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May 23, 2024

Vivian Lenardon
Fruitvale, BC

vivianrocks@telus.net

Dear Vivian Lenardon:

Re: FortisBC Inc. (FBC)

Application for a Certificate of Public Convenience and Necessity for Approval of the Fruitvale Substation Project (Application)

Response to Vivian Lenardon (Lenardon) Information Request (IR) No. 1

On February 29, 2024, FBC filed the Application referenced above. In accordance with the amended regulatory timetable established in British Columbia Utilities Commission (BCUC) Order G-100-24 for the review of the Application, FBC respectfully submits the attached response to Lenardon IR No. 1.

FBC is requesting that Attachment 9 be filed on a confidential basis and held confidential by the BCUC in perpetuity, pursuant to Section 18 of the BCUC's Rules of Practice and Procedure regarding confidential documents, as set out in Order G-72-23. The information contains operationally sensitive details pertaining to the Company's assets which, if disclosed, could impede FBC's ability to work safely and reliably operate its electricity system assets and could increase the risk to the safety of both its workers and the public and/or jeopardize the safety, security, and operation of FBC's systems. FBC is unable to foresee a time when the information may no longer be confidential and, therefore, requests that the information remains confidential in perpetuity. A confidential version has been provided to the BCUC and Interveners who have signed a Confidentiality Declaration and Undertaking.

For convenience and efficiency, if FBC has provided an internet address for referenced reports instead of attaching the documents to its IR responses, FBC intends for the referenced documents to form part of its IR responses and the evidentiary record in this proceeding.

Further, FBC notes that the Lenardon IRs include lengthy preambles providing comments and the intervener's views. The BCUC has previously provided guidance[1] that any statements that are included in the preamble to an IR should be restricted to providing context for a question

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[1] In the matter of the FEI Application for a CPCN for the Advanced Metering Infrastructure Project, in its letter dated September 28, 2021 (Ex. A-15). https://docs.bcuc.com/documents/proceedings/2021/doc_64336_a-15-information-request-rules.pdf.

relevant to the proceeding submitted by the party to whom the IR is directed. The purpose of IRs is not to enable the author of the IR to introduce evidence, but to elicit relevant information on the evidentiary record or to clarify or test existing evidence to contribute to a better understanding by the BCUC of the relevant issues in the proceeding. In short, a preamble to an IR is not evidence, and should only provide context for why the intervener is asking the question.

Therefore, FBC has provided its responses to the IRs by focusing on the questions themselves, rather than parsing and rebutting each preamble. However, FBC wishes to be clear that the preambles contain inaccuracies and characterizations that FBC does not accept, and FBC's silence regarding the content of a preamble should not be interpreted as agreement. FBC may object to attempts in final argument to rely on the content of preambles to IRs.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC INC.

Original signed:

Sarah Walsh

Attachments

cc (email only): Commission Secretary
Registered Interveners

Following is a list of the engineering questions which I believe Fortis would have done 5 years ago when the project was conceived, and should be shelf ready. I respectfully request that Fortis **please provide** these studies. They will help in determining the necessity, alternatives & justifications, and project descriptions and costs of their proposal. These engineering reports are paramount. Fortis has to date not provided the routine studies that would prove much of what they have said. All of the studies requested should be shelf ready as the project was conceived 5 years ago. As well, most of these reports were asked in a letter submitted to Fortis back in May of 2023 and were basis for the BCUC letter of complaint.

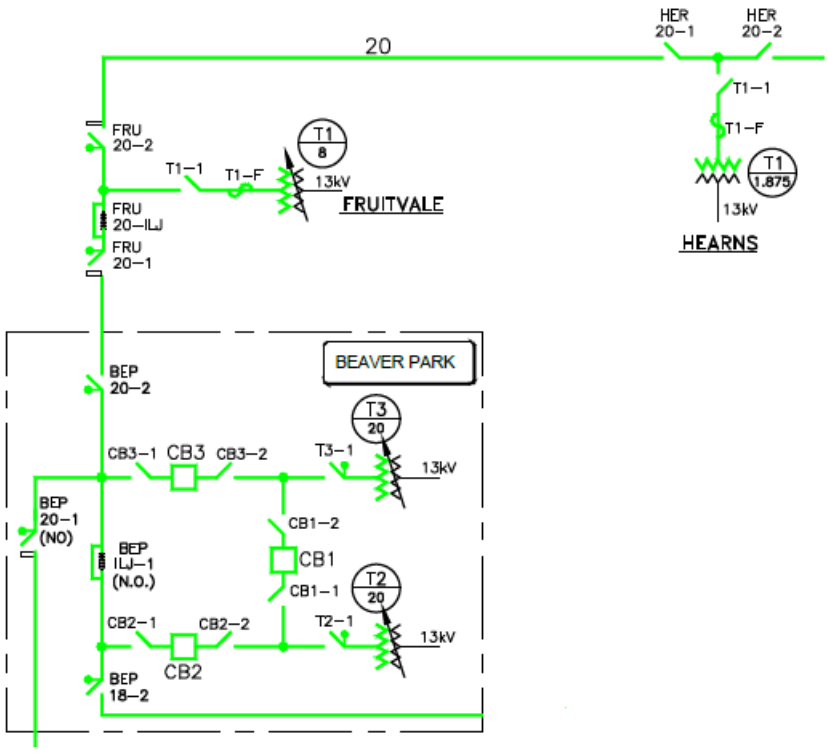
A: Sub transmission system feeding Fruitvale substation: Please provide

1. Single Line Diagram (SLD) of sub transmission system showing conductor sizes and substations on line.

Response:

The requested SLD is provided below. There are multiple different sections along 20L with different conductor types. When planning, the conductor with the lowest capacity (limiting conductor) is considered. The limiting conductor for both sections of 20L between Beaver Park/Fruitvale and Fruitvale/Hearns is 90 KCMIL CU.

Due to the fact that there are multiple different sections of conductor along 20L, it is not practical to show them all on a single line diagram.



2. voltage drops assuming all substations are fully loaded

Response:

The voltage drop between substations at the sub transmission level is not considered as part of the distribution load flow analysis as substation voltage is automatically controlled by the power transformer using a load tap changer (LTC) or by station voltage regulators to maintain acceptable voltage at the substation.

3. future sub transmission improvements if required

Response:

Please refer to the response to CEC IR1 7.2.

B: Hearns Substation: Please provide

4. 1: current peak load

Response:

Please refer to the response to BCUC IR1 3.1.

5. 2: load flow showing feed to ATCO if required

Response:

FBC cannot disclose load information related to ATCO for customer privacy purposes. However, the HER substation does not supply any large industrial customers.

C: COSTS AFFECTING RATE PAYERS: Salmo and Beaver Park Substation: Please provide

6. 1: total existing loading

Response:

The summer and winter peak loads for the Salmo and Beaver Park substations over the past five years are provided below.

Table 1: Beaver Park Summer and Winter Peak Loads

Year	Summer (MW)	Winter (MW)
2019	5.44	6.28
2020	5.38	6.11
2021	6.26	5.89
2022	5.83	6.83
2023	6.07	6.58

Table 2: Salmo Summer and Winter Peak Loads

Year	Summer (MW)	Winter (MW)
2019	4.37	6.41
2020	4.27	7.12
2021	5.06	8.49
2022	6.05	8.94
2023	5.87	9.42

7. 2: new installed capacity

Response:

Both the Salmo and Beaver Park substations were rebuilt with two 20 MVA transformers. Similar to the reliability need identified for the Fruitvale Project, the second transformer at each of the substations was installed for redundancy purposes. Accordingly, each transformer must be capable of serving all the load at the substation, and therefore the capacity of each substation is considered 20 MVA.

8. 3: total dollars spent on both substations

Response:

Salmo Substation Upgrade (2020-2021):

- Total actual capital cost: $9.851 million including Cost of Removal.

Beaver Park Station Upgrade (2021-2023):

- Total actual capital cost: $11.178 million including Cost of Removal.

D: Load Flows: Please provide

9. 1: SLD of the local system showing conductor sizes, normally open (N.O.) points, and existing loading.

Response:

Please refer to the response to BCUC IR1 3.1 regarding existing and historical loading.

The distribution system for the local system showing conductor size and normal open points is provided in CONFIDENTIAL Attachment 9.

FBC is requesting that Attachment 9 be filed on a confidential basis and held confidential by the BCUC in perpetuity, pursuant to Section 18 of the BCUC's Rules of Practice and Procedure regarding confidential documents, as set out in Order G-72-23. The information contains operationally sensitive details pertaining to the Company's assets which, if disclosed, could impede FBC's ability to work safely and reliably operate its electricity system assets and could increase the risk to the safety of both its workers and the public and/or jeopardize the safety, security, and operation of FBC's systems. FBC is unable to foresee a time when the information may no longer be confidential and, therefore, requests that the information remains confidential in perpetuity. A confidential version has been provided to the BCUC and Interveners who have signed a Confidentiality Declaration and Undertaking.

10. 2: load flows showing Fruitvale fed from Beaver Park in outage situation.

Response:

As described in the response to BCUC IR1 7.1, due to thermal and voltage limits, only a portion of FRU load can be transferred to BEP. The BEP and FRU substations are interconnected through a single distribution tie between Fruitvale Feeder 1 (FRU1) and Beaver Park Feeder 2 (BEP2). While the BEP transformers (two 20 MVA units) have sufficient capacity to carry additional load from FRU, to ensure thermal limits on BEP2 are not exceeded and to ensure acceptable end of line voltage for customers, 439 customers would be without service (including a large industrial customer).

The load flow considers historical winter 2022 peak load levels (BEP2 = 5.03 MVA, FRU1 = 4.21 MVA, FRU2 = 2.89 MVA) and assumes the mobile transformer will not arrive for an extended period of time due to weather, road restrictions, or unavailability. In the outage configuration described above, with the additional load from FRU, the BEP2 feeder would be loaded to approximately 63 percent of its capacity, end of line three-phase voltage would be approximately 112.5 V adhering to the CSA minimum voltage limit of 112 V for three-phase customers, and 439 customers would be without service. In this outage configuration, the loadings would be approximately 8.1 MVA for BEP T2 and 2.1 MVA for BEP T3.

In comparison, if all of the FRU load was transferred to the BEP substation, the BEP2 feeder would be overloaded to approximately 103 percent of its capacity, and end of line three-phase voltage would be approximately 104.1 V, outside the CSA minimum voltage limit of 112 V for three-phase customers.

There are already power poles running along the highway from Park Siding where the Hearn's station is. Realizing a small amount of feeder work may be required:

11. **1: Please provide the study to show that feeding Atco from Hearns can not be done with the existing Hearns substation.** Necessity: This would substantially cut the FRU load indefinately. In any case, it's not the public's responsibility to provide service to a sawmill, and Fruitvale can be fed from Beaver Park.

Response:

Given the current system configuration, there is not a supply from Hearns Feeder 1 (HER1) to only the industrial customer such that only the industrial customer could be offloaded to HER. Fruitvale Feeder 2 (FRU2) supplies the industrial customer, and other residential and commercial customers along Old Salmo Road and near the Grieve Location. The only way to currently offload the industrial customer to the HER substation is to entirely offload FRU2 to HER1, which cannot

be accommodated as the HER T1 transformer is not large enough to support the load. The existing HER T1 transformer has a capacity of 1.875 MVA.

However, in order to be responsive, FBC provides load flow results that consider offloading FRU2 entirely to HER1 assuming the following: the load flow is the historical winter 2021 peak load level with a 1 percent load growth factor applied for HER1 (HER1 = 0.82 MVA), and the historical winter 2022 peak load level for FRU2 (FRU2 = 2.89 MVA). With the additional load from FRU2, the transformer HER T1 would be overloaded to 213 percent of its capacity, and end of line three-phase voltage would be approximately 106.3 V, which is outside the CSA minimum voltage limit of 112 V for three-phase customers.

In order to accommodate the industrial customer from HER, the HER substation would need to be rebuilt with a larger power transformer installed, and line upgrades could include, but are not limited to, at minimum constructing a new 0.5 km distribution line to supply the industrial customer only from the existing feeder HER1 and installing a three-phase voltage regulator. This is also expected to reduce reliability for the industrial customer as they would now be supplied by a longer distribution line from the HER substation (approximately 8 km) and exposed to outages along the length of this line.

However, even if the work described above was undertaken to supply the industrial customer permanently from the HER substation (which includes entirely rebuilding the HER substation), offloading the remaining FRU load to the BEP substation would still result in end of line three-phase voltages of approximately 108.6 V, which is outside the CSA minimum voltage limit of 112 V. This configuration is also expected to reduce reliability for the Fruitvale load centre, as it would be supplied by a longer distribution line from the BEP substation (approximately 8 km) and exposed to outages along the length of this line.

The load flow results provided above only indicate the challenges associated with historical winter peak load levels from 2022. The thermal and voltage constraints will only increase as load continues to grow. These load flow results do not consider native load growth, electric vehicles, electrification, or unknown potential new large loads, and therefore the above requested configurations are also not feasible from the perspective of planning for future growth. FBC does not plan its system based on a single year of historical load data but considers a 20-year load forecast considering all customer types.

12. **2. Please show Fruitvale fed from Beaver Park with Atco removed** Necessity-A SLD (single line diagram) of the distribution system showing ties to adjacent stations and conductor sizes.

Response:

Please refer to the response to Lenardon IR1 11.

An SLD of the transmission system has been provided in the response to Lenardon IR1 1 and an SLD of the distribution system has been provided in Confidential Attachment 9 to Lenardon IR1 9.

E: EXISTING LOAD: PLEASE PROVIDE:

13. 1: Existing load on Fruitvale substation.

Response:

Please refer to the response to BCUC IR1 3.1.

14. 2: Existing capacity.

Response:

As described in the response to BCUC IR1 3.1, FRU T1 is nominally rated 8 MVA.

15. 3: Load with ATCO removed

Response:

FBC is not able to provide the requested information due to customer privacy. Removing ATCO's load from the existing load at the FRU substation will indirectly provide a single customer's consumption information.

F: ALTERNATIVES:

16. All alternatives examined including deferral of second transformer at each substation and associated cost savings.

Response:

The alternatives considered and evaluated for the Project are set out in detail in Section 4 of the Application. Please also refer to the response to BCUC IR1 7.4 for further details on why even if FBC were to upgrade the FRU substation to a single transformer configuration, the existing FRU site is still not feasible.

Finally, deferral of the second transformer at the New FRU Substation would result in the Project not meeting the objective to address reliability related to the single-transformer configuration. Deferral of the second transformer at the New FRU Substation would result in approximately $2.5 million of cost savings.

G: Outages:

BCUC has covered this

H: COST TO RATEPAYER:

17. **Please provide combined total of Salmo, Beaver Park and FRU**

Response:

FBC is unclear as to the relevance of combining the capital costs of the three distinct substation projects referenced in this question; however, to be responsive, the total combined actual costs for the Salmo and Beaver Park projects were $21.029 million (please refer to the response to Lenardon IR1 8 for the individual costs and timing of the Salmo and Beaver Park projects).

The total Project cost estimate for the New FRU Substation is $18.867 million in as-spent dollars, including Cost of Removal and Allowance for Funds Used During Construction (AFUDC).

I: COST TO RATEPAYER: PLEASE PROVIDE

18. 1: anticipated effect on rate base

Response:

The incremental impact to FBC's rate base resulting from the Project is estimated to be $18.446 million in 2027, as shown on Line 7 of Table 6-3 of the Application.

19. 2: Annual rate increases for last 5 years

Response:

Please refer to the below table for FBC's approved annual general rate increases for the last five years.

Year	Rate Increase (%)
January 1, 2024	6.74
January 1, 2023	3.98
January 1, 2022	3.47
January 1, 2021	4.36
January 1, 2020	1.00

20. 3: kWh rate for residential for last 5 years

Response:

Please refer to the below table which sets out the energy (kWh) rate for FBC's Residential Rate Class 1 (RS 1) for the last five years. Please note that FBC was phasing out its Residential Conservation Rate (a two-tiered energy rate) and January 1, 2023 was the first year of the flat rate.

Year	Block 1 (first 1,600 kWh)	Block 2 (all remaining kWh)
January 1, 2024	n/a	$0.14160
January 1, 2023	n/a	$0.13266
January 1, 2022	$0.12365	$0.13713
January 1, 2021	$0.11601	$0.14118
January 1, 2020	$0.10799	$0.14320

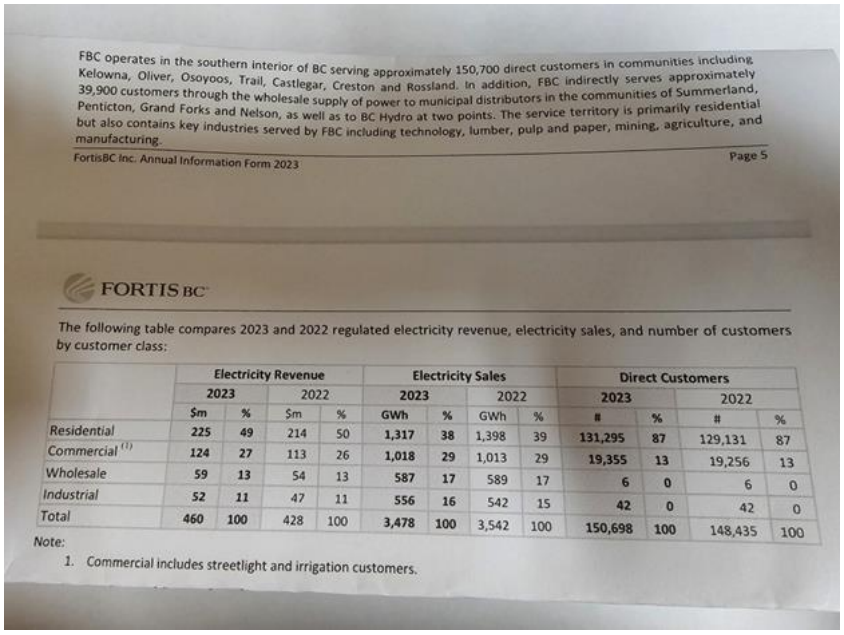
Fortis Fruitvale Cost Report

Attached is text and a table taken from FortisBC Inc Annual Information form 2023 that was released by FortisBC on March 28, 2024 for the year ended December 31, 2023.

Per the text on page 5, FortisBC states that it serves approximately 150,700 direct customers for residential, commercial, wholesale and industrial usage, along with approximately 39,900 through wholesale supply of power.

The table following page 5 compares 2023 and 2022 electricity revenue, electricity sales, and customers by class.

- The direct customer numbers in 2022 is 148,435 compared to 150,698 in 2023 which is an increase of 2,263. A further breakdown of the customer numbers by customer class is provided and you will note that residential customers increased by 2,164 from 2022 to 2023, and commercial customers increased by 99 from 2022 to 2023. Both wholesale and industrial customers did not change.
- The total revenue for all the customer classes increased from 428 million dollars in 2022, to 460 million dollars in 2023, an increase of 32 million.
- The reduction in electricity consumption (GWh) (electricity sales), from 3,542 GWh in 2022 to 3,478 GWh in 2023, is 64 GWh.
- **In summary, an increase in customers and a reduction in GWh consumption equals an increase in revenue for Fortis in the amount of 30 million dollars** from 2022 to 2023.



FBC operates in the southern interior of BC serving approximately 150,700 direct customers in communities including Kelowna, Oliver, Osoyoos, Trail, Castlegar, Creston and Rossland. In addition, FBC indirectly serves approximately 39,900 customers through the wholesale supply of power to municipal distributors in the communities of Summerland, Penticton, Grand Forks and Nelson, as well as to BC Hydro at two points. The service territory is primarily residential but also contains key industries served by FBC including technology, lumber, pulp and paper, mining, agriculture, and manufacturing.

FortisBC Inc. Annual Information Form 2023 Page 5

FORTIS BC™

The following table compares 2023 and 2022 regulated electricity revenue, electricity sales, and number of customers by customer class:

	Electricity Revenue				Electricity Sales				Direct Customers			
	2023		2022		2023		2022		2023		2022	
	$m	%	$m	%	GWh	%	GWh	%	#	%	#	%
Residential	225	49	214	50	1,317	38	1,398	39	131,295	87	129,131	87
Commercial [1]	124	27	113	26	1,018	29	1,013	29	19,355	13	19,256	13
Wholesale	59	13	54	13	587	17	589	17	6	0	6	0
Industrial	52	11	47	11	556	16	542	15	42	0	42	0
Total	460	100	428	100	3,478	100	3,542	100	150,698	100	148,435	100

Note:
1. Commercial includes streetlight and irrigation customers.

Page 7 of the FortisBC Inc. Annual Information Form 2023, refers to power purchase agreements FortisBC has and states that “These power purchase contracts have been

accepted by the BCUC **and <u>prudently incurred costs thereunder flow through to customers through electricity rates</u>."**

The estimated cost for the (Fruitvale, Salmo, and Beaver Park) substation projects is more than 50 million dollars, of which approximately two-thirds has already been spent on the Salmo and Beaver Park upgrades, the balance of which is targeted for the Fruitvale substation proposal. These upgrades and proposed new substation build in Fruitvale result in 5 times the capacity needed, in this part of the province.

What is not clear is the usage for all this power.

<u>Note</u>:

- It is important to note **that the Fruitvale area has shown no real load growth in 40 years**
- The company's own outage statistics have not been provided to support their claim that the transformer is going to fail.
- Clarification is sought on whether or not the April 1, 2024 increase in the federal carbon tax has been applied to the cost projections for goods and services required for constructing the Fruitvale substation, which will be added costs if not included.

Ultimately it is the customer, the majority of which are residential customers, that will be paying for these projects costing in excess of <u>50 million dollars</u> through the current electrical rates and through future rate increases. **This is a significant amount of money that will be downloaded to the customers**

FortisBC is a for profit company and has a vested interest in increasing shareholder profits. This can be done by new substation builds (Fruitvale) **the cost of which will be passed on to the customer through rate increases.**

Fortis BC rates are currently higher than BC Hydro, and the utmost scrutiny for the Fruitvale substation project is required by the BCUC since customers will be negatively impacted, financially, if this Fruitvale substation project is approved.

J: DESIGN: PLEASE PROVIDE

21. 1: Review of substation design and need for 63 kV breakers

<u>Necessity and Alternatives</u> are breakers really needed for this size of transformer. This would be confirmed by a review of the overall design. They don't have to be in a substation if vacuum devices are used.

Response:

As has been affirmed by the BCUC in the past, a preamble to an information request is not evidence and its only purpose is to provide context for why the intervener is asking the question. As such, FBC has responded to the question above, not to the preamble, and FBC's silence on any statement in the preamble does not indicate agreement.

Please refer to the response to BCUC IR1 7.4, which sets out FBC's current standards for its substations, including why high voltage fuses are no longer installed to protect substation transformers that are 10 MVA or larger.

Please also refer to the response to Lenardon IR1 25 for a discussion of alternatives related to vacuum interrupters and enclosed switch gears, as requested in the preamble to both Lenardon IR1 21 and 25.

K: PROJECT DESCRIPTION & COST: PLEASE PROVIDE:

22. 1: Proposed new feeder routes

Response:

The proposed new feeder routes for the New FRU Substation for the preferred Highway 3B Option are shown in Confidential Appendix C-3 on pdf page 85. The new feeder routes for the Old Salmo Road Option are also shown on pdf page 86.

23. 2: Their costs since the proposed new location has feeder routes not previously accounted for.

Response:

The distribution reconfiguration required to accommodate the new source of supply for the preferred Highway 3B Option at 2064 Grieve Road has been provided in Section 5.3.3 of the Application. These costs are included in the total estimated cost for the Project in Table 6-1 in Section 6.2.

24. 3: Please show future routes also. Since the substation is being designed for multiple feeders where are they all going to go? Fortis has not shown the new feeder routes and it will be very expensive and difficult to bring 4 feeders back to the load centre. This must be considered in total cost.

Response:

The Project includes provisions for four distribution feeders in total. Three distribution feeders will be installed at the time of construction and, therefore, are included in the total estimated cost for the Project. As noted in the response to Lenardon IR1 22, the proposed routes for these three distribution feeders are included in Confidential Appendix C-3 on pdf page 85. The new route for the fourth feeder will depend on how load grows in the area and thus has not been determined at this time. It is normal and cost-effective to include an option for future growth by providing for a fourth feeder. As shown in Figure 4-2 of Section 4.3.3.2 of the Application, the New FRU Substation at 2064 Grieve Road will be sited near the load centre.

L: PROJECT NEED, ALTERNATIVES & JUSTIFICATION, PROJECT DESIGN

It appears that half of the footprint size of the new design is taken up by circuit breakers. The size of this proposal can be significantly reduced, probably by half, if fuses were used. At 63Kv, fuses are not uncommon.

Section 1.1.2.1 Fruitvale Substation Condition Issues On page 3 of the Application for a Certificate of Public Convenience and Necessity for the Fruitvale (FRU) Substation project, FortisBC Inc. identifies one of the drivers of the FRU Substation Project (Project) need as:. (my comments and alternative suggestions have been added in red)

"The FRU substation is supplied by the transmission line 20L through high voltage fuses. A station design using high voltage fuses with distribution switchgear creates a higher arc flash hazard, increasing employee safety risk. Due to the arc flash hazard posed by the (high voltage fuses) enclosed switchgear at FRU, crew personnel are required to wear restrictive high level personal protective equipment (PPE) to perform any switching at this station... **ALTERNATIVE (a):** Vacuum interrupters can be used in conjunction with fuses as an option in case of a fault on the transmission line. These can be pole mounted outside the substation thus reducing the need for breakers and reducing footprint size. Breakers are used for higher loads. Vacuum interrupters are common on 63kv switches to reduce the arcing.

ALTERNATIVE(b): Enclosed switch gear can be operated remotely and represents far less risk to employees and surrounding equipment.

1.1.2.1 A fault inside the switchgear equipment can also result in an arc flash explosion that can damage surrounding equipment. Enclosed switch gear seldom fails explosively.

25. 1. **Please provide maintenance report on explosive failures to switch gear**. To improve safety and reliability, new FBC substation designs replace high voltage fuses with high voltage circuit breakers. Fuses are not uncommon at this voltage level. This new design requires much more space, possibly even twice as much.

Response:

FBC has not had explosive failures to its switchgear at the FRU substation to date.

The following provides additional detail on the need for high voltage circuit breakers and addresses each of the alternatives proposed in the preamble to this question.

Re ALTERNATIVE (a): "Vacuum interrupters can be used in conjunction with fuses as an option in case of a fault on the transmission line. These can be pole mounted outside the substation thus reducing the need for breakers and reducing footprint size. Breakers are used for higher loads. Vacuum interrupters are common on 63kV switches to reduce the arcing."

Vacuum interrupters and adequately rated line switches in conjunction with high voltage fuses cannot be used for transformer protection for the reasons outlined below:

- High voltage fuses are not ganged and operate in a single-phase individual fashion during fault situations, instead of an all three-phase type operation comparable to a circuit breaker. If a fault originates on one phase only and is isolated by a single high voltage fuse, which could take a few seconds to open due to the time-based current curve of the fuse, this single-phase fault can spread to other phases and evolve into a multi-phase fault causing more widespread equipment and possibly environmental damage.
- High voltage fuses only provide one defined time-over-current curve based on the size of the transformer they are protecting. This limits upstream and downstream protection coordination, which results in slower fault clearing times. Slower fault clearing times expose all station equipment to high through-fault currents, resulting in damage and outages.
- High voltage fuses do not provide an isolation point that can be operated from the station's protection such as transformer non-electrical devices (e.g., low oil, fast gas, etc.). Transformer alarms require a call out to site for any repairs which if not acted on in time could result in a serious equipment damage or failure.
- Vacuum interrupters and adequately rated line switches in conjunction with high voltage fuses do not provide any remote System Control and Data Acquisition (SCADA) visibility or control; an outage is normally called in by customers that have lost power. After a fuse operation for any station issue, switching cannot be performed remotely to restore power to customers. Fuses are required to be replaced at site, which could take hours before

power is returned. Restoration and switching takes a long time, especially at remote stations.

- Fuses also do not provide any self-diagnostics. FBC could be unaware if a fuse has failed or is damaged. Larger outages and equipment damage could result when such a fuse is called upon to operate during a fault.

Re ALTERNATIVE (b): "*Enclosed switch gear can be operated remotely and represents far less risk to employees and surrounding equipment."*

The challenges associated with metal-clad switchgear and the ability to operate the FRU switchgear remotely are as follows:

- Although switchgears can be operated remotely, remote operation is dependent on operating conditions. Due to the age and condition of the FRU switchgear, there is risk that the switchgear will fail in a manner such that it cannot be operated remotely. Remote operation does not eliminate the risk that at the time of operation the switchgear will fail catastrophically, exposing workers and the public in the vicinity to hazardous conditions.
- CEATI Report T123700-3083 states on page iv, "The majority of North American utilities did not pay a lot of attention to the risks associated with the failure of metal-clad switchgear until the increased awareness underlined by the OHSA (Occupational Health and Safety) Standard 1910.269, which has regulated protective clothing for electrical workers since 1994, and by the release of the 2000 revision of NFPA (National Fire Protection Association) Standard 70E. Since that time a lot of attention has been paid to risks associated with arc flash. While much of the concern has been directed towards protecting workers from hazards of arcing faults in low voltage switchgear, the increasing presence of related advertising in trade press has heightened the awareness of workers, utility and non-utility management of the standards that already provide for medium voltage arc-resistant switchgear construction and testing." During this study's survey, CEATI found that "results indicate that the hazards related to working with older, non-arc resistant metal-clad switchgear are becoming widely recognized."
- The CEATI Report also found that switchgear "metal-clad failure rates are typically grossly under reported" (pg. 3-3). The research found that only 20 percent of switchgears in service were over 30 years. FBC has experienced two switchgear failures in the last 12 years; both switchgears were near or over the age of 30.
- FBC has provided the switchgear condition assessment report for the FRU switchgear in Appendix A of the Application.

Re ALTERNATIVE (c): "Depending on the rating of the switch, it may be the switch is approaching its specification. Replace with a higher rated switch if this is the case."

The hot spots reported on FRU 20-1 and 20-2 that are referred to in the preamble are not the result of FRU 20-1 and 20-2 being loaded near specification. Hot spots are exacerbated at peak;

however, they have been reported at lower loading. Replacing FRU 20-1 and 20-2 with higher rated switches on wood structures will not prevent this issue from re-occurring.

Hot spots can occur on high voltage switches mounted to transmission structures over time. Hot spots result from misalignment and changes in mechanical pressures caused by the pole shifting from the freeze-thaw cycle effect.

Replacing FRU 20-1 and 20-2 will not reduce the footprint of the station due to the superstructures required to support the switches.

High voltages switches are not a fault interruption device, as discussed above under alternative (a).

1.1.2.1 Additional equipment issues found at the FRU substation include hot spots on the 63 kV transmission switches FRU 20-1 and 20-2, which show signs of contact overheating during peak load conditions. **ALTERNATIVE (c)**: Depending on the rating of the switch, it may be the switch is approaching its specification. Replace with a higher rated switch if this is the case.

26. (2) **If these alternatives are not acceptable for reliability, please explain why not**

Response:

Please refer to the response to Lenardon IR1 25.

M: PROJECT DESCRIPTION and COST: PLEASE PROVIDE

27. 1. Proposed Footprint size

Response:

The proposed footprint for the New FRU Substation at the Grieve Location for the Highway 3B Option is approximately 3,000 m^2 (60m x 50m). Please refer to the responses to BCUC IR1 7.4 and 7.5 which set out FBC's design standards and the need for the minimum typical substation size of 2,500 m^2. FBC clarifies that the statement in its Application at Section 4.3.2.1 regarding a typical 63 kV radial substation refers to a substation such as the FRU substation that is supplied by a 63 kV transmission line that is operated radially.

Capacitors can be installed on the poles to decrease footprint size. As well, if vacuum interrupters are used, they can be pole mounted and used instead of breakers to decrease footprint size.

CPCN section 4.3.2.1 The existing site is too small to accommodate a one- transformer substation that meets FBC's current design standards. The standard station footprint size for a typical 63 kV radial substation with either a single or two-transformer configuration is 4,736 m^2 (or 61.5 m by 77 m) with a minimum typical size of 2,500 m^2 (or 50 m by 50 m). In contrast, as discussed in Section 3.2, the existing FRU substation footprint is approximately 640 m^2 with an irregular shape (the FRU substation property itself is approximately 1,400 m^2; as a result, the existing location is too small to accommodate upgrades to the station equipment.

FortisBC indicates that their current design standard for a **radial** substation is too small and they provide a diagram to show this is true. The problem is that ***the existing Fruitvale station is not a radial station on the transmission grid.*** It's like comparing apples to oranges. The transmission line enters from one side and exits through the other side. This allows the station to be fed from the Salmo station or the Beaver Park station ***(better reliability,).*** I am not sure if the distribution feeders are radially connected or if they have alternative feeds. Sometimes feeders exiting stations are built in a ring with multiple possible open points so that problem areas can be isolated and minimize the affected customers. **I don't see where the feeders have been included in the total cost of the proposal.** At least 2-477mcm under built circuits will have to be placed on the 60 kV line going into Fruitvale. No estimated cost for this has been provided and was not included in the BCUC application. If Fortis hasn't figured this out yet, then why plan for multiple feeders. You can only put two feeders on a pole, so now you have to put 2 pole lines, one on either side of the road. This isn't going to be cheap or pretty. I assume it could be comparable to running new poles from Hearns to Fruitvale, which they don't want to do and said it could cost $10million. Further, Fortis can design a substation standard anyway they choose. Not all cookie cutter designs fit into the same category, the same terrain, the same community. Respectfully, these standard cookie cutter designs are for the ease and convenience of Fortis and has nothing to do with Public Convenience. There are alternatives on the market to reduce the footprint while maintaining reliability **if the project is deemed necessary.** Innovative solutions is one of their tag lines, and it does look like a properly designed substation could be built on the existing site. It would however be a different design. This location is ideal for feeder egress. As well, I wonder if the existing sub transmission line can support these 3 substations under full load. Additional subtransmission lines or upgrades will likely be required.

CPCN Application 5.3 pg 48 states: The final location for the substation may shift approximately 20 meters in any direction subject to final design and

engineering/operational considerations. 20 meters is 65.7 feet in any direction. This is unacceptable. Project approval is based on accurate and detailed work, and location affects accurate overall costs, details as well as overall disruption to land, a community, wildlife corridor, and rural lifestyle. When my partner and I walked the property with Fortis officials, we were shown where, upon approval, it would go, and that it could possibly move **2- 3 feet** in any direction. There's a big difference between 2-3 feet and 65.7ft. It's very hard to trust anything we are being told when seeing things in writing is much different. Fortis is not being transparent to leave this clause in with respect to 'what may be found under ground.' I would expect a more accurate assessment of the land is required prior to final decision and not after. Any substantial move, and 65.7ft is substantial, would be a red flag that the BCUC would need involvement.

M POINT RECAP

- Capacitors can be installed on the poles to decrease footprint size
- if vacuum interrupters are used, they can be pole mounted and used instead of breakers to decrease footprint size.
- the current FRU substation is approximately 640m^2
- Salmo is approx 45mx45m =2025m^2
- the proposal for this substation is based on equipment condition and not load growth
- a substation 50mx50m =2500m^2 is 3.9 times the size of the current station
- new equipment is often smaller than older equipment
- the footprint size of the proposed substation is not in the CPCN
- the footprint size of the proposed substation must be made public
- new standard radial substation design is 61.5mx77m= 4735.5m^2 and 7.4 times the size of the current substation and completely out of proportion to community need.
- current FRU substation is not radial
- Mazocchi proposal design to supply Fruitvale was:
- lot size- 53 m x 77 m = 4081 m^2
- footprint size- 49 m x 63.5 m = 3115.5 m^2 = 4.87 times existing site, again, out of proportion to community needs

N: PROJECT DESCRIPTION:

May 17, 2023 Greg Nesteroff from My Kootenay Now writes "The current zoning allows utility use and at 10 acres, it's larger than the three acres they require. Brown said that gives them options for siting the new substation and other opportunities with the remaining property." (zoning is being interpreted by RDKB area A staff how they like as the wording

and entire context of their bylaws says different and is being dismissed. A public document in this regard was submitted as a letter of comment to BCUC)

source: FortisBC proposes new location for Fruitvale substation - My Kootenay Now

As per CPCN Guidelines appendix A4.(i)Description of the project, its purpose and cost, including engineering design, capacity, location options and preference, safety and reliability considerations, and all ancillary or related facilities that are proposed to be constructed, owned or operated by the applicant:

28. 1: **Please provide** all ancillary or related facilities that are proposed to be constructed, owned or operated by the applicant.

A prudent company would subdivide it in order to reduce their land costs.

Response:

FBC reiterates that, as has been affirmed by the BCUC in the past, a preamble to an information request is not evidence and its only purpose is to provide context for why the intervener is asking the question. As such, FBC has responded to the question above, not to the preamble, and FBC's silence on any statement in the preamble does not indicate agreement.

FBC intends to retain the full Grieve Location property and does not intend to subdivide it for sale or other purposes. FBC will assess how best to utilize the remaining portions of the property in the future.

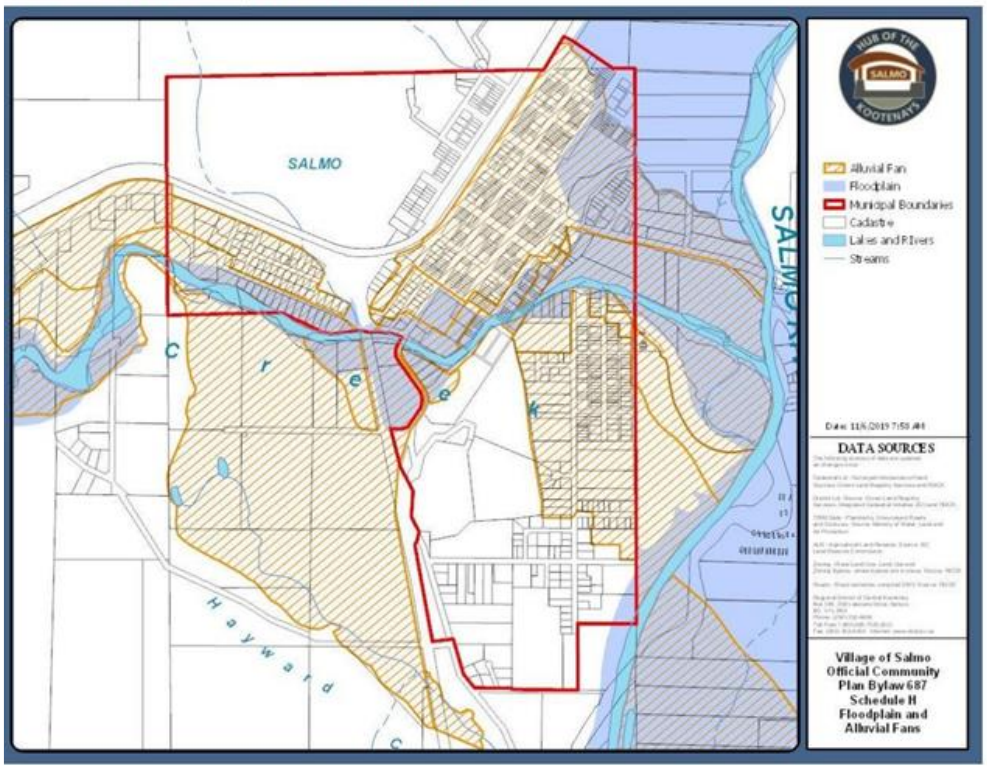
ALTERNATIVES AND JUSTIFICATION

CPCN APPLICATION 4.4 SITE SELECTION p 33 table 4-2 shows reasons of other locations' faults. Flooding is mentioned in regards to 3 of these locations. Provided is a floodplain map of the Village of Salmo.

CPCN APPLICATION 4.42 Flooding, Terrain and/or Infrastructure Factors: A number of the available sites considered by FBC were ultimately rejected because the potential for flooding, challenging terrain, and/or the need to reconfigure transmission and distribution line infrastructure resulted in the sites being unfeasible.

With regard to steep terrain, I live here in the Kootenays and Whitewater substation on Hwy 6 between Ymir and Nelson has a substation in steep terrain with the potential of falling trees, which are now mostly cut down. It is10km from the whitewater resort. I presume that many substations in BC have been built on slopes and are further than 10km from the load.

12.7. Schedule H: Floodplain and Alluvial Fans



O: PROJECT DESCRIPTION EMF PROFILE:

29. Please Provide EMF profile at max current, produced specifically for this project up to 40 m away showing reasonable precautionary measures away from adjacent property lines.

Response:

The power lines entering and leaving the substation are generally the strongest source of magnetic field outside of a substation. The magnetic field produced by equipment within the substation is typically indistinguishable from the background levels from other sources beyond the substation fence. Transformers within substations are not a high source of magnetic field. To maximize efficiency, modern power transformers are designed and constructed to contain the magnetic field in the core of the transformer.

Therefore, FBC provides two magnetic field strength profiles based on the preliminary design for the transmission line that will connect to the New FRU Substation, and the existing transmission line on Old Salmo Road. FBC does not expect the final design for the new line to vary significantly from the preliminary design.

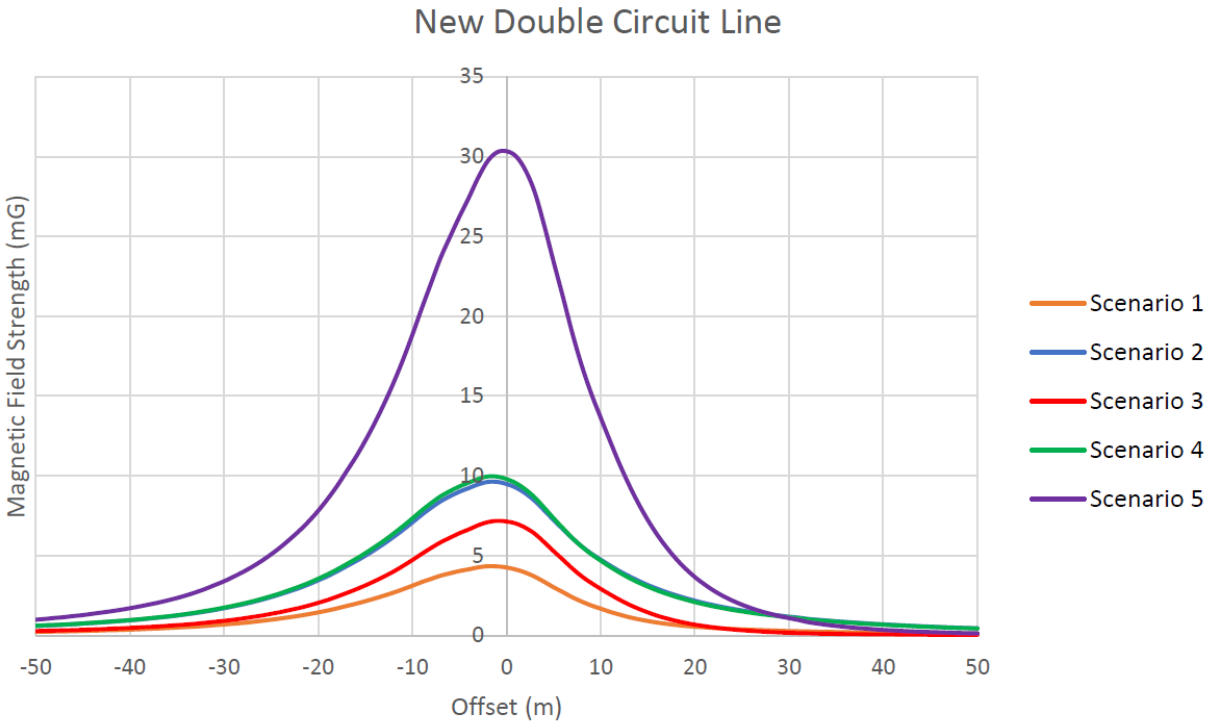
As shown in the below figure, the magnetic field levels are well below the exposure guidelines developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which

are endorsed by the World Health Organization. ICNIRP is a formally recognized, international non-profit organization made up of independent scientific experts that are responsible for providing guidance and advice on non-ionizing radiation protection for people and the environment. In its guidelines update in 2010, ICNIRP recommends a residential magnetic field exposure limit of 2,000 milligauss (mG) and an occupational exposure limit of 10,000 mG.

FBC has modeled five scenarios to show the EMF levels for the New FRU Substation power lines and the figure shows that even at the highest power levels for the lines, EMF levels are well below the exposure guidelines.

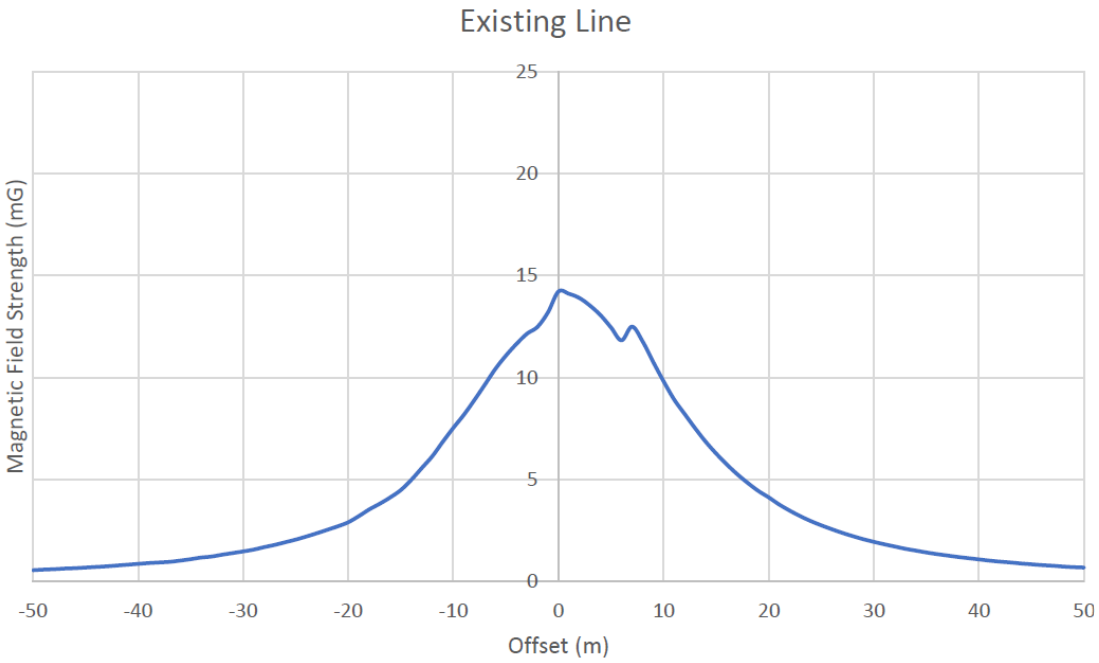
- **Scenario 1: 20-year Forecast Load.** This is the maximum normal load anticipated in the next 20 years, with the existing transmission line conductor. This is the everyday condition that will exist when the new line is constructed.
- **Scenario 2: Maximum Fruitvale Station Load.** This is the maximum possible normal load the station is designed for, with the existing transmission line conductor.
- **Scenario 3: Emergency Rating, 20-year Forecast Load.** This is the maximum emergency load anticipated in the next 20 years, with the existing transmission line conductor. The emergency rating can only be applied for a period of six hours, so this scenario cannot be sustained for long periods.
- **Scenario 4: Emergency Rating, Maximum Fruitvale Station Load.** This is the maximum possible emergency load the station is designed for, with the existing transmission line conductor. The emergency rating can only be applied for a period of six hours, so this scenario cannot be sustained for long periods.
- **Scenario 5: Emergency Rating, Future Reconductoring and Maximum Fruitvale Station Load.** This is the maximum possible emergency load the station is designed for, with upgraded transmission line conductor (anticipated upgrade in 2028-2029 as explained in the response to CEC IR1 7.2). The emergency rating can only be applied for a period of six hours, so this scenario cannot be sustained for long periods.

Figure 1: Magnetic Field Profile for the New Double Circuit Line that will Connect the Substation to the Existing Line on Old Salmo Road



For comparison purposes, FBC also provides the magnetic field profile for the existing line on Old Salmo Road that connects to the existing FRU substation. The EMF profile shows the maximum emergency rating for the existing transmission line and compares to Scenarios 3 and 4 as modelled for the new line. This is the maximum emergency load anticipated in the next 20 years.

Figure 2: Magnetic Field Profile for the Existing Line on Old Salmo Road



The magnetic field strengths for all scenarios on the new line and for the existing line drop steeply within the first 20 metres and then to approximately 1 mG at a distance of 40 metres from the line. Under normal operation, the magnetic field strength directly under the new section of the transmission line will be more than 250 times lower than the ICNRIP recommended exposure limit for residential and even under the higher short-term emergency loading scenarios, the magnetic field strength will be more than 60 times lower than the ICNRIP recommended exposure limits. The addition of the new section of transmission line will not significantly impact magnetic field levels in the area.

P: Project Description: Screening and Trees

30. Please Provide: I would like to confirm in writing that a cedar fence made of 1x6 x9ft tall, spaced no more that 1 inch apart, will be installed along the length of our property, 2080 Grieve Rd, on the side that abuts the 2064 Grieve Rd property. It could be rough cut. A variance permit to build it 9 feet would be required and is doable, as there is a fence in the town of Fruitvale with a variance. Cedar is important because of it's durability, strength and asthetics value. As well, please confirm that the 40year old full grown lilacs around our fish pond will not be removed and only minimally disturbed if necessary. They will not grow taller than they are now.

It was also requested that the back portion of our property, 2080 Grieve RD, be planted with fir, pine, cedar or any combination so as to shield the neighbors from the proposed substation.

Further, there is ample room on 2064 Grieve Rd to plant cedar hedging which grows very tall, upwards of 20feet, on the outside of the proposed station's chain link fence, and to confirm the use of concrete blocks that was proposed in the Mazocchi site should this unwanted project be approved.

Response:

FBC appreciates receiving feedback from Ms. Lenardon on her individual greening and screening recommendations and has recorded her request in the Stakeholder Engagement Log. FBC will work directly with Ms. Lenardon on her request. Please also refer to the responses to BCUC IR1 14.2 and 14.4 for further information on how FBC intends to work with residents on greening, screening, and station aesthetics.

Attachment 9

FILED CONFIDENTIALLY