the 5.5 11 kilometre length of the NPS 20 gas line would be a complex project, and that the approach to 12 remove the NPS 20 IP gas line would be similar to that required for the construction of a new 13 large diameter gas line such as the NPS 30 IP gas line.

In line with the above understanding, FEI prepared an AACE Class 5 cost estimate for the removal of the NPS 20 IP gas line. In BCUC Phase 2 IR 2.10.1 FEI outlined the rationale for the assumptions of the cost allocation for the NPS 20 IP gas line removal. FEI estimated that the cost to remove the NPS 20 IP gas line would be \$77.5 million (in 2018 dollars).

In the responses to BCUC Phase 2 IRs 2.10.4 and 2.10.5 FEI outlined the process FEI adopted to reverse engineer the cost estimate to install the NPS 20 IP gas line in 1957 (in 2018 dollars) from the 2018 budget cost to install the NPS 30 IP gas line. Utilizing this approach, FEI estimated that the cost to install the NPS 20 IP gas line in 1957 would be \$25.1 million (in 2018 dollars) (see Table 3-6 of Exhibit B-12).

FEI's responses to BCUC Phase 2 IRs 2.10.4 and 2.10.5 also explains that the main reasons for the comparative increase of approximately \$52 million (in 2018 dollars) between the cost to



install the NPS 20 IP gas line in 1957 (in 2018 dollars) versus the cost to install a similar gas
line in 2018 include:

The significantly more onerous project management and stakeholder engagement, permitting
 and approvals, detailed engineering, procurement, construction management, and property and

5 right-of-way requirements which FEI assumes exist in 2018 compared to 1957; and

associated with safe asbestos removal.

6 The reduced construction productivity which FEI assumed would be 3 to 10 times less in 2018 7 compared to 1957 due to the highly developed surrounding urban development, confined 8 construction workspace, traffic management restrictions, and sub-surface constraints.

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 12 12.2 Please describe what, in FEI's opinion, the incremental cost to the City would be if the abandoned NPS 20 pipe is removed in conjunction with the installation of the City's new sewer and water mains, taking into consideration the costs
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17 <u>Response:</u>

18 FEI assumes that the City's question relates to the proposed approximately 380 metres of new 19 sewer and water mains that the City is planning to install between Como Lake Avenue and 20 Clarke Road and North Road and that the City would execute the installation of its proposed 21 new sewer and water mains at the same time that the NPS 20 IP gas line removal work would 22 occur. In this scenario, the City would incur the costs associated with its own utility project 23 scope of work in addition to the City's allocation of the NPS 20 IP gas line removal costs as per 24 line 7 in Table 3-6. However, the City may actually realize overall savings from coordinating its 25 proposed new utility installation at the same time as the NPS 20 IP gas line removal compared 26 to separately installing its proposed new sewer and water mains at a different time. Since the 27 cost of the City's work for the installation of the City's new sewer and water main is unknown or 28 has not been provided to FEI by the City, FEI is not able to evaluate what the incremental cost, 29 if any, would be to the City in this scenario.

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- 32 33
- 12.3 Please explain whether FEI has included the cost effect of advances in construction technology from 1957 to 2018 in its calculations.
- 34 35



1 Response:

- 2 Yes, FEI has considered the cost effect of advances in construction technology from 1957 to
- 3 2018 in its calculations. FEI prepared an AACE Class 5 cost estimate for the removal of the 5.5
- 4 kilometres of the NPS 20 IP gas line. The basis of estimate accounted for the use of modern
- 5 construction equipment and resources experienced in modern urban construction practices.

6 FEI's estimate of the cost to install the NPS 20 IP gas line in 1957 utilized various factors to 7 infer the level of effort and construction productivity to install a gas line in 1957 compared to 8 2018. FEI's assumptions in developing these factors included consideration of the less 9 sophisticated resources, techniques, materials, and equipment utilized in 1957 compared to 10 2018.



1 13. Reference: FEI Phase 2 - Appendix B

2 3	13.1	Please clarify how the corrected age of the roads below affect the conclusions in Appendix B.
4 5		 a) Figure 5: North Road to Robinson was most recently paved in 2003, not 1989
6		b) Figure 16: Poirier to Baker was most recently paved in 2010, not 1966
7 8		c) Figure 20, Baker to Mariner Way was most recently paved in 1989, not 1962
9 10		 Figure 22, Mariner to Pinnacle, the eastern section was paved in 2017, not 1962.
11		

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12 Response:

The dates provided by the City in the information request do not reflect the information provided on the City of Coquitlam public mapping website, QtheMap. However, more recent paving activity in some areas was observed and documented in the Pre-Construction Roadway Condition Assessment (Exhibit B-12 - Appendix B) as follows:

- a. Refer to page 11 which states: "We note that sections of the road between Clairmont St
 and Emerson St <u>appear to have been repaved as part of recent transit system works</u>
 and these dates have not been noted on the City mapping system."
- b. Refer to page 22 which states: "The Coquitlam mapping system indicates that this section was last paved in 1965, although <u>it is possible that this area has been repaved</u> since that time."
- c. Refer to page 26 which states: "The Coquitlam mapping system indicates that this section was last paved in 1962, although <u>it is possible that this area has been repaved</u> since that time."
- d. Refer to page 28 which states: "The Coquitlam mapping system indicates that this section was last paved in 1962, although <u>it is possible that this area has been repaved or partially repaved</u> since that time."

29

The new information does not change in any appreciable manner the pavement condition observations or conclusions contained in Appendix B.