SCLG Final Argument re SR1 ~ NRCB Application No.1701 ~ April 6, 2021

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0.0 INTRODUCTION

1. Introduce the final argument for the SCLG. This argument will address the issues identified by the Board in the 5 topic blocks.

2. To the extent that this argument does not specifically address matters raised by AT, CRCAG or the City of Calgary in their final arguments, SCLG's positions remain as expressed in its previous submissions and through the public hearing process.

0.0 THE PUBLIC INTEREST

3. Is the test for whether or not the SR1 application is in the public interest is that it is "better than nothing?"

4. Is the public interest test served when only a portion of the public is protected, in this case the homeowners downstream of the Glenmore reservoir in Calgary? Meanwhile the Alberta residents upstream of SR1 in Redwood Meadows and Bragg Creek are hung out to flood?

5. If approved, one community wins flood protection to a 1 in 200 year level and one loses its environment, its heritage, its inheritance, its culture, its quality of life and potentially, its future. Does this serve the public interest?

6. In the Cougar Creek decision, NR 2018-01, the Board stated at pdf pg. 82:

> **14.2: Public Interest Test**
>
> [345] The Board does not have a fixed formula for determining whether a reviewable project is in the public interest. The outcome of a Board review is shaped by the nature of the project under review, its location, community support for the project, the project's impact on the natural environment and the project's contribution to public benefits. There is no fixed objective test, but to make the determination, the Board balances the economic, environmental and social interests in the context and time period in which they arise. In the Board's view, for a project to be in the public interest, the Board must be convinced that the identified project benefits the region and the province, and is consistent with any applicable *Alberta Land Stewardship Act* regional plan, without generating unacceptable economic, social or environmental impacts.

7. Cougar Creek had an estimated $38 million dollar construction cost. SR1 does not have the support of the Springbank community. SR1 does not benefit the region upstream of SR1 and generates unacceptable economic, social and environmental impacts between SR1 and the Glenmore Reservoir.

8. Is the test of public interest time-specific? This SR1 project will be here for hundreds of years. Is it "public interest" for the next 5 years because Calgary needs flood mitigation now and this is the only project before the Board? Should not consideration of the public interest on a long-lived project like SR1 consider the next 50 years? the next 100 years? the next 200 years? What if, as Dr Fennell stated last week, the 1 in 500 year flood becomes the 1 in 200 year flood? What is the responsibility of this Board to consider the long-lived nature of this project?

9. Is a test of public interest to consider whether this Project manages our precious water resource, the Elbow River, for future generations? After all, the name of this Board is the Natural Resources Conservation Board with emphasis on Conservation.

10. Is it in the public interest to invest over ½ a billion dollars in a project that will sit idle while severe drought and climate change takes hold over the next 100 years?

11. Is it in the public interest to approve a project that has not considered the worst case scenarios?

12. Is it in the public interest to approve a project where modelling changes and recalculations continue to be made even as late as March 2021 (for instance, the soil and sediment modelling revisions and the air quality modelling revisions in Ex. 327)?

13. Is the public interest served when material costs have been hidden from public view, are uncertain, or simply unavailable for the review by this Panel? Is the public interest served when AT explicitly refuses to disclose certain material costs?

14. Is the public interest served when one community, Springbank, is asked to accept fugitive dust emissions, where no exposure is acceptable, on behalf of another community such as Elbow Park or the Calgary Golf and Country Club?

1.0 TOPIC BLOCK 1

Topic Block	Witnesses
Topic 1: Project Need and Justification i. Project purpose and need ii. Social and economic project costs and benefits iii. Alternatives considered iv. Crown engagement with the public	Alberta Transportation SCLG

1.1 Project purpose and need

15. The SCLG requests that the Board pay close attention to the numerous submissions made by its members in Exhibit 250 (Appendix C Landowner Statements). The SCLG also request that the Board pay close attention to the viva voce evidence given by Ms. Karin Hunter, Mr. Brian Copithorne, Ms. Mary Robinson, Ms. Tracey Feist, Mr. Marshall Copithorne, Mr. Lee Drewry, Ms. Jan Erisman, Ms. Barbara Teghtmeyer and Dr. Karen Massey.

16. The SCLG members do not dispute that there is a need for flood management or mitigation to manage high consequence floods. As Mr. Marshall Copithorne put it, nobody could. [Ex. 357, pdf 536, line 16-17.]

17. The SCLG disputes the need for a project such as SR1, that has crucial design limitations that creates unequal outcomes and that limits its ability to adapt to a range of future flood conditions. I would refer in particular to Karin Hunter's evidence in Topic Block 1.

18. Under the rubric of project purpose and need, let's recall the 2 SCLG aids to cross-exam discussed on March 22, the first day of the hearing.

19. SCLG Aid to Cross No. 1 Ex 360 and SCLG Aid to Cross No. 2 Ex 361 provide a side by side comparison of SR1 to MC1. The comparison demonstrates that MC1 is vastly superior to SR1 in capturing peak flows.

20. The most basic test of whether SR1 should be approved by this Panel is its ability to manage flood risk. Exhibit 350 Transcript page 156: Matt Wood stated "It is the peak, you know, that is the most important when it comes to flood damages." If that is so, when why were volumes used to compare SR1 and MC1? The comparison has always been volumes, not flow rates. MC1, as an instream dam, has superior outcomes to SR1, for more communities and under more extreme flood events.

20 proposition?
21 A. MR. WOOD: Mr. Chairman, I don't know if I
22 would necessarily agree with that. I mean, every event
23 comes in differently. I think what's important is the
24 diversion rate here, and I think, as well, as we're
25 talking about volumes and rates and interchanging them,

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ALBERTA TRANSPORTATION TOPIC #1 PANEL
Cross-examined by Mr. Secord

1 it is -- it is the peak, you know, that is most
2 important when it comes to flood damages, not
3 necessarily the volume.

21. If a flood surge or peak flow arrives that is NOT captured by SR1, either because the reservoir is full, due to forecasting errors or environmental conditions (back-to-back storms or a short but high intensity storm), SR1 will not be effective at capturing flood waters and preventing damage downstream. What is the point of infrastructure that may not capture the flood peak it is intended to capture?

22. Consider that we are in the middle of a "hypothetical pandemic". Let's call the virus in this case a '1-in-200 year' flood with a maximum flow rate of 1,240m3/s. There is a vaccine that is 100% effective against the virus - this is MC1. There is another vaccine that is 0% effective for the population upstream of SR1, and only 25% effective for the population downstream of SR1 to the Glenmore Reservoir - to which the Proponent eagerly acknowledges '1-in-50 year' level of protection', rather than the Proponent's 1:200 target level - and only 100% effective for the population downstream of the Glenmore reservoir to the confluence of the Elbow and Bow rivers - this is SR1.

23. Shouldn't the Government of Alberta protect everyone with the vaccine that is 100% effective? This vaccine is MC1.

24. Why would we choose a vaccine that has lower effectiveness? This is SR1.

25. Using the vaccine analogy, MC1 is also effective against the variants of climate change, 1 in 1000 and 1 in 500 year floods, drought, water security, fire-fighting protection and recreation.

26. SR1 is useless against the variants of 1 in a 1000 and 1 in 500 year floods. Even the residents downstream of the Glenmore will not be protected by SR1 from those events as SR1 can only take the top off a flood to a maximum of 600m3/s. SR1 is also useless against the variants of climate change, drought, water security, fire-fighting protection and recreation and SR1 has a wide range of negative side effects (such as PM 2.5 air pollution for the Springbank residents).

27. As Marshall Copithorne stated it is never too late to reverse course and ditch a bad decision. The SCLG notes that the government recently did exactly that with the 1976 coal policy!

28. Marshall Copithorne stated at Ex 357 Tr. p.537:

> With listening to this morning's dialogue, I recognize that, with SR1 in place, we do not protect Calgary. In fact, 80 percent of the damage could still occur in Calgary with SR1 and, to me, that's ridiculous.

There is some things that really bother me. In the presentation this morning with regard to folks in Calgary, and it seemed to me that private land and property rights and homes in the City of Calgary are more important than private property out in the country. What are we teaching our kids these days? That bothers me. Should we let this continue in our society or should someone stand up and say this is enough?

29. At Tr, p.538, he said:

I'd like to advise this Board to the fact that, whether you're in business or whether you're in government, it's never too late to reverse a bad idea or an investment. It will enhance Alberta's credibility for future generations to come. Cut and move on from our suffering Alberta taxpayers' sunk costs into SR1. Excite anxious Albertans with a better, comprehensive, multiuse plan to address the longer term future of this great province.

This huge financial investment we have for this SR1 is good for something that might happen. I know this has been clearly identified, and it just -- it just sticks with me. Why wouldn't we put that huge investment and all our resources into a project that

will serve this province and this community for the next hundred years? Next thousand years?

30. At Tr, p.539, he said:

> What's wrong with us? Why are we worried about building a mud hole when we could build a resource that would enhance the lifestyle and the productivity of this province for a long, long time.

31. This application should be denied and the government should be advised that SR1 is not the best alternative. Why are we building a mud hole when we could build something like MC1 that could provide lasting benefits from permanent water storage for generations to come.

32. As Jan Erisman stated, there's a reason why no one is building dry dams anywhere else in the world!

33. As Barbara Teghtmeyer has noted from personal experience, the Elbow River's water flow has been declining so why aren't we looking to the future?

34. The NRCB issued a decision for the Revised Highwood Diversion Plan in 2008. This is NRCB Decision NR 2008-01.

35. At pdf pg. 5:

> **1.1: The Application**
>
> This report contains the decision and recommendations of the Natural Resources Conservation Board (NRCB or the Board) respecting application #0603 submitted by Alberta Environment and Alberta Infrastructure and Transportation in December 2006 for the *Revised Highwood Diversion Plan*.

36. In Decision NR 2008-01 the Board discussed NRCB Board Order 9601-1 at pdf 13 and I quote:

> NRCB Board Order 9601-1, included as Appendix D, and described in detail below, outlined the specific information requirements for the deferred items and the process to be followed in acquiring that information.

> Several conclusions reached by the Joint Review Board in its Decision Report are significant with respect to the deferred items listed in NRCB Board Order 9601-1. Of particular importance is the Joint Review Panel's approach to assessing the proposed diversion plans. Fundamental to this approach was its adoption of a sustainable development frame of reference to assess the proposed project, based on the following principles:
>
> > *"First, water management projects must respect existing riparian rights and water licenses, and should not result in the loss or injury to existing water rights.*

37. The Board discussed its adoption of a sustainable frame of reference to assess the proposed project. It should adopt a sustainable development frame of reference for the SR1 project as well.

38. In terms of the first principle noted above, it appears AT clearly stated that the operator of SR1 will need a water licence from the Elbow River to remediate the reservoir after flood events (water for re-seeding and vegetation growth). This may result in the loss of water from the Elbow River for downstream communities in the future.

39. The second principle noted by the NRCB and I quote:

> *Second, water management projects must be able to meet basic environmental criteria to avoid significant adverse effects.*

40. In this case the bull trout may be extirpated from certain reaches from the Elbow River as noted by Paul Christensen in Ex. 187, pdf pg.3:

> Given the above noted items, AEP- FM is of the opinion that this project, as proposed, will present a high risk to fish populations in this reach of the Elbow River. Additionally, it is also of the opinion that Bull Trout may eventually become extirpated from this stream reach given the unique life history characteristics of Bull Trout in the Elbow River (i.e. documented use from Elbow Falls to Glenmore Reservoir and their late age to maturity) given the frequency of operation.

41. The SR1 project will have significant environmental effects. Intact native grasslands will be destroyed and revegetation success is unproven [Ex. 271, Mr. Wallis' report references

Lancaster et. al. which confirmed that revegetation of native grasslands is not successful. The only site that recorded success was an undisturbed site] .

42. The third principle noted by the NRCB is and I quote:

> *Third, water management projects must be able to meet current and future needs for domestic, riparian, and municipal needs, and other consumptive uses.*

43. SR1 is unable to meet current and future needs for domestic, riparian, and municipal needs and other consumptive uses. For crystal clarity, SR1 is merely a diversion channel whereby contaminated water is stored in a mud pit for a short period of time - there is no practical and real storage application of this facility].

44. In Decision NR 2008-01, Board stated and I quote:

> *These environmental, social and economic considerations are basic to the determination of the public interest. A project must be able to meet these three criteria to be worthy of detailed consideration by the Panel with respect to project effects."*[10]

45. The NRCB should find that SR1 fails the sustainable development frame of reference test is not worthy of being found to be in the public interest. The focus on flood mitigation as the sole purpose of the project created a warped decision process, narrow in scope, that did not allow consideration of drought, fire suppression and potential recreation. Rather than allowing this narrow scope to define the Board's review, we ask the Board to consider that the original scope was inappropriate for a project of this magnitude.

46. In NRCB Decision NR 2008-01, the Board stated:

Accordingly, the Joint Review Panel concluded that:

> *"the proposed Diversion Plan fails to remedy the current deficits and fails to meet future needs for water. It would not meet the basic criteria of sustainable development, since it would not meet existing licence commitments; it would not meet Preliminary IFN requirements; and it would not meet environmental and consumptive water quality requirements in the Little Bow basin. The proposed Expanded Diversion Plan does not meet the minimum Preliminary IFN used in the analysis. However, it also does not meet the other basic criteria of a sustainable development, since it did not contemplate meeting existing license commitments, and it does not meet ecosystem and consumptive needs due to the poor water quality associated with low conveyance flows. The Panel finds serious concern with the Diversion Plan and the Expanded Diversion Plan. The Panel concludes that the Applicant's proposed diversion plans are not sustainable and could not remedy the problems that already exist."*[11]

47. Comment on highlighted passages.

Further, the Joint Review Panel observed that there were very few alternatives for dealing effectively with the demand for consumptive uses of water during low flows, and it concluded that in the context of sustainable development, there was a need for storage for the Highwood basin. The Joint Review Panel concluded that the proposed diversion plans contained limitations, especially with respect to the need to meet current demands for water and there was an interest in alternative diversion plans based on the development of storage on the Highwood River. Accordingly, during the review process the original applicant produced model runs for a Super Expanded Women's Coulee Reservoir leading the Joint Review Panel to conclude that:

> *"on the basis of the information currently available to the Panel, the Super Expanded [Women's] Coulee Reservoir could meet current requirements for water in the basin and remedy the currently unsustainable over-allocation of water. The Panel tentatively concludes that the modelling currently available shows that the development of storage equivalent to the Super Expanded [Women's] Coulee Reservoir may fall short of meeting all future water needs while providing sufficient protection to the environment."*[12]

48. Discuss highlighted passages.

The Joint Review Panel found that there was a need to consider a continuum of storage options to meet current and future needs, with the Super Expanded Women's Coulee presenting a feasible option. However, further evidence was required before the Board would be able to draw a final conclusion. Accordingly, the original applicant was directed to update the comparative analysis of the potential storage sites including the Super

Expanded Women's Coulee site, Tongue Creek Site 4 and Stimson Creek Site 8, and to show comparative data regarding environmental, social and economic effects. Public consultation was to be an integral part of the further analysis and assessment.

The Joint Review Panel also required that diversion plans for management of water in the Highwood River be revised to meet the basic criteria of a sound water management project, including:

- objectives that ensure that the science-based IFN is observed in the Highwood;
- existing license commitments are upheld;
- flows are maintained in both the upper Little Bow River and Lower Mosquito Creek;
- known future demands are met; and,
- consideration is given for reserving water, if possible for future unknown requirements.[13]

49. Discuss the highlighted passages.

50. Comment on last bullet point; climate change; no consideration for preserving water for known future demand and future unknown requirements.

51. Mr. Frigo from Calgary suggested that the Elbow River doesn't have the flow for a new storage dam, but the Glenmore reservoir is on the Elbow and yet it was filled up. Dave Klepacki estimated you could fill MC1 4 times in the course of a year, based on volumes from the Elbow River. Exhibit 395, Tr page 2014

SCLG TOPIC #4 PANEL
Questioned by The Chair

1	**Elbow River flows, was that the Elbow River could --**
2	**could fill a 70,000 dam reservoir four times in the**
3	**course -- located at MC1 four times in the course of a**
4	**year.**

52. The SCLG asserts that the SR1 design is unprecedented. On Day 5 Exhibit 373, Tr, page 1183, Mr Wood testified that the Pine Coulee Reservoir in southern Alberta is a comparison to SR1.

53. Mr Wood referred to Pine Coulee as an "off-stream storage reservoir"

A. MR. WOOD: Mr. Chair, if I may, we have an example that is very similar right here in Alberta, the Pine Coulee Reservoir.

It's an off-stream storage reservoir, with a diversion structure located on the river channel, and a diversion channel that takes the water from the diversion structure to the off-stream storage reservoir. That water is held there and then released for later use.

54. When asked for details of the similarities between Pine Coulee and SR1, Mr Svenson attempted to provide some clarity on the similarities. He was unable to tell the panel whether Pine Coulee has a debris deflector. He did not know the outlet capacity. He acknowledged that the reservoir did not empty completely, and had some "park-like" amenities.

So, yes, in reference to the Pine Coulee Reservoir, the volume of Pine Coulee Reservoir is 50,000 dam cubes, so 50 million cubic metres of water, and it has a dam length of 3.5 kilometres.

It does not completely empty, so it is -- it does hold some water during -- year-round. And there are some park-like amenities that do surround the top of that reservoir.

55. When you look at the NRCB Pine Coulee decision report you will see the small creek referred to by AT on Friday, Willow Creek is used for Pine Coulee reservoir. It's maximum diversion flow is 8.5 m3/s and yet that reservoir is 50,000dam3. From NRCB decision report:

The proposed diversion weir and canal would carry water from Willow Creek to the Pine Coulee Reservoir. The 12-metre high weir and headpond, to be located approximately one kilometre upstream of the existing Secondary Highway 527 bridge across Willow Creek, would include a 48-metre wide concrete overflow section and a 100-metre wide emergency overflow section. Canal headgates, adjacent to the diversion weir, would control the diverted flow and protect the canal works from floods on Willow Creek. The canal would be constructed with a seven metre bed width and have a flow capacity of 8.5 cubic metres per second. The Pine Coulee Dam would stand 21 metres above the valley floor and would extend 450-metres between the valley walls. A

56. Further, in Exhibit 325, page 39 (AT's Response to Dr Klepacki), AT states, regarding the Elbow River, that "The mean annual flood of the river in this reach is 70.9 m3/s. " This is nearly 9x the maximum Pine Coulee diversion flow rate.

57. Pine Coulee reservoir is filled by this small Willow Creek, yet provides drought mitigation and irrigation capabilities over the long run for the surrounding and downstream communities.

58. There is very little that is similar between that body of water and the SR1 plan. It is a desperate [and misleading] attempt to make an experimental project [that is without precedent] (SR1) seem common and normal. [NTD: When questioned, AT failed at drawing any direct comparisons between Pine Coulee and SR1. Let's be crystal clear, there is no similarity].

59. AT also refers, in its reply evidence, Ex. 325 pdf 20, to the Miami Ohio conservancy dams, which are 100 years old.

60. The Bow River Basin Council (BRBC) Report dated March 2014, Exhibit 275, page 348, refers to a tour of the Ohio Dams by members of the Flood Recovery Task Force and the Expert Panel on Flood Mitigation in January 2014. From this BRBC report, quote: "Compared to the Elbow River system, the dry dams of the Miami Conservancy District in Ohio are in a radically different ecosystem and climate and have a much different elevation drop in their rivers, as well as differing riparian ecology and species. To expect the same results of a dry dam in each system may be misleading. The highest rainfall event in the Miami River occurred in 1925 at 121 mm in one day. Over three days, 170

mm was recorded in Bragg Creek in 2013. Considering the length and drop of each river, the average drop of the Miami River is 0.64 m/km, whereas the average drop of the Elbow River is 8.83m/km. The runoff coefficient in the Alberta East Slopes would be much higher than in the Eastern Corn Belt Plains Ecoregion, with a dramatic difference in soils and slope. ...In our East Slopes we would face a very different issue of introducing shallow-rooted large woody debris and large boulders with significant gradient and bed load movement. This will make flows, timing, and debris very different, as well as the associated ongoing maintenance costs. " A further discussion of the Miami, Ohio dams is available in Exhibit 133, page 14.

61. **Project Justification - Key Points**

62. Storage Volumes: The Deltares report concluded that "Both storage facilities have sufficient SR1/MC1 storage capacity for 1:200 return period and can offer the same level of protection." As discussed throughout this hearing, the reliance on "storage capacity" to conclude that SR1 = MC1 is erroneous. The diversion limitation of SR1 creates a disproportionate reliance on river flow rate, which was not explored, nor discussed by AT until this very hearing. This oversight is nothing less than astounding. Perhaps instream dams don't need to consider flow rates, as they can control their outflows up to a certain storage volume. Perhaps people involved simply overlooked that SR1 allowed more water to bypass it in a design flood than was captured by the diversion inlet. Perhaps no one thought to look at the outflows of the two projects side by side to assess the impacts of a capped diversion. Nonetheless, when MC1's superior outcomes became apparent, it should have been broadcast far and wide. **This is a fundamental and critical oversight that is inexcusable, considering communities, property and lives are on the line. [To rely on this storage capacity comparison is inexcusable. We heard specifically from AT that flow rates are far more important than volumes.**

63. Catchment Area: Another reason given for the choice of SR1 over MC1 is SR1's larger catchment area. AT and the City of Calgary referred to "Catchment Area" repeatedly over the course of the hearing.

64. On Day 1, Exhibit 350, page 158

A. MR. HEBERT: Mr. Chairman, if I could just supplement the response.

The feature on SR1 that was one of the advantages of selecting the project is the capture of the large -- from both the water from the larger area, catchment area, relative to the McLean Creek option.

65. Mr Frigo, on March 26, Exhibit 373, pdf page 1294 offered to undertake to provide details on the catchment area which concluded that SR1 was superior to MC1.

Q. And have you -- have you actually looked -- have you looked at any studies to determine how much of the Elbow River catchment MC1 captures? If I suggested to you that MC1 captures 96 percent of the Elbow River catchment area, would you disagree with that or do you have a comment on the percentage?

A. I would have to check that number. That doesn't seem correct because my recollection is that at MC1, we're well below a thousand square kilometres, but I would need to check that, Mr. Secord.

Q. Would you undertake to check for me the percentage of the catchment area that MC1 would capture and provide that in due course? Is that agreeable?

A. Sure, subject to check with counsel.

66. The response from Mr Frigo, Exhibit 378 stated the following:

> Mr. Frigo has now had an opportunity to review the exhibits and the City is in a position to respond. As referenced in Exhibit 3, pdf page 79 (report page 3.4), "The Elbow River has a watershed area of 702 km^2 upstream of the [MC1] dam site (Opus 2017a)." In the same exhibit, pdf page 60 (report page 2.4), "The total watershed area upstream of Glenmore Reservoir (and the city of Calgary) is 1,217 square kilometres (km^2)." As such, the percentage of the total Elbow River catchment above Calgary that lies upstream of the proposed MC1 dam site is 58%, and not 96% as was suggested to Mr. Frigo in cross-examination.

67. AT has repeatedly referred to this so-called advantage of SR1 over MC1. This appears similar to a reference in Ex 12, Table 12, Page 38.

Table 12 Best Available Estimates of the 2013 Flood for the Elbow River at Combined and Bragg Creek Stations

	Combined Station		Bragg Creek Station	
Drainage Area	1,200 km²		791 km²	
Flood Peak	1,240 m³/s	210-year	1,150 m³/s	230-year
7-Day Volume	149,600 dam³	230-year	138,600 dam³	250-year

68. This is a really critical point and clarification is required. A larger catchment area, in this case square kilometers, does not necessarily translate to a much larger water volume or flow rate, especially considering the topography of the Elbow River.

69. The City of Calgary response stated that MC1 was 58% of the catchment, rather than the 96% suggested in cross-examination. This is an "apples to oranges" comparison and misleads the Board by falsely comparing the SCLG's number of 96% of the flow that MC1 would catch relative to the flow that SR1 would catch to a drainage area based on square kilometers. The 96% is a flow rate measurement that comes from the Elbow River tributary made by the graduate environmental science class of the University of Calgary in 2012.

70. Dr Klepacki reviewed published flow measurements of the tributaries and mainstem Elbow River by Sosiak and Dixon for the years 1999-2002 inclusive. These are the last published measurements of these quantities. These measurements show that MC1 captures 90.4% of the peak flows above the Glenmore Reservoir and SR1 will have capability of a percentage of 98% of flows above the Glenmore, if all flows were captured. However, because SR1 allows some river flows to bypass the diversion, MC1 will capture more than 91% of what SR1 captures.

71. In summary, on this point, in the Elbow River, most of the volume and flow rate is generated in the headwaters, as would be expected in a foothills region. This is why Bragg Creek floods when Calgary floods. This is intuitive. The use of square kilometers to choose SR1 over MC1 is not appropriate and the analysis should have been to a much

deeper level that considered rates and volumes. Catchment area is a gross oversimplification in the SR1 vs MC1 context. A review of Exhibit 12, pages 16, 20 and 38 shows the very high correlation between the Bragg Creek Station and Combined Station/ Glenmore readings over time, for both volumes and rates, consistent with Dr Klepacki's findings.

72. In Exhibit 252, the AEP decision report from 2015, the SR1 project was chosen because it was less expensive, more environmentally-friendly and could be delivered in a shorter timeline. In Exhibit 325, page 8, AT's response to SCLG still uses these same justifications that existed in 2015. The SCLG rejects all these justifications, with the exception of SR1 timelines, which at this point is no doubt faster.

73. "SR1 is less expensive" Now we know that SR1 costs are now well over MC1.

74. "SR1 has less environmental impact" This is not backed up by science; no negative environmental outcomes for SR1 were considered at all until the EIA in 2018. A comparison of the two projects, based on science, has not been done.

75. "SR1 has less impact on the Elbow River". This is a judgment, not based science. Now, the Proponent states that water may be drawn from the Elbow River water the reservoir.

76. "SR1 is off-stream and less sensitive to impacts from sediment or debris". This is not backed up by evidence. If anything SR1 has more sediment and debris issues, being downstream. In fact, a debris deflector wasn't added until 2018 afer the EIA was submitted. There is no doubt that sediment is huge problem at SR1.

77. "SR1 presented less risk than MC1 during construction." We have seen no evidence to support this conclusion. Yet, the 2017 Opus report stated that MC1 is relatively easy to operate. Meanwhile, the complexity of operating SR1 during a flood is glaring.

78. "SR1 has less impact on social/recreational values". This is a judgment and is reflective of continued bias by the Proponent against natural grasslands and their environmental, social and recreational utility. There was no consideration of the community surrounding

SR1 at all and no mention of any air quality concerns until 2018. Air quality risks are highly concerning.

79. "SR1 has less impact on commercial/tourism values". Another judgment. There was significant focus on MC1's recreational attributes in the AEP decision report, Ex 252

80. Yet, in the OPUS report of 2017, Exhibit 101, it was concluded that, in fact, very few existing recreational amenities were impacted (19 camp stalls, a camp store, wastewater lift station and the Ranger Station).

81. The question that the Panel needs to consider, when reviewing the justification, is whether or not the Proponent's conclusions are based on judgment and science. Rocky View County's 2018 report on SR1, Ex 255, page 4 stated that "In choosing the SR1 project over the Mclean Creek (MC1) option, Alberta Environment and Parks (AEP) relied on technical experts to make subjective choices on values not linked to the technical merit of either option. The public should have had inputs into these value-based decisions, as other choices are possible."

82. Regarding the Bragg Creek berms. A project upstream of Bragg Creek would still benefit Bragg Creek and Redwood Meadows. It would reduce groundwater flooding and increase flood mitigation substantially at higher flow rates, such as 2013 or greater, by reducing the chance that the berms are breached. There is still incremental benefit to these communities from an upstream alternative like MC1. [

83. Unequal Outcomes

84. Alberta Transportation acknowledges that SR1 was designed to protect the City of Calgary from a '1 in 200 year' flood.

85. As has been shown through AT's witness panel #1's responses to cross questions, the SR1 creates unequal levels of flood protection.

86. As confirmed by Mr. Dowsett in his report, Ex. 259, pdf 8, Table 1, there are 16 Springbank properties located directly below and south of the proposed SR1

Embankment Reservoir that experienced flooding in the 2013 flood that would not be protected by this project. Mr. Dowsett highlighted this during cross at Ex. 379, p. 1405, lines 19-25.

> The ones I'm concerned about are those directly below the foot of the dam that are below the emergency spillway, and I'm worried about those people and what they knew and what they understood the hazard was and what operational decisions may be taken by the operator that would increase the rates coming down this river and raising numbers even higher.

87. It is important to note that AT did not challenge this evidence. AT also agreed with Mr. Dowsett that the residual flood risk of the project is similar to that of 1:50 year flood [Ex. 327, pdf 40]. This is best explained by using rates. Some of these properties flooded in 2005, with a 300m3/s flood event. In a design flood of 1240m3/s, SR1 will take between 480m3/s and 600m3/s. This leaves between 640m3/s and 780m3/s going down the river. If these homes were protected to a 1:100 flood, that would be protection to approximately 990m3/s, the rate used for design of the Bragg Creek berms. Rather, these homes and businesses will flood at levels well below a 1:100 flood. This is inferior and in contravention of the Design Standards in Alberta of a minimum 1:100 flood mitigation level.

88. The Canadian Dam Association guidelines state a minimum level of '1-in-100 year' level of flood protection for new projects Similarly, the Government of Canada, the Alberta Government, and City of Calgary bylaws state a '1-in-100 year' minimum level of flood protection standard. Why are some communities receiving a vaccine that is not 100% effective?

89. Although AT attempted to diminish the impacts to these 16 residences by suggesting, during cross of Mr. Dowsett, that those residences within the 1 in 100-year flood hazard area are in an area that the Rocky View County's land use bylaw had prohibited

development. It is important to note that there is no documentary evidence of the Rocky View County's land use bylaw on the record. There is also no evidence from Rocky View County regarding this bylaw, their interpretation of it and its effects on existing residences. This bylaw, dated January 2021 is not applicable retroactively. We submit that the Board should disregard any information regarding the Rocky View County's land use in making its decision on this project [This bylaw deals with future development].

90. In response to concerns raised by the SCLG about flood risk downstream of SR1, Mr Wood, in Exhibit 350 stated "There are some residences; part of Rocky View County, there's some golf courses…it is only those who have built very close to the river who may get flooded…those who are down low may still have the problems in a 2013 event that [what] they get for living near the river". Is this statement not diametrically opposed to the entire purpose of SR1 which is to protect residents and inner city locations that are next to the river? Can we transpose this statement to "that's what Elbow Park, Roxborough and Rideau get for living near the river" - all of which are located along the river in the City of Calgary.

91. As expressed by the CRCAG in their submissions (Ex. 237, pdf 11), the Board must prioritize public health and safety. Prioritization of public health and safety should include consideration of impacts to residents upstream of the Project and directly below the Project. In the event of a failure of the dam or structure or in the event of flows greater than the design flood, SR1's location is a serious concern. As discussed in Exhibit 373, Tr. p. 1186, the time for the residents below the reservoir to evacuate could be less than one hour. [RCS Springbank could have 100 fatalities]

1.2 Social and economic project costs and benefits

92. The NRCB/CEAA Joint Review Panel issued a Decision Report in May 1998 on the Little Bow Project/Highwood Diversion Plan Application to Construct a Water Management Project to Convey and Store Water Diverted from the Highwood River.

93. In the May 1998 Little Bow Project Decision, the JRP stated at pdf pg.297:

8.9 Economic Effects

Despite concerns about the extent to which some project benefits and costs were adequately quantified in the economic evaluation, the Panel concludes that, on balance, project benefits would exceed costs. The Panel heard abundant evidence from both APWSS and most interveners that the construction of the three-component project would create the water supply conditions necessary to stabilize and expand economic and social development in the region. Construction of the project would provide some employment opportunities for regional residents but, more importantly, project operations and the resulting irrigation expansion would directly and indirectly lead to a significant increase in regional employment and economic activity. The Panel notes that the stabilizing of Clear Lake and creating the new Little Bow River Reservoir would provide new recreational opportunities that would further enhance the quality of life in the region, and become a regional tourist attraction.

The Panel's conclusions concerning the economic effects of the project relate to its responsibility for determining whether the proposed project is in the public interest. A conclusion that the project is in the public interest does not commit the Government of Alberta to actually investing public funds in the project. Should the Panel determine that a project is in the public interest, it remains the responsibility of the Government of Alberta to actually decide whether an investment of public funds is warranted.

The Panel concludes that the proposed project would have significant, positive economic effects on communities and residents near High River, near Clear Lake, and the Little Bow River Reservoir, should it proceed. The Panel specifically notes that while the quantifiable economic effects of the project are favourable, additional non-quantifiable benefits and costs considered by the Panel tend to improve the relative economic effects of the project. The construction and operational effects on the economy of the area surrounding the project will be significant and positive should the project proceed.

94. In this case the Board should have a great deal of concern about the extent to which project benefits and costs were adequately quantified in the economic evaluation. The SCLG submits that the Board should conclude that on balance, project costs, including ongoing operating costs, will exceed project benefits.

95. Some things are a certainty. SR1 will not improve water supply conditions like the Little Bow Project. SR1 will not result in irrigation expansion. SR1 will not provide new recreational opportunities. The mud hole will not become a regional tourist attraction, and in fact is likely the opposite.

96. The SCLG note that in the JRP decision the Panel stated that just because a project is in the public interest does not commit the Government of Alberta to actually invest public funds in the project and that it remains the responsibility of the Government of Alberta to actually decide whether an investment of public funds is warranted.

97. The SCLG also hopes the Board will warn the Government of Alberta that this project does not meet the test of sustainable development and that the money could be better spent on a project like MC1 that included flood protection greater that 1 in 200 for more communities as well as contemplated future water needs in the age of rising temperatures, climate change and drought.

98. Alternatively, given the benefits of SR1 are designed to accrue to communities downstream of the Glenmore Reservoir, then perhaps some of this money for SR1 is best redirected to a large-scale flood mitigation project for Calgary's downtown core, where most damage occurred in 2013. The advantage to this is that the City of Calgary would not be beholden to adverse parties from a timeline standpoint.

99. Benefits

100. On Day 1, Exhibit 350, pdf pg 233, the Proponent agreed that the avoided damages used to arrive at a benefit/cost analysis for SR1 did not include any avoided damages upstream of the Glenmore Reservoir and below SR1. The Proponent also agreed that MC1 would have higher benefits, as it would have protected more communities to a higher level than SR1. These benefits would be higher for the life of the Project. The increased benefits for MC1 over SR1 were not measured above a 1240m3/s flood or for the communities between SR1 and Glenmore or the communities upstream that would be better protected by MC1, even to a 1:1000 level flood.

Q. In terms of conclusions on avoided damages, Springbank and Elbow Valley will receive better flood protection with MC1 than SR1; true or false, Mr. Sol?

A. MR. SOL: Sorry, can you reframe that?

Q. Springbank and Elbow Valley will receive better flood protection with MC1 than SR1; true or false?

A. MR. SOL: Are you -- you're referring to downstream of SR1 or upstream?

Q. Yes.

A. MR. SOL: Downstream, I believe you guys just had that conversation; we haven't modelled the flood damages.

Q. So would I be correct, then, in saying that the benefits for MC1 are higher, in terms of avoided annual benefits for those --

A. MR. SOL: Marginally, yes, as we demonstrated with Bragg Creek and Redwood Meadows, 180 versus the 27.7 million that you referred to.

101. Capital project costs

102. Bragg Creek - which have always been linked with SR1, have increased from the $209M in 2014, to $263M in the 2015 IBI Report to $580M today. The Proponent refers to $432M as the Project cost. This ignores costs to date and is a present value, or discounted, number. The $580m capital costs includes construction costs of $340M from Exhibit 159 pdf page 379, land costs of $140M (Exhibit 100, page 6), Bragg Creek berms of $42.2 (Exhibit 254, pdf pg 33). That totals $522M. Add to this payments to RVC of $10M cash and $10.5M in intersections and the $32M grant to Tsuut'ina. Add to this the newly disclosed detour road upgrades to RR40 and Township Rd 250 of $3.8M (Exhibit 385 pdf pg 7) and Wetland Replacement cost of approximately $800k and you arrive at $580M. The MC1 report, Exhibit 101, includes a capital cost of $406M.

CAPITAL COST EVOLUTION	AMEC Report (2014)	2015 IBI Benefit/Cost Report*	Current View (2021) - AT Numbers
Construction (Exhibit 159 Appendix G.2)	$ 159,767,800	$ 214,767,800	$ 340,628,065
Land (Exhibit 100 pdf page 6)	$ 40,000,000	$ 40,000,000	$ 140,000,000
Upstream Migitation (Exhibit 254, pdf page 33)	$ 8,900,000	$ 8,900,000	$ 42,200,000
Total	**$ 208,667,800**	**$ 263,667,800**	**$ 522,828,065**
	*Note 2015 was $55M more for 1:200 vs 1:100 in 2014		
Facilitation Payments			
RVC Exhibit 254, pg 30	$ -	$ -	$ 20,500,000
TTN Exhibit 254 pg 29	$ -	$ -	$ 32,000,000
Other Costs - Known/Estimated			
Offsets - Wetlands (estimate based on Exhibit 94 IR421), SCLG Estimate @ MC1 cost of $30k/Ha			$ 833,000
Road Upgrades - Twp Rd 250 and RR40 Ex 386 pdf pg 7			$ 3,800,000
Total Project Costs - Known or Estimated			**$ 579,961,065**

103. Uncertain Costs - In cross examination, on Day 3 Transcript, Ex 365 page 772, Mr Hebert indicated (twice) that access road relocation for landowners was a construction cost, but in a response to an undertaking, the claim was made it was a land acquisition cost. Which one is correct? The access relocation costs were not specifically mentioned in Exhibit 159 G.2. These changes are mentioned in Exhibit 138, SIR2 Response from July 2020, page 7, below, with no costing associated with the changes.

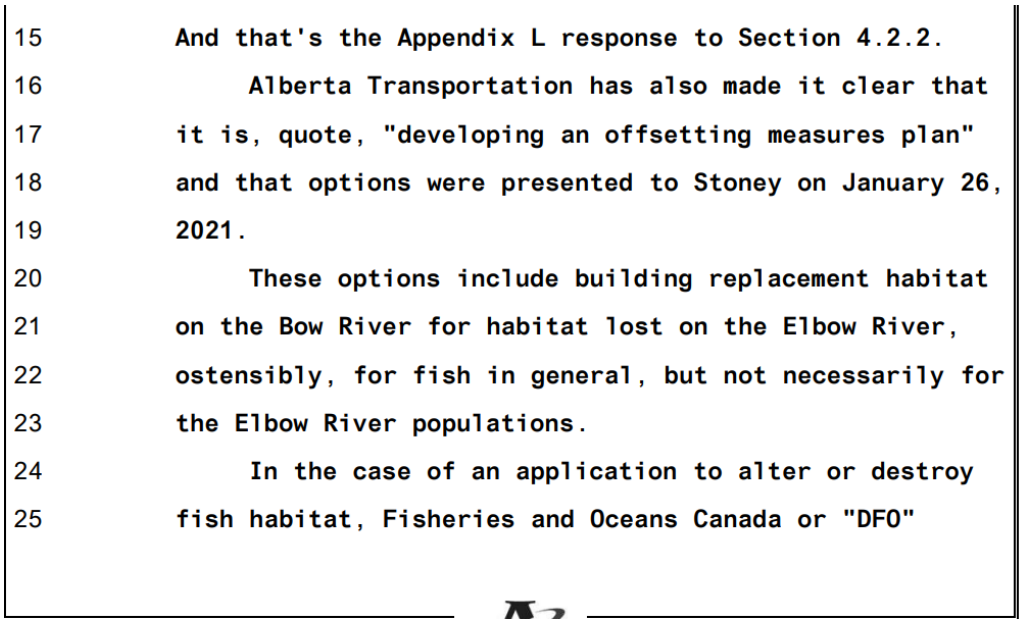
> *NEW PROPERTY ACCESS CONFIGURATION*
>
> There have been approximately 10 property accesses identified close to the PDA that may require replacement or modification as a result of land procurement. The property accesses are to privately owned land, which often includes a residence or agricultural uses of that land. These replacements or modifications are required to maintain the access to parcels from the public right-of-way where land will not be acquired for the Project, but where all or a portion of that existing property access has been acquired. The exact locations, and number, of these access points and roadways cannot be confirmed until the land has been completely acquired by Alberta Transportation. It is estimated, there will be 1.1 ha of new access right-of-way associated with these changes that fall outside the PDA. This new access increases the total area of the PDA from 1,438 ha to approximately 1,439 ha.

104. Uncertain Costs - Land: the total project budget for the 3600 acres is now $140m. That is just under $40k per acre, which is nearly double the 2017 cost. The original land cost used in the 2015 Decision was $40m as stated in Exhibit 100, page 11. It is unclear how this land cost will settle out. The strange shape of the PDA that creates the 3600 acres is nonsensical from a land acquisition standpoint and there will be budgetary implications.

105. Missing costs: all other facilitation payments to First Nations, which AT has refused to disclose. This is a public project, not a private corporation. Disclosure of these payments is in the public interest to determine the true Cost/Benefit..

106. Missing Costs: Kamp Kiwanis accommodation, either for interrupted operations during construction, relocation of the Kamp, or any other compensation. Again, this is a cost that should be disclosed for the purpose of determining true cost/benefits.

107. Missing costs: environmental offsets, including "building replacement habitat on the Bow River for habitat lost on the Elbow River" as a result of SR1 as discussed in Exhibit 385 at transcript pages 1774, 1779. This is the first time the SCLG has heard of this additional cost. MC1, Ex 101 pdf page 71, included $10 million for "Aquatic Habitat Management Plan", but there is no equivalent for SR1.



And that's the Appendix L response to Section 4.2.2.

Alberta Transportation has also made it clear that it is, quote, "developing an offsetting measures plan" and that options were presented to Stoney on January 26, 2021.

These options include building replacement habitat on the Bow River for habitat lost on the Elbow River, ostensibly, for fish in general, but not necessarily for the Elbow River populations.

In the case of an application to alter or destroy fish habitat, Fisheries and Oceans Canada or "DFO"

108. Missing Costs: AT did not provide fish passage measures on the unnamed creek, where erosion mitigation measures are proposed. Are fish not passing through the conduit, into a constructed channel and into the unnamed creek? The Proponent rejected a request to have a sediment screen at the LLOW which would impede fish passage. Why would fish passage be excluded? Is this another missing cost? Exhibit 385, transcript page 1710.

fish passage?

A. MR. WOOD: Mr. Chairman, I can say that fish passage was not an element of design for those erosion mitigation measures.

Currently, the Unnamed Creek is not found to have fish passage characteristics in it. And so while these erosion mitigations were designed to in effect mimic natural features, specifically a step pool feature, fish passage wasn't necessary to be provided. And so it was not evaluated.

109. Missing Costs: AT has not provided a cost for wetland replacement. MC1 did have wetland offset costs of $700,000 (Exhibit 101 pdf pg 71), while SR1 has no such budget, despite the fact that wetlands are lost. The SCLG provided an estimate of $830,000, using the MC1 budget per hectare but we look to the Panel to require this detail as a direct project cost of SR1. To date, AT has not provided any offsetting details aside from what we heard from AT on Day [9]. It is possible that there are more offsetting plans that weren't mentioned.

110. Missing costs: CEAA conditions (Exhibit 219) for embankment & diversion channel riprap (3.1.4), removal and storage of the diversion channel substrate (3.8), and reservoir grading (3.15) are expensive.

111. Missing costs: Dam safety recommendations are costly, especially the recommendation for a second outlet and increased capacity of the Emergency Spillway. In Exhibit 327 Page 6: Table 1, Point 6, AT states "The design of the Emergency Spillway is underway. The need for erosion protection is part of this design and will be reviewed by AEP Dam Safety as part of Alberta Transportation's Water Act application. " We are unclear how substantial these costs are, but they should be included.

112. Missing Costs: Public benefit - parking lots, pathways, any accommodation for the local community for benefit.

113. Missing Costs: Any upgrades required to systems or infrastructure for emergency management, especially considering the significance of this Project on a small county like RVC.

114. Missing Costs: Updated pipeline estimates that have not changed for 5 years or so (2016, Ex 159, pdf pg 180). Mary Robinson was told by TCE, which has two of the seven impacted pipelines, that their costs are $24M (Exhibit 357, Tr. pages 509-510). The current pipeline budget in Exhibit 159 Appendix G.2 is $12.4M in totality. Again, we are 7 years into this project, sitting here for final approval by the regulatory and pipeline costs haven't been updated the past 5 years? If Mary Robinson is correct, these costs could increase the Project budget by at least $20M!

Facilitation Payments	
Blood/Kainai Ex 323	Unknown
Ermineskin Ex 322	Unknown
Siksika Ex 367	Unknown
Kamp Kiwanis	Unknown
Missing	
Changes between 2019 December Cost Update & Exhiit 160: Change Summary Memo	Unknown
Updated Pipeline Costs (Exhibit , Expected May 2021) Ex 350 pg 139	Unknown
Emergency Spillway (under design, response to Austin Engineering)	Unknown
Public Benefit - Public Parking Lots & Facilities	Unknown
CEAA Conditions	Unknown
NRCB Conditions, if any	Unknown
Offsets - Fish (mentioned, Exhibit ?, but not costed)	Unknown
Offsets - Other (native grasslands)	Unknown
Calaway Park Accomodation for Lost Water Licenses	Unknown
Shelter Belts (Exhibit 405)	Unknown

115. Ex 138, SIR2, page 6 lists a change of new erosion management measures along the full length of the unnamed creek. Quote "Alberta Transportation, as a result of feedback from regulators, Indigenous groups and stakeholders, has revised the design to include measures to reduce erosion along the full length of the unnamed creek and to further mitigate sediment mobilization in the unnamed creek and reduce sediment input into Elbow River (see Figure 1)." These were also referenced on Day 7, Exhibit 385, transcript page 1710.

116. The SCLG is unable to find reference to these erosion reduction measures along the full length of the unnamed creek in Exhibit 159. In the Change Summary Memo, Exhibit 160, December 18 2020, pg 3, these erosion protection measures are not mentioned. As

such, we are concerned that these costs are excluded from Exhibit 159 Appendix G.2. We attempted to ask about these costs on Day 1 of the hearing, but were unable to determine if they are included, and what the specific costs are.

117. Operating costs: Exhibit 159, Table 49, page 231 shows annual operating costs of $300k with no full time staff listed, no costs for fire suppression operations, no costs for testing and reporting requirements for water or air, no costs for wildlife management, including surveys and reporting, mapping for migratory birds, no costs for security, no costs for emergency planning preparedness, including staff training, no costs for flood forecasting, no costs for the proposed community liaison or administration of First nations land use committee. Exhibit 159, Table 49, page 231.

118. Flood Costs - Direct: Exhibit 159, Table 49, page 231 provides some estimate of flood-operations and post-flood operations activities. The Proponent has used an average annual benefit calculation for the design flood. Yet, the post-flood costs appear to relate to smaller floods. Reseeding for instance, uses 25% of a 20 year pool? Is this reflective of a design flood? This appears to be inconsistent with the benefits, which are annualized and based on a design flood. Why would benefits be based on a design flood, but costs on a much smaller flood? Should benefits be based on a much smaller flood, then, or should the costs be based on a design flood?

119. Flood Costs - Direct: Exhibit 159, Table 49, page 231 Dam personnel costs in a flood event are estimated to be every 20 years for a total of $65k, for 4 dam attendants: Mr Wood stated it would be used 10 times in the last 100 years, why is this cost every 20 years? Is the dam going to operate itself during a 1:10 year flood? Do these people stay at the site for 36 hours or 50 hours straight during filling or are they working shifts with another crew or two? Are they onsite while water is in the reservoir? This is lacking all sorts of detail.

120. Flood Costs - Direct: Exhibit 159, Table 49, page 231 Flood operations are missing costs for emergency operations, including personnel for road closures, and security at the site of impounded water, all costs of water testing and reporting, air quality monitoring and reporting. There appear to be no costs for the "adaptive management" program Mr

Hebert referred to for dust suppression, which would include tackifier, even in the 16 months post-flood. There is no budget for tackifier listed anywhere. Mr Zelt estimated that tackifiers could run into the hundreds of thousands of dollars for a design flood.

121. Flood Costs - Direct: Exhibit 159, Table 49, page 231 There is additionally no cost for watering the newly seeded sediment. In an arid, windy location like Springbank, during the dry summer months, watering is a likely requirement, although the Proponent acknowledged on Day [9] that water may be diverted from the Elbow River for this purpose. This has a cost that could be substantial.

122. Flood Costs - Direct: Exhibit 159, Table 49, page 231 . All wildlife rescue costs in the 2-3 days before a flood. This would be a massive undertaking at significant costs which are not estimated.

123. Flood Costs - Direct: Exhibit 159, Table 49, page 231 Fish rescue costs are missing. If a 30 person crew of fish rescuers, including biologists, is required for the 30 days of draining, this could run in the hundreds of thousands of dollars. Exhibit 385, Day 7, transcript pages 1712-1722.

124. Why haven't these operating costs been estimated? How can the Board make a decision without a full accounting for future expected costs? We view that this lack of detail is due to the unique nature of the project, which does not provide an operating model anywhere in Canada. Yet, these costs are relevant to this decision before the Board. All flood-related operating costs should be estimated for a design flood, just like the benefits.

125. Post-Flood Costs - Indirect: This includes repairs to Bragg Creek Berms, Redwood Meadows Berms. Although the Proponent states that these will be borne by the owner of the infrastructure, it must be clear that had MC1 been chosen, these costs would be avoided. Instead, these costs are being downloaded to Rocky View County and Tsuut'ina Nation. Exhibit 350 pdf page 115, 116

A. **MR. SOL: Yeah.**

Q. So you're saying, then, that there would be no cost of repairs to the berms at Bragg Creek as a result of the design flood?

A. **MR. SOL: No, I'm not saying that.**

A. **MR. HEBERT: Mr. Chairman, if I can interject. These are separate projects from the SR1 project, again, appreciating that they're part of a system of flood mitigation projects on the Elbow River, but specific costs related to repairs of those projects would be borne by the entities responsible for those projects.**

Q. Okay, so that actually, Mr. Hebert, that's useful, because I was going to ask who will pay to repair them.

126. Post-Flood Costs - Indirect: Park Infrastructure Exhibit 350 pdf Page 117. Park infrastructure at Highway 66 was damaged in 2013 (pathways, parking lots, visitor amenities such as washrooms). These costs would reasonably be expected again in a design flood.

> Q. But given that -- given that parking lots, pathways, and other public infrastructure along Highway 66 were replaced following the 2013 flood and will be subjected to unmitigated flooding because of the choice of SR1, why would the cost of repairs to these items not be shown as a cost of SR1?
>
> A. **MR. HEBERT: Mr. Chairman, in the same way that the cost for repair for other projects would be borne by the operator responsible, in the way same, it would apply to the infrastructure that's being referred to. Some of it is public infrastructure. If it's government of Alberta infrastructure, the government of Alberta would have responsibility for those costs, depending on the department that owns or operates the infrastructure at the given time.**

127. **Benefit/Cost Analysis:** Until 2019, SR1 had a favorable benefit/cost ratio relative to MC1. All figures from Exhibit 100, the May 2019 Benefit/Cost update. SR1 has a benefit/cost of 1.28, including Bragg Creek berms of $32M, while MC1 has a benefit/cost ratio of 1.41. MC1 is the project with the better economics at this point. SR1 benefit/cost ratio of 1.28 is also missing the $9 million of new costs of the Bragg Creek berms, now $42.2M and also the updated capital costs, including another $17M of capital to align with the new capital cost of $340 million, versus the $323M included in Exhibit 100. It is also missing the road costs of $3.8 million required for the detour route and all facilitation payments. Each new cost added to SR1, drives this benefit/cost ratio lower and lower, further below the superior benefit/cost ratio of MC1. This is relevant to this Panel.

128. Simplistically, the MC1 project has higher benefits due to more communities receiving a higher level of protection - all communities receive the 100% effective vaccine. It also has lower costs at this point, with the capital costs of $406M (Ex 101, pg 105) sitting approximately $170 million cheaper than SR1's $580M, using. Yes, the $580M includes facilitation payments to RVC, and the $32M grant to Tsuut'ina. These are costs of the

Project. Even excluding these known payments for withdrawal of opposition- generously, SR1 is sitting at $527M including construction costs from Exhibit 159 Appendix G.2, Bragg Creek Berms and the new road costs of $3.8M from Exhibit 385 pdf pg 7.

129. In summary, SCLG asks that all the costs of this project be estimated and documented. Hidden capital costs, including infrastructure repairs to upstream berms, should be identified and noted. Secret agreements must be brought into the light. Operating costs for flood events should be estimated prior to the Panel ruling on the Project.

130. Social Costs

131. AT from the very beginning, chose a strategy that pitted stakeholder against stakeholder. It has been highly divisive. In the beginning it was rural landowners against Elbow River residents. Rocky View against Calgary, urban against rural. There was never an attempt to bring stakeholders together to try to find a win win solution.

132. Looking to the future, the conflict will be between the landowners, First Nations and the public. We do not see a satisfactory resolution to this conflict.

133. In their opening statement on Day 1, the Proponent was dismissive of the impact to Springbank and to landowners. There was no mention of the multi-generational ranching history of the families who will be wiped out by this project. For Lee Drewry and his siblings, land taken by the government will essentially wipe out the family ranching business in the area, leaving the family with a choice of relocating or giving up our ranching operations. That is a tough choice, but even tougher for the children who will no longer have a choice to live on, or ranch, the land of their great great grandparents. If they had it to do over again, landowners might have had their children provide evidence. Their children are losing the most if this project proceeds.

134. If the project gets approved, then generational land will be taken. The Proponent makes this sound like an everyday occurrence. It is not. The taking of such a huge contiguous block of land is extremely uncommon.

135. The potential for degraded air quality following flood operations is an unacceptable social cost. This project creates an air quality problem that will be challenging to manage and that will no doubt impact the quality of life of residents surrounding the reservoir and downwind. The Proponent contends that these periods will be brief, but does not dispute that they will occur. How is it possible that this Panel would knowingly approve a project with this unacceptable outcome, when it could be avoided.

136. The SCLG asserts that the Springbank community bears all the social and also economic costs of this project, while the benefit is passed to residents downstream of the Glenmore Reservoir in Calgary. The safety and viability of our community is at risk with this project over the long run. We will live with impacts to water quality and quantity, degraded air quality, loss of heritage and culture, including the loss of pioneering families, who also experience loss of inheritance, and the loss of our natural environment. This imbalance of the distribution of benefits and costs is striking. Monitoring these effects is not mitigating.

137. CRCAG's closing argument mentioned disruption and impacted bus routes. So, instead, these burdens are passed to Springbank residents and our children on school busses who will be detoured? With all due respect, CRCAG will take any project that has the shortest timeline. When referring to impacts of lost memories, collected over generations. What about lost generational land due to SR1? By enthusiastically supporting SR1, CRCAG is enthusiastically supporting negative social and health outcomes in another community. CRCAG also mentioned substantial economic costs for flood-proofing homes. These costs are borne by upstream communities, too.

138. The Proponent has referred to various future plans that will be developed for all areas of the project operations - land use, dam operations, first fill, air quality monitoring and adaptive management, weed control, and more. These theoretical plans are important and are required now, not after the Project is approved.

139. As a condition of Approval, the SCLG requests the Panel consider the burdens imposed by the project on the local community and include a budget for community benefit.

1.3 Alternatives considered

140. Despite what AT and CRCAG have said in their Final Arguments today, the Board specifically included "Alternatives Considered" as a specific sub-topic in Topic Block 1. As the City of Calgary correctly noted in its Final Argument, "Alternatives considered" are contextually relevant to the Board's decision in this case.

141. In the May 1998 Little Bow Project Decision, the JRP stated at pdf pg.37:

3.2 Alternatives to the Proposed Project

As discussed earlier in Section 2, water management alternatives within the Little Bow River basin have been extensively examined. Twelve potential water storage sites in the Little Bow River basin were identified by the Prairie Farm Rehabilitation Administration (PFRA) in 1965. After initial screening, eight were investigated at a conceptual level and four were recommended for more detailed investigation. These four are identified in Map 3-1. Numerous combinations of canal sizes, and reservoir sizes and locations were examined. These were evaluated to determine their technical and economic feasibility and a preliminary assessment of their environmental and social impacts was conducted. The combination of storage and diversion facilities described in the Application and referred to as the three-component project was concluded to be the most effective in providing the water management capacity to meet the needs of both the Highwood and Little Bow river basins.

142. MC1 and SR1 were both "screening level" through 2015, and maybe AT could argue for "Conceptual Design" by 2017. AT has let down the taxpayers of Alberta and the future generations of Albertans by only taking one project through a feasibility stage. In fact, when new information about costs, sediment, air quality were identified, no one even stopped to ask if SR1 was still the best path forward.

143. The Little Bow project offers a glaring contrast to SR1. There was no extensive examination of alternatives in this case and that is a shortcoming of this application.

144. And at pdf pg. 40 of the JRP Report:

since their proposed project could not completely satisfy all three demands. They assigned highest priority to meeting the IFN. Consequently the diversion plan associated with the Expanded Squaw Coulee project component failed to meet basic conveyance needs and licence commitments. This less comprehensive approach to identifying alternatives needed for storage for the Highwood River basin to meet the various demands for water during low flow events has serious implications. The Panel will discuss the implications of this approach in later sections of this report.

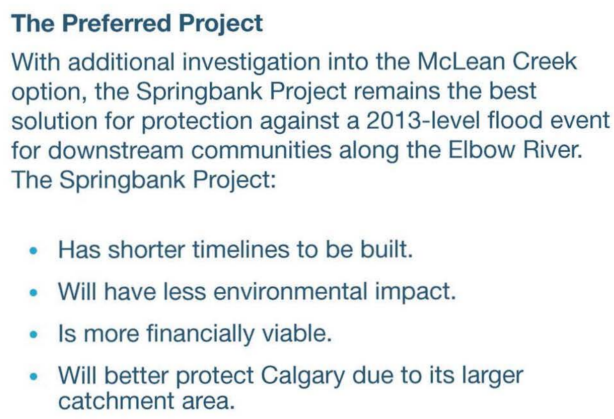
145. One of the major implications is climate change. What if the 1 in 500 year flood becomes the 1 in 200 year flood in terms of frequency as noted by Dr. Fennell. What if there is serious drought in the future? The lack of a comprehensive approach in identifying alternatives should result in a denial of this application. Indeed, after the horse had left the barn, the OPUS Report (Ex 101 dated August 2017 but only brought to light in June 2019 as a result of an NRCB Round 1 IR) indicated that MC1 was a superior alternative to SR1.

146. Comment; no extensive investigation done here; AT jumped to a rapid conclusion in 2014 without any serious study. It is worthwhile comparing the Bow River dam projects as Karin Hunter discussed in Topic 2. SR1 is just now at the feasibility stage and it is NOT TOO LATE to take another look. On the Bow River, all three dam options are going through a three-year feasibility study. What a contrast. Further, public consultation with affected parties on the Bow River occurred during the conceptual design state and will be ongoing through the feasibility stage!

147. In the Rocky View County report dated December 2018 (Exhibit 255 pdf 6), it stated:

> This report does not recommend one option over another; however, in the review of the literature and discussions with technical experts, the County believes that both the Mclean Creek dam and the Priddis diversion were prematurely dismissed and not given a thorough technical analysis so that objective decisions could be made.

148. In Ex 358, AT stated that RVC was presented with the OPUS report and provided a link to an update provided to RVC. However, the 3 pages presented on the OPUS Report in 2017 to RVC did not show the difference between SR1 and MC1 on flood effectiveness. Therefore, the SCLG rejects the Proponent's claim that RVC was aware of the superior flood mitigation outcomes of MC1. The three pages were MC1 cost and timelines and 2 MC1 illustrations. The following statement was provided, which did not address flood mitigation effectiveness at all:



149. We reiterate that these judgments about SR1's benefits are not rooted in science.

150. Rocky View County residents are directly harmed by SR1 and would have improved outcomes with MC1. This outcome has never been discussed by the Proponent, until raised by the SCLG at this hearing despite the outcry from the local community over the past 7 years. RVC residents are harmed by:

151. New Provincial Guidelines (Exhibit 356) will cap payouts to landowners at $500K one time.

152. Downstream of SR1: Landowners only receive flood mitigation to a maximum level of 1:50, whereas the City of Calgary residents downstream of the Glennore receive protection to a 1:200 level. These residents will be likely to draw on that cap well before City of Calgary residents.

153. Upstream of SR1: Landowners receive a 1:100 level of protection plus 0.6M freeboard, which quote "will reduce but not eliminate the risk of basement flooding as a result of groundwater seepage during extreme floods" See Exhibit 275, page 127. The only way to control groundwater flooding is to control the river levels, like MC1 would do. Therefore, these residents will be likely to draw on the $500K cap before inner city Calgary residents.

154. New Provincial Guidelines (Exhibit 356) require cost sharing of disaster recovery with municipalities.

Cost-sharing

We have implemented a 90:10 cost-sharing arrangement with local governments and private-sector applicants, which include homeowners, residential tenants, small business owners, landlords, agriculture operations, condominium associations and not-for-profit organizations and cooperatives.

This arrangement means we provide assistance for 90% of eligible disaster costs and the impacted community and private-sector applicants are responsible for the remaining 10% of their respective costs.

155. This cost sharing has tremendous implications RVC which had over $13M of infrastructure damage in 2013 (Exhibit 254, page 41). Now, because of SR1, RVC will be responsible for those costs which would have been avoided at MC1 due to its superior flood mitigation capabilities.

156. Repairs to new flood mitigation works at Bragg Creek may be substantial and be borne by RVC residents. The cost of repair to Redwood Meadows berms were estimated at $2.7M, most of which were berm repairs (Exhibit 275, page 114 IBI Report Appendix F). Bragg Creek berms are far more extensive, running for a total of 3.9km along the townsite (Exhibit 254, page 10). RVC does not have the tax base to sustain these damages in a large flood. Dr Karen Massey's evidence spoke of the failures of berms at Redwood Meadows during the 2005 and 2013 floods.

157. The inequities here are glaring and have not been disclosed by the Proponent, nor, to our knowledge, discussed with residents and businesses.

158. Alternatives Considered: The Narrow Frame of Reference

159. How is it possible that a project that is now ½ billion dollars didn't include a discussion of drought, water security, recreation, fire suppression? This is completely unacceptable, especially when the Alternative at MC1 provides such an option. OPUS report 2017, Exhibit 101 pdf pg 55 included the following statement.

It should be noted that the preliminary operating strategy for MC1 has focused primarily on flood management. However, the permanent storage of the facility can also be used to provide additional water supply in the event of an extreme drought. If needed, the projects 3,500 dam^3 permanent storage volume could be utilized to augment flow releases during a severe drought period. Depending on the value associated with this type of flow augmentation capability, it may even be desirable to increase the project permanent pool level. This could be assessed as a part of future optimization studies should the project advance past the conceptual level of study.

160. The narrow frame of reference, which focused on a project for Flood Mitigation 'downstream of the Glenmore Reservoir" is felt acutely at this point. Drought and wildfire are serious and pressing concerns, raised by Dr Fennell and Dr Klepacki in Topic 4.

161. When presented with information from the MC1 report, the Proponent stated that the report is "conceptual". Using that logic, what was the very preliminary report on MC1 and SR1 that were used to compare the projects in 2014 through 2015? The 2014 AMEC Report used by AEP to choose SR1 actually called the Project *"Conceptual Design of the Springbank Off-Stream Flood Storage Site"*, Exhibit 275, page 17The very same June 2014 AMEC report (Ex. 275) was used for over a year, used for the October 2015 Deltares Review (Ex. 13), used for the October 2015 AEP decision (Ex. 252). This very same AMEC report, more of a "screening" report, a desktop analysis with no apparent geotechnical field work, no documented environmental work, no hydrological work. So, the 2017 MC1 report, signed, stamped and dated by OPUS is conceptual? The alternative presented to CEAA as fairly considered, was conceptual? This doesn't hold water, so to speak. The SR1 Preliminary Design report was not signed, stamped and dated until December 2020! SR1 was chosen with far less information, and far less due diligence than was conducted on the Opus MC1 report.

162. See Ex 254, pdf p.1-105.

1.4 Crown engagement with the public

163. It is the position of the SCLG that AT's consultation with the public, especially the directly impacted landowners, is inadequate and lacking in depth considering the impact on these landowners and the Springbank community.

164. There were multiple claims by AT about how well they have consulted and how willing they are to continue consultation. The landowner experience with consultation is that landowners were told many things, but never asked about much. Telling is not talking and sharing information while your ears are wide closed is not consultation.

165. In Ex 254, pg 9 Ms Hunter provides the image used by the Proponent to discuss the benefits of the Project. It is fair to say that this image does not include the fine print that Springbank residents still flood and that MC1 is superior for all communities.

166. SCLG asserts that Alberta Transportation misled the Public on the effectiveness of the SR1 Project relative to MC1. Alberta Transportation stated that SR1 and MC1 were equal, and referenced flood volumes, when they have materially different outcomes for communities west of the City of Calgary. If they knew this, why was it not disclosed?

167. The Proponent was unable to provide evidence that the inequality of outcomes caused by SR1 was presented to the impacted Springbank community.

168. As pointed out by members of the SCLG, notably Lee Drewry, AT's approach to consultation has not been fair. The residents that are directly impacted by this project have not been given the same level of consideration and attention as AT has given to other groups such as CRCAG. Mr. Drewery put the issue this way [Ex. 357, p. 546]:

> **So that, to me, is a theme throughout this whole seven- or eight-year debacle that the rural communities don't seem to matter as much as the -- as the urban communities, and not even all urban communities are treated equally. It seems the ones downstream from the**
>
> **Glenmore Reservoir are treated better than the rest. With regards to the City of Calgary's presentation, I thought it was interesting that they indicated they attempted to monetize the cultural and historical values created within that flood zone area, and yet I am not aware of any attempt by the proponent to monetize the loss of the family history and the agricultural history that would be decimated with the proposed project. So I found that a bit disconcerting that there's not an equal playing field in terms of**

valuing that historical resource.

169. Even in the creation of future land use plans for the reservoir area, priority is being given to First Nations' exercise of their traditional rights without any recognition of the multigenerational ranching history of the families that will be removed by the Project. For instance, Mary Robinson, Brain Copithorne and Lee Drewry's families have been ranching in the area since the 1800's and yet, there is no recognition of that history that will be wiped away.

170. SCLG members further noted the inconsistent and untrue information given to them during the few conversations that were held with some members and the number of times that AT has changed the information presented. For instance, Mr. Drewry pointed out that AT's claim that the sediment modelling has not changed since [Ex. 357, p 544.] was fallacious. In fact, he and other landowners were told that they should not worry about sediments as their cattle could graze the land as soon as the water in the reservoir went down. [Ex. 357, pdf 544]. As the panel has heard in this proceeding, that is not accurate.

171. Many SCLG's members, such as Mary Robinson [Ex. 250, pdf 1] noted in their submissions that the impacted landowners did not hear about the proposed SR1 project from AT; instead, they heard it from the local news or through other people. For instance, Ms. Vickie Tait heard about the project through a neighbour and attended the Springbank open house late last year. [Ex. 250, pdf 29]. Ms. Erisman noted in her direct testimony that the project's advertising is misleading as people believe that they would be getting a reservoir like the Glenmore reservoir, i.e. a lake with lovely walking paths. [Ex. 357, p. 555].

172. Other SCLG members such as Ms. Tracey Feist noted in her submissions that AT did not seek input from local landowners in the area considering the potential impacts that this project could have on her family's lands and considering the knowledge of the area that they have gathered. [Ex. 357, p. 522]. Ms. Erisman also testified that her question about how much land would be cleared for the project was never answered even though her

email was collected. [Ex. 357, pdf 551].

173. It is not clear why AT did not engage directly impacted SCLG members, such as Ms. Robinson, Brian Copithorne, and Lee Drewry during the initial stages of the project's design considering that their lands are required for the project to proceed. Typical process in other industries such as utilities is for the proponent to engage directly impacted owners early on in the process to inform them of the upcoming project and gather feedback. This was not done in this case.

174. The SCLG notes that AT acknowledges in its reply evidence, Ex. 327, pdf 11, para. 21 that it did not consult with all landowners whose lands will be impacted by the project before the SR1 was identified. AT's explanation for not having consulted with potentially directly impacted residents is unconvincing and not acceptable. Even if the design of the project at that time was a 1:100 year flood design, it should not have prevented AT from consulting based on the information known to it at that time and then expanding the consultation efforts once more impacted landowners or information are known.

175. A review of AT's Ex. 327, Appendix C, shows that after the initial meeting of July 18, 2014 with a few landowners, there was no other contact until September 22, 2014 when AT sent out email notification to affected landowners providing draft terms of reference for the EIA and advising of public advertisement of the project in the local newspaper. Again, more than two months elapsed without any action being taken to further advise the community or other potentially affected landowners about the project.

176. Ex. 327, pdf 12 indicates that AT held an open house in Springbank on May 22, 2018. Brian Copithorne provided a description of the type of information presented to them in the open houses at Ex. 250, pdf 95 as follows:

> "At these Open Houses they present an animated video of the operation of the Project. The animation shows blue coloured water flooding over green pastures, with the water then receding to leave those green pastures behind again, with a

> "business as usual" impression to the general public. This is misleading and false information. Nothing could be further from the truth. The flood waters will be full of inorganic silt, containing various contaminants. The flood will occur in late June or early July and cover the prairie grassland for 6-8 weeks or more during the growing season. The result will be nothing short of an environmental disaster for Springbank. The deprivation of oxygen and sunlight to the grassland during the short and peak growing season can only result in death. [Ex. 250, pdf 95)

177. Ms. Karin Hunter also described the open houses as one where boards with some project information were set up and people could look at the boards and put comments down. One of such open houses was described as being crowded, with no opportunity for dialogue. [Ex. 357, p. 488]. The SCLG submits that the open houses were not effective public consultation regarding the project. Further, there was no engagement with this affected community during the decision process; only after, and only then to explain the project.

178. It is important to note that AT did not begin to inform the potentially affected communities about the effects of the project to these communities until the week of June 10, 2019 when mailouts began. [Ex. 377, pdf 3]. This communication went out 4 years after the project was selected and 4 years after the draft terms of reference for the EIA was sent out. This communication should have occurred much earlier, presumably in 2014 or 2015 at the latest.

179. SCLG members are surprised by how little AT knows about the area. Examples include missing houses on maps (pointed about by Mr. Drewry at Ex. 357, p.545) , not knowing distances between key sites, not knowing the Wagner 'fingers' was a section of land not a quarter section, claiming Our Lady of Peace is on high ground with a view of the surrounding area, as discussed in Exhibit 365, transcript page 705. After 7 years of supposed study, you would think AT would know the project area intimately.

180. The SCLG requests the panel to critically review the information presented to the communities in Ex. 377 regarding this project vis-à-vis the information that the panel

has received through this hearing process and determine if the information presented is accurate in view of the projected impacts of this project. For example, the impacts related to fish, water quality and quantity, and wildlife.

181. As stated by the Board in the Little Bow Project/Highwood Diversion Plan, Application #9601, May 1998 Decision Report, pdf 18: “Public consultation is a key element in the Joint Panel Review Process. Public consultation allows the public to be informed at an early stage of the existence of the project.” [pdf 18 of decision report]. The applicant in this case established a public advisory committee for the project in addition to conducting public meetings, group meetings and open houses to discuss the project. The Panel in the case found the public consultation to be satisfactory because it had provided opportunity for potentially affected individuals, groups and communities to become involved at the project design stage.

182. In fact, consulting with the public at the initial stages of the project prior to selection of SR1 may have resulted in AT addressing the issues that have been raised by interveners in this hearing through design changes and could have resulted in a deeper look at other alternatives before the selection of this project as the preferred project.

183. Mr Krulak provided a long list of reasons why emails to Ms Hunter beginning in 2019, meet the test of engagement. Blaming Ms Hunter is deflecting blame from the Proponent’s own inadequate consultation process. Mr Hebert was more than capable of reading regulatory submissions on SR1 created by the Springbank Community Association. Ms Hunter was no barrier to engagement with the broader community. Ms Hunter did not prevent Mr Hebert using local papers, newsletters, mailing his updates, or hosting sessions. Ms Hunter, a volunteer, mom of 4 children, running a Community Association, coping with an unfamiliar Federal and Provincial regulatory process with various deadlines, is a scapegoat for the Proponent's engagement failures and this is beyond the pale. How many other area residents were directly contacted in response to Open Houses, information session feedback or through other means?

184. Mr Hebert began to email Ms Hunter beginning in June 2019 long after the SR1 project was decided on and nearly all details were finalized. 2019 was 5 years too late. [Exhibit 327].

a. Ms Hunter's role as President of the Springbank Community Association does have "Trump-like presidential authority" to make decisions on behalf of area residents or affected landowners. She has no legal authority to enter into agreements. Her role is to share information with the community, not market the SR1 project to Springbank area residents

b. Why did Mr. Hebert assume that contacting Ms Hunter discharged Alberta Transportation's obligation of engagement with Springbank residents? This is misguided.

185. Regarding the October 2020 email sent by Mr Hebert to Ms Hunter pertaining to the draft land use plan, the Plan was already submitted to the NRCB and was created following consultation with first nations. There was no engagement with the Springbank community in advance of the Plan. How does the Proponent justify putting the onus on a volunteer, not an elected official, to meet to discuss a Plan that was already submitted to regulators? Mr Krulak asks for a courtesy of engagement when one was not given in the first place. Comments on the Land Use Plan were provided by the Springbank Community Association to CEAA and the NRCB and Mr Hebert had access to those submissions, which would be appropriately considered engagement. This type of "consultation" is a pattern, where AT makes decisions, changes the project, grows the footprint, doubles the size all without any engagement with the affected community and then attempts to redirect blame for the Proponent's inadequate process.

186. In Exhibit 254, Ms Hunter provides a history of the SR1 project. This is relevant to Crown Engagement because this history undermines the assertion that the MC1 option was fairly assessed. While both MC1 and SR1 were recommended to proceed to environmental screening and preliminary design in the June 2014 AMEC report (Exhibit 275, pg 8), only SR1 had a project summary submitted to the NRCB that

same month and was approved and tendered for detailed design, with the RFP closing the next month, August 6, 2014 (Ex 254, pg 88) . Only SR1 was presented in any detail to the public from that point forward. Why?

187. Approving this project will set a precedent that consultations are not important early in a process, and can be completed with payoffs and offers to engage late in the process, as we have seen here. It will allow this deficient engagement process to stand.

188. The SCLG submits that the Board should find that AT's consultation efforts with the Springbank Community were inadequate.

2.0 TOPIC BLOCK 2

Topic Block	Witnesses
Topic 2: Crown Consultation and Land Use, specifically: i. Future land use and land use plan for the Project development area ii. Historical resources	Alberta Transportation SCLG Ms. Karin Hunter

2.1 Future land use and land use plan for the Project development area

189. The SCLG rely on Karin Hunter's powerpoint marked as X254, pdf 106-120 and the SCLG oral evidence in Ex.368, Tr, p.954-993.

190. The draft land use plan, Ex 216, creates wholesale land use changes from what was contemplated in the 2015, where "SR1 is pasture land and its use doesn't change except during high river discharges."

191. In the early days of the project the Proponent assured landowners that they would continue to be able to ranch the land. Lee Drewry asserts landowners were regularly vilified by politicians (Brian Mason was particularly vocal) as being unnecessarily obstructionist. As the First Nation opposition became more obvious, the Proponent changed gears and cut out landowner usage and began to focus on making promises to FNs regarding land usage. This is obvious in the FN consultation records. Landowners were kicked to the curb and the focus became traditional usage for FNs to try to bring them onside. In the hearing the Proponent seemed to try to appease the public and the FNs by claims of opportunities to use the lands – but essentially AT is kicking the can down the road to AEP to figure out all the competing land uses that AT has promised. Interestingly, landowners are way down the list in terms of future land usage.

192. Exhibit 386, Undertakings, multiple identical statements "If SR1 is approved, AEP will be responsible for consulting with stakeholders to develop the final Land Use Plan consistent with the draft land use principles for the Project." What does this even mean? Does "consistent with the draft land use principles" mean that any and all community benefit items are automatically excluded because they conflict with First Nations use?

193. The "fingers" in the NW side of the Project and the PDA angling across driveways are confounding and are barriers to land use for both the landower and other users of the adjacent crown land. These examples indicate the lack of foresight and consideration to local landowners and future land use shown by AT. There was apparently no sober second thought about this project footprint. Has there ever been anything like this, which carves Crown Land out from private land in unusual shapes without regard to the affected landowners?

194. In terms of land use, landowners have potentially competing interests with both the public and the FNs. Landowner preference would be to continue to ranch the land that is not subject to frequent flooding – especially the land north of Springbank Road. It may

never flood in our or our children's lifetimes, yet it appears the land will be taken and re-purposed

195. Additional conflicts relate to hunting. Mr Wagner is concerned about hunting for a variety of reasons, including safety and concern for the elk herd; FN support hunting. Hunting is at odds with public use of this land and its location along two main roads.

196. Yet even more conflicts are expected post-flood, with the use of tackifiers and herbicides conflict with traditional use. Further, the state of the reservoir, the largest land use area, post-flood is a completely unknown outcome. 10-100cm of sediment from one flood, let alone multiple floods, over hundreds of acres is not conducive to traditional use.

197. General management of the reservoir may also be at odds with First Nation traditional use: mowing for fire suppression conflicts with traditional uses such as plant collecting and may impact wildlife behaviour.

198. AT thinks that AEP can solve all these issues?

2.2 Historical resources

199. As noted by Mary Robinson in Ex. 250, pdf 10, "There are many historical and Native traditional factors in this area that need to be considered. i.e.: The Cairn, Stoney Trail, burial grounds, etc. We have the Stoney Trail going through our property and native teepee rings, buffalo wallows, medicine wheels etc. There is a historical camping ground for natives who travelled on this north to south trail. Our ranch was the staging area for the UNITY ride held where Natives and other individuals rode horses from our ranch to the Tsuut'ina Indian Rodeo grounds to show our opposition to SR1."

200. As noted by Jan Erisman, this project will destroy 14 historical structures and 22 archaeological sites will be compromised. [Ex. 357, Tr, p 557]. Such destruction of historical structures and archaeological sites is unjustifiable considering that there are other alternatives, such as MC1, that will not involve any destruction of historical resources.

201. The SCLG has requested a condition concerning gathering the historical resources in the SR1 area. See the discussion between Ms. Roberts and Ms. Erisman relating to gathering the historical resources at Ex.368, Tr, p.991.

2.3 Conditions

202. In Exhibit 365, Tr p.789 to p.812 Mr. Secord requested that AT advise whether it would accept a number of specific conditions arising out of the Land Use Topic Block as a condition of any approval that might be issued by the Board. A series of undertakings were given to the SCLG by AT.

203. The SCLG requests that these conditions asked for by the SCLG be specifically attached to any approval that might be issued by the NRCB.

3.0 TOPIC BLOCK 3

Topic Block	Witnesses
Topic 3: SR1 Design, Safety and Risk i. Project description (including operating plan, flood water management and reservoir capacity) ii. Dam safety iii. Risk management iv. Public safety, including emergency response v. Sensitivity of project design, operation and safety elements to changes or variability in climate parameters vi. Reservoir capacity	Alberta Transportation City of Calgary SCLG Mr. Roger Austin, Ms. Ruth Keyes Dr. Jon Fennell Dr. Dave Klepacki Mr. Ian Dowsett

3.1 Project description (including operating plan, flood water management and reservoir capacity)

204. The SCLG rely on the prefiled evidence of Dr. Dave Klepacki and Ian Dowsett in this Topic Block. See also Karin Hunter's evidence in X254, pdf 122-124.

205. The pivotal Deltares report of 2015, Exhibit 13, stated the following, which still applies to SR1 today: pg 5: "Temporary storage of water in detention areas is not a very robust measure, in the sense that it is effective up to a certain design condition, but when it is overcharged its effect is reduced to nil."

206. We do not believe that operating risks identified by Deltares, Ex 13 which include the following, have fully been addressed, even as this project sits before the NRCB:

207. SR1 is quote “very sensitive to sound operation and fast response time” and “the effect of storage heavily depends on the expected range in possible flood hydrographs, accurate forecasts and quick operation of the gates.” (Ex 13, pg 5)

208. We have not seen the “range of possible flood hydrographs” prepared by the Proponent.

209. Quote “It is expected that SR1 is more sensitive for differences in flood hydrograph or inaccurate forecasts than MC1.” (Ex 13, pg 8)

210. We have not seen sensitivities of SR1 across various forecasts, and nothing over the 2013 flood, except for the PMF. Is this because SR1 becomes more and more unfavorable at higher flow rates?

211. The AEP Draft Hydrology Assessment Report from fall 2020 (Exhibit 265, page 5) summarizes rates with associated return periods and confidence intervals. It shows that a 1:200 flood at Bragg Creek is estimated at 1140 m3/s, with a range from 727m3/s to 1930m3/s. What happens downstream if a flood approaches the upper limit of this forecast? The Proponent will say SR1 will “bypass” the balance of the flood, while the diversion skims off 480-600m3/s. That is fine for SR1, but what about the other communities downstream?

212. From Decision NR 2008-01, pdf 13; the Board stated:

2.1.4: NRCB Decision Report

The Joint Review Board held 19 days of public hearings on the Little Bow Project/Highwood Diversion Plan, between November 12, 1997 to January 9, 1998, in Vulcan and High River, Alberta. It issued its decision in May 1998.

In summary, the Joint Review Board approved, with conditions, the construction and operation of the Little Bow River Reservoir, the construction and operation of diversion works on Mosquito Creek and associated conveyance canal leading to Clear Lake, and the construction of the works at High River to divert water from the Highwood River and the enlargement of the existing canal to the Little Bow River. Operating plans for the facilities in the high flow period were approved, while consideration of the operation plans for these works during the low flow season of late July and August was deferred, pending receipt and review of additional information. Also deferred was consideration of the construction and operation of the expansion of the Women's Coulee Reservoir and associated diversion works and return works subject to receipt and review of additional information.

213. Comment; it is with noting that the NRCB specifically "approved operating plans for the facilities in the high flow period." Why is that not the case here? Or will you be opining on the operating plan to only syphon off 480m3/s to 600m3/s of the 1,260m3/s FoR and pass the balance of the flood downstream? In SR1, we have no operations manual. This is a huge deal - so much of this project is dependent upon future uncertain operating conditions.

214. Exhibit 218 pg 23 provides a high-level flow chart for operations of SR1 during a flood. Critically, this flowchart relies on several fundamental assumptions, that if voided, introduce significant operating risk. Examples: "all hydrometric stations are in operation" and "priority should be to divert to SR1 over Glenmore" A critique of this Flowchart is available in Ex 199.

215. As noted in Mr. Kruhlak's letter dated February 1, 2021 marked Ex. 172:

> Mr. Secord also requested the draft Operations Manual referred to in section 8.1.3. of the PDR. As clearly stated in the section, a draft Operations Manual will be developed but is not at present complete. An Operations Manual for a water control structure, such as SR1, requires coordination with the electrical and mechanical equipment to be selected by the contractor during construction and is, therefore, typically developed in parallel with construction and commissioning of the Project. Consequently, this information is not available at this time.

216. How can the NRCB approve operating plans for the Project when there is no Operations Manual to review.

3.2 Dam safety

217. The SCLG relies on AEL's evidence in this proceeding (Roger Austn & Ruth Keyes) including the oral evidence in Ex 373, Tr, p.1302 to 1324.

218. In particular the AEL would like to see AEL's recommendations, as discussed during the hearing, added as conditions to any approval issued to AT for SR1.

219. The SCLG note the following specific recommendations set out in Ex. 370:

220. Recommendation #1 (Ex 370. Slide 8) & Ex.373, Tr, p.312

24 A. MS. KEYES: So our Number 1 recommendation was
25 that the diversion inlet maximum discharge capacity be

1 reviewed and modelled with the access bridge in place.
2 Between the draft and final preliminary designs, an
3 access bridge has been added over the diversion inlet
4 with a bottom elevation of 1215.5 metres.

221. The SCLG would like AEL's Recommendation No. 1 added as a condition to any approval issued to AT.

222. AEL Recommendation #2 (Ex 370, Slide 10) & Ex 373, Tr. p.1314:

Next slide, please, slide Number 10.

Our Recommendation Number 2 was that the emergency spillway maximum discharge capacity is less than the diversion channel design flow.

As the storage dam is an extreme consequence dam, the emergency spillway should be capable of discharging the IDF, taking into account the routing effect of the reservoir without infringing on the minimum freeboard requirements. Spillway sizing should be based on the reservoir routing started with the IDF entering the reservoir when the reservoir is at full service level and routed up to the minimum freeboard level.

A reassessment of the emergency spillway should be considered to increase the discharge capacity.

223. The SCLG would like AEL's Recommendation No. 2 added as a condition to any approval issued to AT.

224. AEL Recommendation #15 (Ex 370, Slide 22 and Ex 373, Tr, p.1320):.

For Recommendation Number 15, Stantec has responded that: (as read)

"As discussed in Section 10.4.2 of the Preliminary Design Report, the low-level works design capacity was selected based on the industry standards for evacuation times for the reservoir. No basis for increased capacity has been provided."

> Austin Engineering accepts this response, though we note that there is no secondary means for draining the reservoir should a failure of the low-level outlet occur. And a significant reduction in the risk and operation to the structure can be realized from the addition of a second low-level outlet.
>
> It is typical of dams to have a conduit for water supply and conveyance along with a low-level outlet for utilization during emergency, and we recommend the consideration for a second water conduit or low-level outlet be given during the final design.

225. The Canadian Dam Association (2013) Guidelines and the Alberta Dam and Canal Safety Directive (Government of Alberta 2018) do not address requirements for sizing of outlet works or evacuation times for reservoirs.

226. The SCLG would like AEL's Recommendation No. 15 added as a condition to any approval issued to AT.

227. AEL Recommendation #17 (Ex 370, Slide 24 and Ex 373, Tr, p.1321):

> With regard to Recommendation Number 17, "Riprap on the Upstream Face of the Dam," Stantec has responded: (as read)
>
> "The upstream face of the dam is subject to varying reservoir levels during filling and draining. This varying level will reduce the risks associated with progressive erosion from wind-driven events. The combination of cohesive clays and vegetation will provide sufficient mitigation during the short exposure periods."
>
> We accept this response; however, we caution that riprap along the crest of the dam would function during an event where water would be required to be stored within the reservoir at full service level or full supply level for a period of time during passage of a major flood. Riprap would still provide a benefit in this instance.

228. The SCLG would like AEL's Recommendation No. 17 added as a condition to any approval issued to AT.

229. In relation to Dam Safety, the SCLG notes that "to Monitor" is not the same as " to mitigate."

230. "Monitor" is not the same as mitigate or diminish or lessen or make something go away entirely.

231. Anyone can stand on the sidewalk in the middle of a school zone and "monitor" cars speeding by

232. You mitigate or diminish or make something go away by minimizing the risks in advance by installing speed bumps or by enforcement, in the school zone example – enforcement by police with penalties.

233. If this poorly designed project does, in fact, proceed, how will AT mitigate or diminish or make these very real risks to the community and to the project go away?

234. Monitoring is not a solution. It is standing on the sidewalk, watching cars speed by and doing nothing until a kid steps off the sidewalk and gets hit. It is standing on the sidewalk and watching this ill-fated and poorly designed project proceed until there is a catastrophic failure – the risks associated with this project have not been even close to adequately addressed.

235. Monitoring does nothing once this project is built. Once something goes wrong, it is done.

236. The Proponent suggests that first fill requirements will be determined through the Dam Safety review. Yet, when the SCLG asked for a controlled first fill, as is standard in dams, the Proponent said no. It is possible that the Dam Safety review recommends a first fill that is at odds with the first fill during a flood event. For instance, if the Dam Safety office requires limits to reservoir fill level or diversion rate, all financial benefits could be eroded. In that case, SR1 loses its time advantage over other options.

237. The SCLG would like the NRCB approval to be conditional on findings from the Dam Safety review, which may impose operating conditions or significant additional capital cost.

238. Also, how long does it usually take for a first fill process? ...Is it common for dams to go from empty to full in 50 hours (480) or 36 hours (600)? Most dams are filled over months or even years. I know they said this is part of a future commissioning plan, but by my math, the SR1 reservoir fills at a rate of 1/2 to 3/4 of a meter per hour. How long

for the water to impact the readings coming from instrumentation? How long before you know if it is okay or there is an issue? Hours, days? weeks? Is it even realistic to get instrumentation readings in 10 hours or 15 hours? Also, if there is water to begin with, such as a permanent pool like in most dams, that is an advantage as levels start to rise because the dam has already proven itself safe at an earlier first fill. [RA had answers to this]

239. Also note my cross-examination on the 2018 dam / canal safety directive marked as Ex. 339. The SCLG is concerned that AT has not considered safety of excess flows passing the structure during expected operations. There are a number of paragraphs of concern in Ex. 339.

240. With respect to AT's Final Argument, the SCLG make the following points:

a. The reference to low probability (by Mr. Austin) is taken out of context, even though there is a low probability of the gate failing in the open position it does not preclude the design taking this into consideration.

b. The point with regard to the two low level outlets is not to do with the drawdown rate. This is risk management, we are talking about the only outlet for the reservoir that cannot be tested until it is at full service level, what if the low level outlet fails to function? It will be tested under full design head, it would be prudent to include a secondary means of dewatering the reservoir as is typical with other structures which have one conduit for the purpose (ie water supply, power generation) and a low level outlet.

c. With regard to the Emergency spillway sizing, the US Army Corps ER1110-8-2 – Inflow Design Floods for Dams and Reservoirs suggests the initial reservoir level be taken as the Full Supply Level (FSL) or the pool level after a flood half the size of the IDF. Based on the operation assumptions, we cannot be certain the reservoir will be near empty during routing and as an Extreme consequence dam it must be able to pass the PMF with reservoir routing starting at an appropriate level. If the Diversion Inlet gates fail open or are left open when the SR1 reservoir

is already at its FSL, then it only takes 13 hours to overtop the Storage Dam. By increasing the discharge capacity of the Emergency Spillway to match the design capacity of the Diversion Inlet, you can prevent the possibility that the Storage Dam can be overtopped. For an extreme consequence dam, this possibility, no matter how low, must be avoided.

d. Operation of the SR1 Reservoir has repeatedly been discussed as "simple", this is not likely to be the case during flood conditions as information on river levels, instrumentation readings, weir settings, flood forecasts, Glenmore storage volumes will all need to be considered and acted upon appropriately.

e. Both Mr. Austin and Ms. Keyes have much experience with Dams within Canada and the application of the CDA guidelines. Their task was to review the safety of the SR1 structure and they have done that. Their experience with the permitting process in Alberta is not relevant to the safety of the Dam.

3.3 Risk management

241. The SCLG rely on Ex. 199 which is the Springbank Community Association's 36 page letter to IAAC/CEAA and the NRCB relating to risk and the limitations of SR1.

242. SR1 is not able to rapidly draw down its water levels, which has implications for risk and also for climate change.

3.4 Public safety, including emergency response and Conditions requested

243. There is the potential for more than 100 lives to be lost as a result of a failure of SR1.

244. In my questioning of AT on the 2018 Dam Directive, Ex. 339, there was the following exchange in Ex. 373, Tr, p.1132

A. MR. MENNINGER: In the highly unlikely scenario of a breach of the off-stream storage reservoir, it was determined that there was the potential for life loss downstream, and that was the basis for the determination of an extreme consequence structure.

Q. And was there a determination of how many lives would be lost in the Springbank community?

A. MR. MENNINGER: We did not do an exact determination on the individual number of lives to a specific degree, Mr. Secord.

Q. Is there a range of loss of life?

A. MR. MENNINGER: In the dam classification criteria for an extreme consequence structure, there is a number for what would qualify as an extreme consequence.

245. At p.1132

Q. And what is that number?

A. MR. MENNINGER: So in the Alberta Dam and Canal Safety Directive, it identifies an extreme consequence structure as a structure that if -- if, as I said, in the very unlikely effect of a failure, there is the potential for life loss of more than 100 people or individuals. It doesn't mean that it's guaranteed, but that means that there is the potential, and so that's how you classify it accordingly.

246. Public Safety and emergency response is of great concern to the SCLG.

247. Ex 373, Tr, p.1195 to page 1209 I requested that AT accept a number of public safety conditions to be attached to any approval issued by the Board.

248. At Tr, p.1196 Mr. Fitch noted this might be a problem because AT was kicking the emergency management plan to AEP.

249. As noted by the Chair and Mr. Kennedy at Ex 373, Tr, p.1201:

THE CHAIR: Sure. So, Mr. Kennedy, it's kind of being punted back and forth in terms of AT's willingness to accept conditions, and then what happens after the project has passed from AT on to AEP as the ongoing operator, because some conditions may in fact be operating conditions well after AT has raised the project.

And I just wanted to shed a little bit of light in terms of NRCB's past experience, because this comes up often, and we've issued conditions in the past when projects have been approved; and if you could just maybe add to that in terms of how we deal with it.

MR. KENNEDY: So if the question is, will those conditions carry forward to future custodians of the ownership of the project, absolutely. Those conditions flow with the project.

And it's pretty common, both with public projects, which typically are advanced, in this case, by Alberta Transportation and will move to Alberta Environment, or with private sector projects where there's a change in ownership that takes place sometime post-NRCB approval.

250. It is very important to the SCLG that these conditions that I requested (Ex 373, Tr, p.1195 to page 1209) relating to public safety of the Springbank community not fall through the cracks and they be added as conditions of any approval issued by the Board..

3.5 Sensitivity of project design, operation and safety elements to changes or variability in climate parameters

251. The SCLG rely on Dr. Fennell's prefiled evidence as well as his powerpoint and viva voce evidence on March 30 and March 31, 2021.

252. AT suggests that protection of people and property from a future event like the one we experienced in 2013 is the primary goal.

253. Having said that, the SCLG is quite surprised at how the climate change aspect of this project has been dealt with, or more importantly how it has not been dealt with in a manner consistent with this goal. Much of the work done to support SR1 has been based on an evaluation of documented events over a very protracted time period. This is a dangerous limitation and one that has driven the process since the beginning, and in our opinion has led to a false sense of security.

254. 2013 was a significant event, but not the most significant event that has occurred in this region in our known history, or likely in the past. You are probably familiar with the terms “known knowns” and “unknown knowns” when speaking about situations or concepts we are trying to understand. But it is often the “unknown knowns”, and more importantly the “unknown unknowns” that tend to get us into trouble. And it’s no one’s fault really, but these oversights often lead to unintended consequences. Sometimes catastrophic.

255. If approved, SR1 will be a rather unique (and large) extreme consequence dam set right in the middle of a quiet country residential setting. Now, you are not dam engineers, but if there was an option to put something like this in a safer, and more beneficial, location wouldn’t you do that. So it is beyond the SCLG how this SR1 option got so much traction from the outset. It doesn’t seem logical.

256. When it comes to climate change this is where we see us getting into trouble if we don’t use our imaginations. It is clear that SR1 will only be able to deal with a flood similar to 2013 and the rest of the disaster will be sent downstream to other communities, with the possible exception of those below the Glenmore reservoir. The focus seems to have been on preserving those communities and businesses, at the expense of those upstream. I am sure AT has to be aware of that, and that there is another solution that would mitigate that risk, and the risk of an even greater flood.

257. What is a bit disheartening is that when presented with evidence, prepared by AT themselves, on the benefits of the MC1 option they continue to argue the merits of SR1, an arguably inferior option. Maybe it’s because they have come so far down this road they feel compelled to work with it, but it is clear that the benefits of SR1 are limited. And in fact the full cost, and I mean the FULL cost, has not been fully explored. Only a limited version of it. As taxpayers in Rocky View Country that makes my clients nervous. Nevertheless, AT remains convinced that it can engineer its way around these limitations. But at what cost? Costs that seem to keep escalating with each tweak of the design, and there have been many. Is that because of failure of

imagination? Shouldn't we strive for something more simple, more robust, more beneficial?

258. The fact that higher magnitude flood events have occurred in the past, but perhaps have not been measured or documented, is not a reason to move forward with a partial solution. If there is an option to address larger floods and protect more people and property we should be looking at that. That's the agreed upon goal, right? Protect people and property? This is no time to have a narrow view.

259. All of the literature we have read about what the future hydroclimate of Alberta holds for us, both from a flood and drought perspective,should alarm us. We cannot, and should not, just rely on the period of record. We have to step outside conventional thinking to deal with something we don't totally understand. This is due diligence. It should be clear to the Board that higher magnitude floods of greater frequency are a distinct possibility in the future when one looks at the existing data in a different way. If we are truly trying to assess the worst-case scenario when it comes to climate change we need to step beyond the conventional. And we know that can be hard for some, but if we don't then bad decisions are going to be made that will become other people's problems.

260. The SCLG understands the need for standards, and that much of Canada designs infrastructure with the 1:100 event in mind. In Alberta we align with this standard, and design infrastructure to withstand such an event; however, SR1 is designed to address a 1:200 event. That would appear conservative, but other jurisdictions are starting to see a move towards more conservative and proactive design constraints. Saskatchewan's recent move to incorporate the 1:500 event in their design considerations is a good example. BC's adoption of the 1:200 as their design event is another. As Dr. Fennell noted it is clear that the engineering community is beginning to understand the risks related to climate change and are adapting to its inevitability.

261. Given the documented limitations of SR1 to address an event greater than 2013 (or a 1:200), the chance that an event greater than that occurred in response to climate change, and the extreme consequence classification makes this project a precarious

one. The fact that a much better option was put forward earlier that protects all, and I mean ALL, downstream communities from a flood much greater than a 1:200, and that this option was put aside is frankly unbelievable.

262. One other aspect we would like to address is drought. This was not really dealt with in the application beyond some passing statements. The SCLG finds it quite interesting that AT and the City of Calgary is putting forward the notion that SR1 will increase water security for the City of Calgary. The SCLG struggles with this logic given that during an extended drought, which would include low snowpacks and low seasonal rainfall, SCLG suspects that water levels in Glenmore Reservoir would not be lowered to the usual degree in order to preserve water for the high-use season. Under such a scenario, SR1 would not be engaged anyway, but would instead sit there generating dust for the local residents to breathe. So, how does SR1 enhance water security in this case. It certainly doesn't enhance public health security.

263. During the hearing on Thursday, April 1, Alberta Transportation admitted that some of its climate change data it relied on was incorrect. This had to do with the role that snowpack plays in the intensifying of flood risk during early spring rain-on-snow events like 2013. SCLG questions whether AT has modelled the worst case scenario for climate change in coming up with its design criteria for MC1.

3.6 Reservoir capacity

264. Why isn't the diversion capacity greater so that the entire peak flow can be diverted into the reservoir thus providing the residents downstream of SR1 with the same protection as the resident downstream of the Glenmore Dam?

265. MC1 has a reservoir capacity of 93,000 dam3in a PMF; Ex 101, pdf 46. SR1 is inferior. Is this not superior to SR1's 77.7 million?

4.0 TOPIC BLOCK 4

Topic Block	Witnesses
Topic 4: Water	Alberta
i. Hydrology	Transportation
ii. Surface Water quality	SCLG

iii. Aquatics iv. Hydrogeology v. Sensitivity of project water elements to changes or variability in climate parameters	Dr. Jon Fennell Mr. Allan Locke Dr. Dave Klepacki

266. From Exhibit 347 Calgary's Water Supply:

> Calgary's water supply
>
> Water is a limited resource and our water supply is changing due to climate change and a growing population.

267. SR1 does not store any water on the Elbow River which might be used by the Glenmore water treatment plant in the future in the event of severe drought. So if the Elbow river runs dry the water for the Glenmore treatment plant serving 40% of the City of Calgary would have to come from the Bow River.

268. Bow River height in 2013 backing up into Elbow regulated by SR1; see discussion with Frigo.

269. Karin Hunter X254, pdf 125-128 [KH spoke to this in her Topic 1 DirecT Evidence]

4.1 Hydrology

270. The SCLG is concerned that flow from the low level outlet is going to scour the unnamed creek.

271. The faster the low level outlet drains the greater the risk to the environment and the riparian areas below the low level outlet.

272. Mary Robinson also has concerns about the headpond from SR1 backing up flood water onto her property.

273. New Conditions:

274. The Proponent shall include Redwood Meadows should be included in the Groundwater Monitoring and Mitigation Plan due to its close proximity to SR1.

275. The Proponent shall include Redwood Meadows in water quality monitoring during and after a big flood.

276. The Proponent shall pay for the cost of damages to Bragg Creek and Redwood Meadows berms caused by high flow rates.

4.2 Surface Water quality

277. Frank Frigo sequester water contaminated by forest fires in SR1; see Tuesday transcript; none of this modelled by AT.

278. The 2013 flow does go through Mary's ranch somehow, within the blue circle on the attached jpeg. That area is significantly upstream from the southern tip of the Floodplain Berm. If the headpool reaches this area and the velocity drop causes delta sedimentation, that will lift the water elevation and exacerbate overtopping of the cutbank near Mary's ranch. A scenario that doesn't seem too far-fetched in my limited knowledge of fluvial sedimentology.

279. [As referenced above] The SCLG is also concerned that Pirmez Canal or Creek has not been investigated including the possibility that floodwaters from a Design Flood could bypass the SR1 diversion structures via Pirmez Creek. [Mr Wood was asked if he looked at the Pirmez canal on Ms Robinson's land and he said that was outside of the PDA and that water would just go across highway 22]

4.3 Aquatics

280. The SCLG relies on Mr. Locke's evidence as well as his viva voce evidence on March 30 and March 31, 2021.

281. The SCLG request that the recommendations set out in Mr. Locke's report be attached as conditions of any approval issued by the Board.

282. Mr. Locke's recommendation to consider alternative release scenarios is based on the fact that it is far better and more efficient to consider all reasonable flow release scenarios now so that the findings can be incorporated into the final design. Mr. Locke believes it is better to invest more time upfront instead of more time later trying to react to unintended outcomes.

283. With respect to fish entrainment and other possible deterrents to fish entering the diversion channel, all potential solutions should be investigated. Examples of unique approaches include creating an electrical field or using physical structures.

284. There is considerable uncertainty when predicting fish entrainment at headwork structures. It is unlikely a precise estimate can be calculated. However, it makes sense to try to frame the estimate as best as possible, in terms of a low and high value for the number of fish and size of fish that potentially will be entrained. Based on the information provided to date for this project and what is known for irrigation headworks, all that is possible should be done to first, keep fish out of the diversion channel, secondly return fish during lower flow diversions where it is feasible, and thirdly have a good fish rescue plan.

285. Finally, Mr. Locke emphasized that spending more time upfront will be better than spending more time later reacting to unintended outcomes. A large amount of data has been collected and a lot of modelling has been carried out. Making sure the side boards have been properly identified and all reasonable options have been investigated should be done before final design.

286. Regarding fish, there are really no redeeming outcomes from the Project and there will be much work required to minimize the impacts. The best they can do is “mitigate”. The SCLG does not consider AEP's conclusion that Bull trout may be extirpated to be a positive outcome of SR1.

287. The SCLG would also note the absurdity of fish rescue - 30 people + supervising biologists wandering around the reservoir as it drains - this could be an expenditure of hundreds of thousands of dollars in a big flood.

288. If the Elbow is at 160m3/s downstream of Glenmore as a result of SR1 and the Bow is at 1700m3/s (as it was in 2013), will the water back up? The Bow will be several metres higher than the Elbow at the confluence. They didn’t do the modelling. Mr. Frigo said water would back up from the Bow River into the Elbow River in Topic Block 4 in those circumstances.

4.4 Hydrogeology

289. The SCLG rely on Dr. Fennell's prefiled evidence as well as his powerpoint and viva voce evidence on March 30 and March 31, 2021.

290. An extensive cross-examination of AT was conducted on hydrogeology. Mr. Yoshida was an evasive witness and an examination of the transcript will reveal that he refused to answer straightforward questions on multiple occasions. Sometimes the question had to be asked three times prolonging the length of the SCLG cross-examination. The SCLG submits that the evidence of Dr. Fennell should be preferred over the evidence of Mr. Yoshida.

291. To Recap some key points from the cross-examination of Mr. Yoshida and others on the AT Panel who attempted to help him:

292. Exhibit 110, Figure 3-10 on pdf pg. 47 shows that the base of the SR1 reservoir is underlain by at least 5 m of lacustrine clay

293. Figures 4-5 to 4-8 on pdf pgs. 113-115 show the top 3 layers of the model with a low permeability soil beneath the base of the SR1 reservoir footprint.

294. The lacustrine clay should be in these three layers because it is the uppermost formation.

295. The K value for the top 3 layers is indicated on those figures as being 7.2 x 10-8 m/s

296. Missing from the top three layers of the model is the documented sand and gravel in the unnamed creek valley, which was indicated by AT to be to be anywhere from 1-7m thick overlain by a layer of glacial material.

297. This sand and gravel in the unnamed creek valley should have at least been in Layer 1 or 2 of the model given its proximity to surface.

298. Sand and gravel is given a K value of up to 2.8 x 10-3 m/s in the previously cited Table 4-3

299. This configuration of soils and associated K values in the model is not reflective of the actual geological conditions documented beneath the SR1 reservoir from the exploratory drilling programs.

300. The presence of this much lower K value layer will influence the leakage from the base of the SR1 reservoir. It will reduce it by up to 2 orders of magnitude.

301. Given the fact that only 3 field measurements of K values were obtained, with only 1 for the lacustrine clay, the Board should have no confidence that a full range of values has been obtained including any influence from fractures or other features that would result in a higher K value (like silt layers).

302. AT indicated in testimony on March 29 that a number of K tests were performed, but were not documented because of slow recovery or lack of water. However, we see in Exhibit 110, Table 3-4, pdf pg. 93 that samples were collected for water quality analysis from up to 16 monitoring wells in the unconsolidated deposits. If you were able to sample these wells that were obviously full of water, then why were you not able to K test them as well?

303. AT also brought up some evidence on March 29 in Exhibit 375, Table 17-1 on pdf pg. 47 showing very different K values for the model layers, all of which are lower by orders of magnitude than those indicated in Table 4-3 of Exhibit 110. Why the change, and how can the Board have any confidence in a model that just keeps on changing and incorporating lower and lower K values beneath the SR1 footprint - lower K values that lack a sufficient degree of field verification?

304. SR1 will increase the risk to human and ecological health due to the leakage of water out of the base of the reservoir when full or partially filled. This will result in the flushing of accumulated contaminants, either naturally-occurring in the underlying soils or routed to the reservoir during floods. It's going to be flushed into the underlying groundwater and connected systems. This includes the bedrock intervals, the surface water in the outlet channel, and the receptors that will be affected. .

305. Alberta Transportation also relied heavily on models to frame the hydrological and hydrogeological risks of SR1, but failed to address the geochemical risks. “I would even argue that the hydrological and hydrogeological modelling from the physical standpoint and acknowledgement of climate change as a risk is flawed to some degree”.

306. The SR1 does not consider the risks that the structure poses from extended drought conditions. And the SR1 does not increase the water security for the City of Calgary contrary to what Alberta Transportation and the City of Calgary have said.

307. Only three hydraulic conductivity field tests were conducted to give real data, not laboratory data, to understand the leakage that would occur from this structure. It is real data that's giving you a better idea of the real picture, as opposed to a point measurement from a small core that's confined in a laboratory and tested under controlled conditions. One of those three field tests was for the clay, the main seal beneath the reservoir, and the other two were for the till. This is hardly not enough information to properly constrain the hydraulic conductivity under SR1 and likely led to the very low leakage estimate of 426 m3/d as opposed to likely greater than 100,000 m3/d that I calculated considering the reservoir partially filled during a 1:100 flood event.

308. Alberta Transportation’s response to much of Dr. Fennell’s groundwater concerns is to monitor in order to assess the information gaps. Monitoring is not mitigation, and oftentimes when you detect things, it can be too late, and it can be very difficult and sometimes impossible to remediate. So this is why we assess the worst-case scenarios, but that didn’t really happen here.

309. SCLG’s concern is the proximity of this Project to local residents and the utter lack of assessment regarding potential changes to groundwater quality and impacts to human and ecological receptors. Absolutely no work has been done on this aspect beyond some baseline sampling and reporting. I understand that AT does not believe that SR1 will create any water quality issues, but that is not good enough. People need some form of evidence. Are we just to leave this up to belief? In my clients’ opinion

AT has in no way covered off this issue. This seems to fall into that category of "unknown unknowns" for them. It is abundantly clear that there was no qualified geochemist involved in the development of this application. If the NRCB Board members are being asked to approve an extreme consequence structure placed in a high risk area with no real analogues to compare to then, you should be given the information necessary to make an informed decision. It can't simply be left up to belief.

310. The SCLG also has some concerns with the groundwater model that has been used to support AT's impact assessment. It is clear that the lack of information on the range of hydraulic conductivity (or K values) for the underlying clay and tills is impacting the results. Only three measurements have been provided, yet AT was able to collect water from up to 16 monitoring wells in those sediments for the baseline quality assessment. If these wells could yield enough water to sample, then why could they not be K-tested. This is an example of a discrepancy that we have been painfully trying to resolve. The fact that AT thinks 3 measurements of K value in the clay/tills is sufficient to constraint things is alarming.

311. This concern also extends to how the model layers have been configured, which is causing some issues with being able to accurately mimic measured hydraulic heads. For example, there is no inclusion of the shallow sand and gravel in the unnamed creek valley, yet AT has substantiated its existence. Another is the attribution of K value for the sediments under the SR1 reservoir footprint. They still refute a near-surface sand and gravel that they admitted numerous times is there, yet it is absent in the model. How is this considered comprehensive and reflective of the site conditions. They missed these things yet they dig in on a flawed model. Again, this is to be expected.

312. Then there is the concern with subsurface pore pressure changes once SR1 is built and commissioned. This relates to whether or not issues will occur at "interfaces" between formations or within weak intervals. It appears from the answers provided that these higher-risk intervals of sediment may have been assessed or tested. No

mineralogy as performed, yet we know for a fact that the tills contain swelling clays which could be subject to failure.

313. Hydrogeologists are taught that total stress (the weight of the soil/rock and water) above a certain point in the subsurface is a combination of effective stress (grain to grain contact) and pore pressure. And, if the pore pressure increases the effective stress has to decrease. When this happens the risk of shear-slip increases under the right conditions. Dr. Fennell didn't see any particular investigation of higher-risk intervals, like those at formation interfaces, done by AT. It would have been useful to at least assess this risk so that the residents near this structure can have confidence that it will remain intact when operated.

314. As Dr Fennell stated, models are only as good as the information used, how it is configured, the skill of the modeler to look at the output and make sense of it. In the end, models are not meant to replace human intelligence…they are meant to enhance it but you can't just give it up to the machine. If the NRCB is being asked to make a judgement on a project that is heavily predicated on model results, then they need to be sure they can trust them. And if I was a Board member, I would be quite dubious given the explanations, or lack thereof, provided by the applicant.

315. There are better options and simpler solutions, but unfortunately this is the only one before us. So, we will just convince ourselves that we can engineer our way around the limitations, unfortunately at greater and greater cost with diminishing benefit. If there is a more "elegant solution", to use Mr. Menninger's vernacular, then we should advance it. Not just work with something that is "better than nothing". As educated professionals entrusted with protecting the public good and ensuring that sound decisions are being made, they have a duty to ensure we are not inadvertently creating a situation that we will later regret, just because we believe it is the right choice or we are searching for some convenient answer. Politics has no place here particularly when we are talking about people's safety, well-being, and financial security.

316. Given everything the SCLG have heard over the past two weeks, along with the volumes of support materials, the over-confidence displayed by the applicant during

these proceedings, and the multitude of questions that remain unanswered, the SCLG have hard time seeing how this Project can possibly be in the public's best interest when better options exist.

317. The SCLG is concerned that AT appears to have ignored relevant data and has disregarded climate trends and the likelihood for higher magnitude flood events.

318. The SCLG is concerned that AT has been selective of their use of climate model results which in fact do not accurately represent peak flows, and basically just got totally wrong their snowpack evaluation.

319. If the goal of this project is to protect people and property, AT has fallen short given the lack of protection upstream of the Glenmore Reservoir.

4.5 Sensitivity of project water elements to changes or variability in climate parameters

320. See Dr. Fennell's climate change submissions for Topic Block 3.

6.0 TOPIC BLOCK 5

Topic Block	Witnesses
Topic 5: Air Quality, Human Health, and Terrestrial, specifically: i. Air quality (including dust) ii. Human Health risk assessment (including effects on country foods) iii. Vegetation (including noxious weeds and invasive species) iv. Wildlife and biodiversity v. Terrain and Soils.	Alberta Transportation SCLG Dr. Brian Zelt Mr. Cliff Wallis Dr. Terry Osko Dr. Dave Klepacki

321. Karin Hunter, X254, pdf 128-139

5.1 Air quality (including dust)

322. AT has acknowledged, in response to Dr. Zelt's air quality report, that SR1 airborne particulates may result in "unacceptable short term risk to human health". The SCLG has raised air concerns for years, and unfortunately, their fears are well founded.

323. Note the following at pdf 94 of X327:

Based on this uncertainty analysis, partial mitigation to reduce fugitive dust emissions (i.e., assumed dust control efficiency of 84%) could still result in an unacceptable short-term risk to human health at residential locations under some circumstances (i.e., sediment with higher fines content and either 1:100 year or design flood scenarios). As noted in Section 2.9, more intensive mitigation measures such as adjusting the dilution ratio, chemical application rate and time between reapplications of a chemical stabilizer can be used to achieve and maintain higher levels of fugitive dust control. These more intensive mitigation measures are expected to be effective in reducing concentrations of $PM_{2.5}$ to levels below the applicable benchmarks and reduce the risk to human health.

- Given the low recurrence of the floods that can result in substantial sediment deposition, the proposed mitigation measures of revegetation and application of a tackifier, Alberta Transportation's commitment to monitor and adaptively manage and enhance dust control efforts as required to minimize wind erosion risk, it is expected that fugitive dust emissions would not have significant adverse effects on ambient air quality or human health.

324. Mr. Speller went to great lengths to point out the word "could".

325. SCLG agrees with "could"."Could" children be exposed to unsafe levels of air quality and an unacceptable short-term risk to human health? The answer is yes!

326. In response to a question regarding school locations, Mr. Speller stated:

> The discussion about the school, we saw that in some of the documentation. It was quite alarming when we saw it as -- it's not the findings of our assessment, it's not what we're seeing in the findings of the old modelling we did, the new modelling we did, the frequency work that we did, Ms. Noble's health risk assessment. That -- that kind of supposition of what that outcome could be is alarming. We were equally alarmed because it's not what our assessment concludes.

327. The SCLG is equally alarmed by the fact that the health impacts to their community do not seem to merit serious consideration in this project.

a. Schools: Elbow Valley Elementary, Springbank Middle, Springbank High, Edge, Springbank Playschool and Discovery Corner Playschool, Changemakers Charter school and a future private High School, Webber Academy

b. There are multiple sports facilities: Soccer park, football field, 2 baseball diamonds, outdoor hockey arena, beach volleyball facility, 2 indoor hockey arenas

c. Various proposed developments are downwind of this project.

328. See Ex. 395, p.2183:

12 Q. So in your experience, Ms. Noble, what period of time
13 did your education or professional groups designate as
14 an acceptable period of time that young children should
15 be exposed to unsafe air quality?
16 A. MS. NOBLE: Children should not be exposed to
17 unsafe air quality, nor should the elderly, nor should
18 members of the public.

329. Mr. Hebert stated: "Transportation is not denying the potential risks, but on account of knowing that this is a risk that could accrue on account of its operations, Transportation has proposed a set of management techniques to reduce or eliminate the risk to the population."

330. Does an acceptable amount of risk exist where thousands of children are involved? The SCLG submits that there is no acceptable amount of risk where thousands of children are involved.

331. Dr. Zelt review of the Air Quality.

a. Calculation error for PM2.5, was acknowledged and corrected by Stantec. This correction doubled the PM2.5 emissions for 100 and 200-yr flood scenarios.

332. The issues that Dr. Zelt noted with AT's assessment were:

a. Meteorological data: AT remains confident that they don't need to even consider the implications of the local meteorological data.
b. Surface Roughness: AT remains confident that they are correct
c. Threshold friction velocity: AT remains confident that they are correct, ignoring the critical threshold friction velocity.
d. Sediment Areas: various assessments and various areas. AT remains confident using only the area covered by 10cm of sediments as opposed to the larger flooded areas.
e. Particle Size Distribution: AT remains confident that the particle sizes from the flowing Elbow river bank samples are representative of the top layer of deposits post flood.

333. AT submits that the project's air emissions will be adaptively managed. Where is a precedent for a massive sediment reservoir? Are there any other dry reservoirs in Canada that we can look to? How do you know you can manage it when the best minds in California can't manage it there? This "adaptive management plan" is an attempt to instill confidence where none is earned.

334. AT's air quality assessments only included emissions scenarios 'with mitigation'. Yet, AT's says that it will apply mitigation as an adaptive measure. How can mitigation be included as an adaptive measure when it has already been included in the air quality assessment that was done? One conclusion that can be drawn from this is that there is a likely possibility that non-mitigated emissions of TSP/PM10/PM2.5 will/may occur before 'adaptive management' occurs. These possible scenarios were not provided. Mr Zelt referred to a likely lag time between identification of the issue and the time to apply the mitigation.

335. The air quality monitoring cannot begin post-draining, that is too late. Ms. Hunter emailed IAAC on this point and asked for year-round monitoring for the life of the project and also the monitoring for PM10. The SCLG submits that baseline air quality monitoring and monitoring post are required

336. AT said the "process is dynamic" post flood for sediment control. That sums up everything to do with this project. They continue to kick all these difficult items down the road to the operator, AEP.

Conclusions:

337. AT acknowledged a calculation error which it corrected. The new results start to show impacts for some of the scenarios.

338. Dr. Zelt stands by his objective review of the modelling parameters; There are two important factors particle size and meteorology:

a. Particle size: they claim that the Elbow river sediments (mean diameter 100 μm) are representative of the dust emissions. Whereas, I claimed the Glenmore sediment deposits (representing the top-most layer of deposits from the reservoir, mean diameter 6-7 μm). Dr Zelt disagrees with their basis. And further, the Attachment C-Revised Post-Flood Soil Properties, shows the entire areas covered in fine silt and clays. .

b. Meteorology: They claim that the base-assessment does not need to consider alternative meteorology and is not allowed to use the alternative meteorology. However, due diligence and ethically, since it was raised as an issue in Dr. Zelt's report, SCLG believes AT should consider the consequences of the meteorological differences on the proposed project impacts.

339. Are the short term impacts significant? The health risks quotients for the 24-PM2.5 application cases for most of the receptors are at 0.4 to less than 1, with only a few above. The reason that they are low is a result of frequency of meteorology as Dr. Zelt described in his report. Using the proper meteorology would increase the frequency

and perhaps/likely raise the risk thresholds to greater than 1 for many more receptor locations.

a. AT Risk Characterisation, Top of Page---Pg 24 of 27, AT states "could still result in an unacceptable short-term risk to human health at residential locations under some circumstances (i.e., sediment with higher fines content and either 1:100 year or design flood scenarios).
b. AT Conclusions, Bottom of Page---Pg 24 of 27, "it is expected that fugitive dust emissions would not have significant adverse effects on ambient air quality or human health."
    i.
c. The SCLG does not know how to reconcile these 2 statements from AT.

340. Even if they show impacts, they claim the impacts can/will be mitigated by dust suppression and adapting to the situation at hand. Even if their current budget does or does not reflect adequate costs of mitigation, there would need to be license commitments forcing them to implement timely mitigation. Thus force the cost expenditure rather than discretion. This potential cost would have to be accepted by whoever takes over the dam in the future. Then there would be a debate as to whether they mitigate (wait and see for impacts then try to reduce them, reaction budget) or abate (avoid the impacts by applying the dust suppression promptly when conditions allow access preventing impacts, but a planned predictable budget item). SCLG suspects the former.

341. Lack of consideration of dust storms, mentioned by Brian Zelt, which were already apparent in Springbank over the past week, when wind warnings were in effect. Can these dust storms negatively impact Springbank Airport, located just to the Northeast of Project and the 7th busiest airport in Canada? Can dust storms negatively impact the TransCanada highway which is effectively abuts the project? Can these dust storms impact Calaway Park operations? School operations? Recreational activities?

342. Wind erosion at dry lake beds is well documented. SCLG recommends that the NRCB, prior to making a decision, consider reviewing mitigation effectiveness on large-scale sediment deposits and require an independent air quality assessment and management plan.

343. "Adaptive Management" is NOT mitigation. These are fancy words for wait and see, then mobilize a response, if necessary, and once the crews can get there. How much risk have you exposed this community to in the meantime before your "Adaptive Management" program can kick off? We heard a lot of "adapting" by the Proponent on the air quality during cross examination.

344. Why would you choose a project that creates permanent risk to air quality in a growing community, only 12km upwind of Calgary?

345. Regarding erosion control and reseeding (Topic 5). The Proponent stated that one way water the SR1 lands will be to divert water from the Elbow River to water the SR1 lands? Can anyone see how ridiculous this is? What a complete waste of water. Instead of storing water, you are wasting it to keep the sediment down?! Where was

this mentioned before this hearing? SCLG had to ask the right question to get this answer!

346. With respect to paragraph 269 of AT's Final Argument, this statement is not factual. Dr. Zelt's evidence was based entirely upon the uncertainties that were not properly recognized nor accounted for in the AT assessment of air quality. Dr. Zelt's evidence showed both the urgency required to apply controls (that is, the potential for the severity of air quality issues during the period before air quality controls are affected) and the likelihood that residual air quality is likely to remain poor even with controls in place. The AT assessment of air quality was based upon misrepresentation of emissions area and strong bias underestimating the impacts.

347. With respect to paragraph 270 of AT's Final Argument, this statement is not factual. Dr. Zelt's assessment was careful to explain that it was all too easy to demonstrate un-reasonable predictions. Dr. Zelt's reassessment of air quality using validated sediments and validated meteorology demonstrated that air quality impacts are very likely following post flood drawdown. Air quality assessment must remain objective and not self-serving as the AT assessment is. Dr. Zelt carefully outlined that his assumptions were more representative of the conditions, rather than favourable for the project. Dr. Zelt qualified his predictions as being in-frequent (only during the period of larger post-flood drawdown) and meteorologically dependent. However, the evidence presented by Dr. Zelt clearly demonstrates the errors and bias in the AT assessment as not being representative of the potential for impacts.

348. With respect to paragraph 271 of AT's Final Argument, there is a difference between results being alarming and an assessment being alarmist. Dr. Zelt's objective analysis may be alarming compared to the improper assessment by AT, but Dr. Zelt's objective consideration of each of the major components of the air dispersion modelling presented by AT is factual and representative of the potential conditions. Therefore, it is not an alarmist assessment.

349. AT's use of terms such as non-guideline assumptions remain non-factual. AT's assessment made use of guidance values for emissions and meteorology when the conditions of their assessment were not within those guidance limits. Guidance documents are minimalistic in nature, setting out minimal requirements for assessment and suggestive values for inputs into modelling based upon generalized scenarios. It is up to the assessor to determine whether the guidance is acceptable for the particular assessment. In this case, the AT assessment has been overwhelmingly simplistic and minimalistic to the point where the predictions for air quality are biased. The particulate emissions in the guide documents are not representative of the conditions at the site as demonstrated by Dr. Zelt. The meteorology at the site is not representative of the generalized guidance. An expert in air quality, as is Dr. Zelt, recognizes when the other considerations are required due to site specific conditions.

350. With respect to paragraph 273 of AT's Final Argument, this statement is not factual. In fact, AT's air quality assessment clearly demonstrated that it did not read nor follow their own hydrological assessment. Dr. Zelt incorporated the AT hydrological assessment by including the larger area of sediment deposits of at least 3cm as per the

AT hydrological assessment. The AT air quality assessment was based upon an arbitrary and completely unsubstantiated use of 10cm. The AT soil's expert even testified that soil and dust erosion should be based upon 3cm. The hydrological assessment (Ex 67) and updated hydrological assessment in revised (Ex 327) showed the flooded area to be covered in fine particulate matter whereas the AT assessment ignored this information but instead was modelled using material that would be buried by the fines. AT's assessment was based upon sediment material from the alluvial conditions on the river's edge, which was proven to be not representative of post flood deposits by literature values presented by Dr. Zelt. AT's assessment of the sediments that would be exposed over the larger project area is erroneous.

351. With respect to paragraph 274 of AT's Final Argument, Dr. Zelt presented evidence of the effectiveness of the tackifiers based upon researching the specifications of AT's suggested tackifier. Dr. Zelt independently inquired about the effectiveness of the tackifier longevity and was presented with similar specifications. AT is basing their conclusions on the claims of their vegetation ecologist that is not an expert in air quality emissions modelling. The presence of remnants of tackifier or patchy vegetation growth is evidence of only partial fugitive dust controls. As presented by Dr. Zelt's assessment, even 100% effectiveness of controls will not be sufficient to prevent impacts beyond the project area under the right meteorological and post flood conditions.

352. With respect to paragraph 275 of AT's Final Argument, Dr. Zelt is a recognized expert in air quality dispersion modelling, whereas Mr. de Carlo is not. Mr. de Carlo's interpretation of the cover misrepresents the effectiveness of the cover to prevent air quality emissions.

353. With respect to paragraph 276 of AT's Final Argument, Dr. Zelt made inquiries into tackifiers to determine the cost of application of tackifiers, to supplement information not provided in AT's reports.

354. With respect to paragraph 277 of AT's Final Argument, in short, Dr. Zelt's assessment was objective and impartial. Dr. Zelt clearly outlined where AT's assessment of air quality was not representative of site specific conditions. AT's assessment used a minimalist approach using guidance documents without regard as to the proper application of the guidance nor limitations of the guidance. The result of AT's assessment is a strong bias that under predicts the potential air quality for post flood drawdown and favourable meteorology. Dr. Zelt's objective assessment was based upon reasonable site specific conditions that would be expected and while applying emissions controls as suggested by AT. Dr. Zelt showed that even with highly effective controls suggested by AT which would somehow be applied pre-emptively, air quality could be expected to be degraded in the region surrounding the project area and potentially impacting Calgary city limits and First Nations Lands.

355. With respect to paragraph 279 of AT's Final Argument, this statement is not factual. Because the air quality assessment is a necessary input into the human health assessment. Any change in the air quality assessment is a change in the human health assessment. Dr. Zelt clearly demonstrated the faults in the air quality assessment.

356. With respect to paragraph 280 of AT's Final Argument. Ms.Noble's testimony indicated that air quality was a human health concern. She testified that based upon AT's assessment, of flood frequency and meteorological frequency, that the risks would be acceptable. Ms.Noble's assessment is therefore flawed, by the fact that the human health impacts are greater than she assessed because the emissions are greater than presented by AT. Downwind air quality concentrations are a direct relationship to emissions, therefore if emissions are greater than what was assessed the air quality concentrations downwind will be greater. Ms.Noble's testimony was bases upon biased and incorrect air quality predictions. Further the risk qualification by Ms.Noble is flawed because the frequency of meteorology is not representative of the site specific conditions. Since the frequency of exposure is expected to be greater using site specific conditions, the risks will be greater than Ms.Noble presented.

357. With respect to paragraph 281 of AT's Final Argument, AT did not provide any evidence to base their claim that meteorological conditions were rare or infrequent. This comment is anecdotal at best. While the operation of the project is a rare and infrequent event. Dr. Zelt showed that the meteorological conditions are more frequent than modelled by AT. Dr. Zelt also showed that the meteorological conditions relating to dry and windy scenario for high emissions were much greater than AT presented. In fact, AT did not provide any statistics for precipitation, frequency of strong wind, periods between rain events, etc, whereas Dr.Zelt did present such evidence. This evidence suggests that the site-specific conditions cannot be assumed to be infrequent events as per the AT assessment.

358. With respect to paragraph 282 of AT's Final Argument, Fugitive dust can be mitigated with appropriate controls. However, the effectiveness of the controls must be considered. Most controls (such as watering) must be performed regularly and frequently to maintain effectiveness. Similarly, tackifiers have an optimum effectiveness which degrades with exposure to natural conditions. Any reduction in the effectiveness of the control has been shown to lead to air quality impacts. AT's assessment of air quality has not provided any scenarios where reduction in control levels or no control levels are in place. Dr. Zelt provided evidence that shows air quality impacts are likely when controls are in place, and that 'dust storm' like impacts would be possible without controls. AT's minimalist and biased assessment underpredicts the potential for air quality impacts.

359. With respect to paragraph 284 of AT Final Argument, This statement is not factual. The evidence was presented that because TSP would be present in the dust cloud, which is visible, then a resident could visibly see when they were being impacted. There was no evidence in reference to travel time. Travel time is a function of wind speed. In high wind events, the dust emissions would reach homes 1km away from the project within one to two minutes. It is not possible to monitor, detect, and notify the public within this limited amount of time.

360. With respect to paragraph 285 of AT Final Argument, This statement is not factual. What the AT's minimalist and biased assessment has demonstrated is that AT is basing their conclusions on hope that the flood does not occur, hope that they can

achieve complete fugitive dust controls before conditions occur that lead to emissions, hope that meteorological conditions don't occur, and hope that people are not outdoors not indoors to be exposed. I think we can do better than just hope, but actually assessment and modelling the situation to plan.

5.1.1 Conditions

361. In Exhibit 406, Tr p.2258 to p.2269 Mr. Secord requested that AT advise whether it would accept a number of specific conditions arising out of Topic Block 5 as a condition of any approval that might be issued by the Board. SCLG requests that these be added as conditions of any approval that might be issued by the Board

362. Zelt - Cost of tackifier and time to spread it out - a condition should be to cost out this and provide a timeline for application of tackifier on this massive footprint.

5.2 Human Health risk assessment (including effects on country foods)

363. Ex 395, Tr. p.2177

A. **MS. NOBLE: Yes, I have.**

Q. Right. And I take it you would be familiar with the Health Canada website as part of your work?

A. **MS. NOBLE: Yes.**

Q. And you would have an understanding of PM 2.5?

A. **MS. NOBLE: Yes.**

Q. Okay. And would it be fair to say that PM 2.5 is responsible for an estimated 4.2 million premature deaths every year globally?

A. **MS. NOBLE: I'm aware that Health Canada, as well as the World Health Organization and other health agencies, have done estimates of the high cost of exposure to air pollution.**

I don't know the exact numbers, but I am aware of those studies, yes.

Q. And in Canada, can you confirm that about 6,000 people die every year from air pollution according to estimates from Health Canada?

A. **MS. NOBLE: Subject to check, if you can provide a reference.**

364. Tr, p.2178

Q. And can you explain, what is the -- what is the mechanism for 2.5 killing people?

A. **MS. NOBLE: So when it comes to the actual**

365. Tr, p.2179

mechanisms, there's a number of studies that have identified potential rates for fatalities, but I'm not sure that those have been formally confirmed. However, when it comes to doing the risk assessment, we tend to work at the -- at the comparison of appropriate benchmarks.

What I can tell you is that, yes, Health Canada has confirmed that the potential effects of exposure of particulate matter relate to respiratory and cardiovascular effects, of both morbidity and mortality.

366. Tr. p.2180

Q. Right. And in Alberta Transportation's report dated March 11, 2021, from your own air quality experts, it clearly states that there will be -- and I quote: (as read)

367. Tr, p.2181

"Unacceptable short-term risk to human health due to unsafe air quality levels."

What my clients would like to know is, why are you creating an air quality problem that needs to be managed? Why are you choosing this outcome with likely air quality exceedances over hundreds of years? Why would you intentionally create an air quality problem in a community like Springbank when there are alternatives like MC1 that could have avoided this outcome?

368. See Ex. 398 for Air Quality isopleths and location of homes, schools, playgrounds and camps.

5.3 Vegetation (including noxious weeds and invasive species)

Vegetation - weeds

369. As the Board has heard, members of SCLG are concerned about weeds that will be introduced and spread as a result of this project. Some SCLG members, such as Karen Massey and Mary Robinson testified as to the increase in weed growth after the 2013 flood. [Ex. 250, pdf 225; Ex. 357, p. 517 and p. 573].

370. Dr. Osko, retained by the SCLG, reviewed the impacts of weeds on the landscape including habitat destruction, the threats to biodiversity, the irreversible alteration of native populations, structure, and function of riparian ecosystems. and the costs involved in managing weeds. The costs include agricultural and processing costs, increased water management costs, human health costs (due to allergies, skin irritations, poisonings, fire hazards), decreased land value and decreased aesthetic value (Ex. 273, pdf 7). Also, introduction of noxious and invasive weeds has significant implications for soil quality, productive capability of grasslands, and management costs.

371. As noted by Dr. Osko, weeds compete with crops and native plants for space, light, nutrients and water as well as introduce pests and diseases. (Ex. 273, pdf 7). This is of significant concern to SCLG members considering that many of them are agricultural producers and ranchers who rely heavily on healthy vegetation for their livelihood.

372. AT's assertion that the influence of weeds on vegetation and wetlands will be localized to the PDA is incorrect. Dr. Osko's evidence and Mr. De Carlo's responses provided to cross questions at Ex. 395, p. 2092 to 2095 confirm that the spread of weed vectors will not be limited to the PDA but could spread to surrounding lands especially when vehicles are not cleaned upon leaving the PDA to join the local road network and then rejoin the PDA. The fact that AT did not propose any plan regarding cleaning of vehicles when they leave the PDA to join the local road network is a significant omission.

373. It is therefore important that a comprehensive weed management plan be put in place to prevent and manage weed introduction and dispersal. The SCLG notes that AT agrees with the need for a comprehensive weed management plan and has agreed to develop such a plan. (Ex. 325, pdf 57).

374. The SCLG submits that the panel should include as a condition of approval that AT must develop a comprehensive weed management plan prior to construction of the Project. The SCLG further submits that the condition of approval should require that the comprehensive weed management plan include at a minimum, preventive measures requiring the cleaning of vehicles and equipment prior to entry to the PDA and upon leaving the PDA, details on how cleaning of vehicles and equipment would be achieved including locating cleaning stations at entry point and exit points of the PDA, how to manage potential weed transport by commuting employees, identify the source of all incoming materials, the weed risk associated with them and identify the dispersal barriers to employ. The plan must also assess and prioritize all of the possible vectors by which weeds could be transported on and off the project area and identify appropriate prevention actions to manage them.

375. The SCLG submits that the Board should further include as a condition of approval, that AT must ensure that haul trucks hauling excavated fill material from the diversion

channel to the floodplain berm are cleaned prior to leaving and entering the site and that the fill material are covered with appropriate tarp or geotextile material prior to moving it off the PDA and through the local road network. Note that Mr. De Carlo and Mr. Wood agreed in cross that these are reasonable measures to implement this to manage the issues of weeds dispersing off the project. Ex. 395, pdf 2094-2095.

376. The SCLG acknowledges AT's willingness to accept and implement some of the recommendations of Dr. Osko including the development of a weed management plan. The recommendations that AT has accepted are detailed in paragraphs 205 and 206 of AT's Reply Evidence, Ex. 325. The SCLG requests that the Board should include AT's commitments as detailed in those paragraphs as conditions of approval, should it decide to approve the project.

377. AT asserts in its reply evidence, Ex. 325, pdf 52 that there are already weeds present everywhere in the PDA and the surrounding land, which would have been evident had Dr. Osko undertaken a baseline assessment. As noted by Dr. Osko in his testimony, he is aware that weeds are in the LAA and the RAA from his review of AT's baseline study of the PDA. [Ex. 405, p. 2374.]

378. The issue is not whether there are weeds present but whether the project will exacerbate or multiply the existence of weeds in those areas and impose additional weed management burdens on adjacent landowners, municipalities and ecological sensitive landscapes. The SCLG submits that the project will likely increase the weed situation in the LAA. Support for this contention is founded in AT's position that the release of the diverted flood water will not be an additional source of weed seed distribution when returned to the Elbow River. AT's position in this regard completely ignores the fact, which has been carefully explained by Dr. Osko in his report (PDF PAGE 15, 18-19) that the Elbow River diverted water will mobilize weed seeds present in the soil in the reservoir area. The water being released will then have more weed seeds than was present when the water was diverted.

379. AT further asserts that "many of the weeds observed in the PDA during baseline Project surveys are capable of wind and animal dispersal and likely currently present downstream

of the PDA." While that may be so, AT's position ignores the fact that during a flood event, the flood captures many weed seeds in its path including those in floodplain areas and those weed seeds, which may include varieties not previously present in the PDA, can end up being deposited in the PDA. As Dr. Osko noted in his report, findings of new and different species of weed infestation following a flood event is consistent with information presented by local residents such as Mary Robinson and is borne out in scientific literature. (Ex. 273, pdf 36).

380. While the SCLG accepts that operating a weed filtration system at the low level outlet during flood events and release scenarios may hinder the safety of fish in the diverted water, a weed filtration system at the low level outlet is useful during dry operations and can prevent the release of weed seeds into the Elbow River. As agreed by AT's witness panel Topic Block 5, weed propagules could continue to be mobilized during dry operations and could continue to pass through the low level outlet gates that would be in operation all through dry operations. [Ex. 395, Tr. p. 2105 - 2106].

381. Further, it is highly likely that the risk of weed seeds and plant parts entering the river through the low level outlet will continue especially in times of non-flood or post flood drained condition. For example, weed seed-bearing soil eroded from the off-stream dam will be discharged from the low-level outlet via drainage ditches. Similarly, weed seed-bearing sediment and plant parts will be carried to the low-level outlet via the ephemeral tributaries within the reservoir. Both the ditches and tributaries will discharge weed seeds windblown from any newly established weeds, particularly on weeds rapidly establishing on post-flood sediments. Dr. Osko explained this situation in his direct at Ex. 406, p. 2385 to 2386. Since the tributaries within the reservoir are not important fish-bearing waters (Exhibit #29, pdf pg. 23), no harm to fish would result from low-level outlet discharge filtration during non-flood operation. Therefore, AT should endeavour to filter all reservoir discharge waters except during flood events.

382. The SCLG notes AT's response to undertaking #44 regarding installing a weed filtration system at the low level outlet [No Ex. 407, pdf 5]. There are a number of concerns with AT's response that makes one wonder if AT actually reflected on the response. First, AT

states that the primary purpose of the project is to mitigate floods on Elbow River. While that may be so, it is also AT's responsibility under Section 4(1) of the *Alberta Weeds Control Act* to ensure that it does not release into the environment flood water, or any water from the reservoir that contains weed vectors. For AT to be compliant under that *Weeds Control Act* it must take steps to prevent the spread of weeds from the reservoir.

383. Secondly, there is no supportable basis for suggesting that the filter will prevent stormwater freely passing through the low-level outlet works during dry operations. No information was presented that shows the impacts that a filter might have on free passage of stormwater. A filter should not significantly restrict free flow of stormwater.

384. Thirdly, it is not clear how a filter would compromise the intended function of a low-level outlet structure during dry operations. As AT stated in its filed materials, Ex. 159, pdf 200 a low level outlet is designed to drain the reservoir and pass normal stream flow from the local watershed without creating a permanent pool upstream. Draining the reservoir and allowing normal stream flow during dry operations can continue even with a mesh or small size filter. In fact the installation of the filter will assist in sediment filtration by ensuring that sediments (including sediments containing weed seeds) are not returned to the Elbow River. This will help AT meet its responsibility under the *Alberta Weeds Control Act*.

385. The SCLG submits therefore that a weed filtration system at the outlet limited to operating during dry operations is necessary to ensure that more weed seeds including noxious and prohibited weed seeds are not introduced into the Elbow River resulting in likely weed infestation of downstream communities. The SCLG submits that this should be included as a condition of approval. In the alternative, the SCLG submits that the Panel should require AT to inquire further into this issue and conduct a model analysis of their findings.

386. AT argues that Dr. Osko's suggestion of a filter does not make sense because he does not know of any such filter that will protect fish as well as filter weeds. As established in cross and earlier, a weed filter operating in dry conditions does not pose any risk to fish as the tributaries within the reservoir are not fish bearing. Further, the fact that Dr. Osko

could not name a filter in cross, considering his family emergency situation at the time, does not mean that such a filter does not and could not exist. There was no record of any effort taken by AT in its response to undertaking #44 to confirm the existence of such a filter in the market. To rely solely on the response of Dr. Osko and to suggest that he is confused, is irresponsible and confirms a lack of serious consideration of a suggestion made by Dr. Osko.

387. In AT's argument, paragraph 293, AT states that dry operations will have no water flow. This is not the case. Water will flow through the unnamed creek even in dry operations. AT's topic 5 witness panel confirmed this in cross.

388. AT in its reply evidence, Ex. 325, para 206 (v) indicates its willingness to participate in a local or regional weed management initiative but refuses to fund or lead such an initiative at this time. AT's willingness to participate in a local or regional weed management initiative is welcome news, the unwillingness to fund such an initiative is disappointing. AT should be required to at least fund such an initiative at a membership level to assist in its establishment and operation. Further, it is important to note that spending the dollar now in weeds prevention can save more money on future management and weed control costs. As Dr. Osko noted in his direct testimony in Ex. 406, p.2373, weed management and control is difficult and, despite the proponent's good intentions, weeds are everywhere.

Vegetation and wetlands

389. As the Board has heard and seen from the submissions and oral testimonies of SCLG members and their expert witnesses, the Project is located in one or more landscapes of conservation significance (High Value Landscape, Environmentally Significant Areas, Areas of High Wildlife Sensitivity, Key Wildlife and Biodiversity Area, and High Sensitivity Watershed). This fact is not disputed by AT.

390. Majority of the PDA is identified as an area of high risk/sensitivity for wildlife. Both Dr. Osko and Mr. Wallis testified on April 1, 2021 that the project area is also designated a

high value landscape. While AT does not dispute this, AT attempts to reduce the significance of this designation by asserting that High Value Landscapes occupy the entire landscape west of Calgary, south of Highway 1. While High Value Landscapes may be present at other locations in the project, this does not reduce the significance of the impacts of the project on the environment. In any event, the project's impacts on the environment on which it is situate is the issue and not whether there are other high value landscapes present elsewhere.

391. The biophysical features of the PDA such as intact native grasslands, wetlands and wildlife habitat and migratory pathways contribute to the environmental significance of the PDA. This was acknowledged by AT in its reply argument, Ex. 325, pdf 52.

392. The South Saskatchewan Regional Plan mapped some of the project area as Intact Native Grasslands. As noted by Mr. Wallis in his report, Ex. 271, pdf 14 – 16, the South Saskatchewan Regional Plan (SSRP) guidance requires that an area mapped as intact native grasslands should remain "intact" and conversion for industrial or other uses should be avoided.

393. Section 2.1 of the *Natural Resources Conservation Board Act* requires the Board to act in accordance with any applicable ALSA regional plan in carrying out its mandate. By virtue of section 2.1 of the NRCB Act, the Board must consider the provisions of the SSRP and act in accordance with its directions in determining this application.

394. This means that the Board must, in accordance with the guidance of the SSRP, ensure that intact native grasslands within the project area remain intact and in an undisturbed state. Any application, such as the SR1 Project, that would result in destruction of the intact native grasslands should be a factor in denying this project.

395. AT argues in its reply evidence, Ex. 325, pdf 50, paragraph 176 that the provisions of the SSRP relating to maintaining intact native grasslands are not binding but require consideration by the decision makers. The SCLG agrees that the provisions of the SSRP regarding maintaining intact native grasslands are not binding, however; decision makers

such as this panel, are required to consider its provisions and make a decision that is consistent with the principles and guidance provided in the SSRP.

396. The SCLG notes that Appendix G of the SSRP, p. 148 provides guidance to decision makers that requires considerations of provisions in Strategy 3.7 and the descriptions of intact native grasslands as mapped in page 150 of the SSRP.

397. While acknowledging that its project will intersect areas mapped as intact native grasslands in the SSRP, AT argues that it has committed to revegetation plans to reduce effects to native grassland and will implement adaptive management as required. As clearly explained by Mr. Wallis in Ex. 271, pdf 16-18, rough fescue grassland, which is the dominant grassland species in the PDA, is very difficult to revegetate. This has been documented in literature such as Lancaster et. al. which is referenced in Mr. Wallis' report at pdf 17. According to Lancaster et. al. revegetation success of rough fescue grassland has been recorded only on sites that have not been disturbed. [Ex. 271, pdf 17].

398. We would note that AT in Ex. 2, pdf 72 acknowledged the difficulty of re-establishing fescue grassland communities.

399. As noted by Mr. Wallis on April 1, 2021, Ex 406 Tr p. 2429, there is a high likelihood that reclamation of the native foothills rescue grassland habitats will be unsuccessful and non-native species that are present in the environment will dominate the fescue grasslands.

400. It is also extremely doubtful that AT will revegetate the lands to provide the equivalent variety of grassland communities that were present before the project. The pre-existing complex vegetation communities will be lost and what will be left in its place will be a much simplified vegetation community that will not have full functionality and productivity for native plants and wildlife including invertebrate populations. This outcome was acknowledged by AT in Ex. 325, pdf 52, para 183.

Wetlands

401. Mr. Wallis testified on April 1, 2021 Ex. 406, Tr. p. 2430 that the project will also directly impact 5 kilometers of productive stream courses and numerous productive wetlands during construction. The adverse impacts on wetlands are not limited to flood operations but extend to dry operations. According to Stantec in Ex. 217, pdf 24, over 52% of wetlands classed as either moderate or high value will be lost during dry operations. This impact is significant even though AT suggests otherwise.

402. In AT's views, the impacts should not be considered significant because the wetlands will be replaced. Replacement of wetlands is the last option in Alberta's wetlands' policy. The first preference is always to avoid direct impacts to wetlands because of their ecological significance. Replacing a wetland is at a cost to Alberta taxpayers. As confirmed by Mr. Speller at Ex. 395, Tr. p. 2161, this cost has not been factored into the cost opinion for this project.

403. Other than wetlands that will be permanently lost during construction, the project will impact wetlands during flood operations. As confirmed by AT in Ex. 217, pdf 24, the duration of inundation in the reservoir (for instance, 73 days for a 1 in 10 year flood, 82 days for a 1:100 year flood and 58 days in a design flood) will alter wetland function.

404. With the alteration of wetlands' functionality during flood operations, more wetlands could be lost over time or have significantly reduced functionality and value through successive flood events and sedimentation arising therefrom. [Ex. 406, p. 2431].

Impacts on Downstream Riparian Vegetation

405. The capturing and diverting of floods in excess of 160 m3/s adversely affects downstream riparian habitat and ecological functions of the downstream riparian habitats. In order to fully understand the extent of impacts of this project on riparian habitats, a full appreciation of the definition of riparian habitats as provided by the Alberta Water Council in Ex. 393 and agreed to by Mr. De Carlo at Ex. 395, Tr. p. 2113 is pertinent.

406. I will not repeat the definition here but requests that the panel consider this definition in the context of the evidence provided by the SCLG and AT in relation to impacts of the project on downstream riparian vegetation.

407. Mr. Wallis discussed the impacts of a reduced flow due to capture and diversion of water on riparian habitats. We request the Board to review Mr. Wallis' report, Ex. 271 and his oral testimony at Ex. 406, starting from p. 2433 extensively in this regard. We will highlight a few points for the panel to take away and consider.

a. At a flow rate of 760 m3/s, MORE riparian habitat is inundated thereby supporting ecological function in that wider area. Using a flow rate threshold of 160 m3/s results in inundation occurring in a much smaller area. This has consequences for the ecological health of the riparian ecosystem, such as changing the ecological function, which cannot be mitigated. This was confirmed by AT in Ex. 138, p. 86.

b. A threshold flow rate of 160m3/s was selected by AT's hydrologists without an assessment or consideration of the impacts of this flow rate on riparian ecosystem downstream. This was confirmed by AT in Ex. 138, pdf 86 where AT states:
"The operational target of 160 m3/s that the Project uses honours this design objective **but is selected because it coincides with the maximum discharge capacity of Glenmore Reservoir's low-level outlet. The discharge was not chosen to maintain river processes and does not represent a geomorphic or ecological threshold**.

c. A reduced flow will result in the simplification of the geomorphology of the Elbow river because of reduction in the creation of new side channels and the abandonment of existing channels. Both AT and Mr. Wallis agree that this is a high outcome for this project in Ex. 138, pdf 79-86 and Ex. 406, Tr. p. 2435.

d. AT indicates in its reply evidence, Ex. 325 that the project will allow some floods to pass i.e. floods lower than 160 m3/s and floods higher than the reservoir capacity, large magnitude floods support large riparian areas. Maintaining some

riparian habitat is not the same as maintaining the environmentally significant, extensive and diverse riparian areas downstream of the project. Mr. Wallis showed the differences in effects between large floods and small floods in his report, at Ex. 271, pdf p. 46, Figure 14.

e. The cumulative and direct impacts of this project in conjunction with other projects planned for the Elbow River will have significant impacts on the riparian habitats downstream of the project which has not been assessed. Mr. Wallis discussed this in his report, Ex. 271 and in oral testimony, Ex. 406, Tr. p. 2436.

408. In conclusion, this project's regulation of flow will have negative adverse and significant effects on downstream riparian habitats which have not been assessed. This, as Mr. Wallis, points out in Ex. 406, p. 2434 is a significant omission.

409. AT argues at paragraphs 301 and 302 that Mr. Wallis' position is in essence, "against flood mitigation Projects, because of their environmental impacts." AT further argues that the need for flood mitigation is too important that some environmental impacts must be accepted to achieve this critical need. AT's argument ignores the fact that it did not assess the project's impacts on downstream riparian habitats. Thus, the extent of the environmental impacts on the downstream riparian habitats is not before the Board to enable a determination of whether those environmental impacts are acceptable or not.

410. In addition, there is a solution that will not have any environmental impact. That solution as pointed out by Mr. Wallis in Ex. 406, Tr. p. 2467-2468, is to stop residential developments in floodplain areas and buy out existing developments from the floodplain area. That is an acceptable environmental impact that the Board should consider.

411. Approving this project will only result in increased development in the floodplain areas and more engineered solutions to mitigate floods, which will continue to create environmental impacts.

Cumulative Impacts

412. Cumulative impacts of the project on upland habitats and wetlands have not been adequately addressed due to lack of consideration of the degree to which foothills parkland natural subregion habitat has already been heavily modified. Every incremental loss of native habitat is a significant loss for the natural subregion. [Ex. 406, p 2437]

413. Further, the project did not comprehensively assess cumulative impacts on the riparian habitats and the implications for changes in vegetation as a result of that impact. This omission, as Mr. Wallis points out in Ex. 406, Tr. p. 2439-2440, is inconsistent with the project's terms of reference for the EIA. Mr. Wallis also noted that the use of a 15km buffer for assessing cumulative impacts is arbitrary considering that downstream effects could be felt for hundreds of kilometers.

414. Despite the application of mitigation, impacts will still remain. Mr. Wallis recommended that the project not be approved in its current operating mode due to its impacts on downstream riparian habitat. Ex. 406, p. 2438. If approved, consideration should be given to allow larger floods to pass.

Sedimentation impacts on vegetation

415. Will the deposition of sediments in the reservoir adversely affect the reservoir's vegetation? The answer is yes. This fact is not disputed by AT. AT's Ex. 218, pdf 83 states:

> Most of the sediment deposition is expected to range from 10 cm to 100 cm deep in the reservoir (319.03 ha, 39.07% for early release; 337.36 ha, 41.32% for late release). Sediment ranging from 3 cm to 10 cm deep will cover 15.22% to 18.96% of the reservoir for early release and late release, respectively. Sediment greater than 100 cm deep will cover 0.63% to 0.69% (Table 1-10), respectively. The sediment depth categories are based on a review of scientific literature and effects to plants.
>
> No effect on plant communities is expected in areas of less than 3 cm of sediment

deposition, following the findings of Wang et al. (2013); however, minor effects on germination of annual plants may occur. Following the results of Kui and Stella (2016), sediment deposition between 10 cm and 100 cm is expected to result in mortality of plants in the herb and short shrub strata, and tall shrub and trees are expected to survive. Complete vegetation loss, including herbs, shrubs and trees, is expected in areas of greater than 100 cm of sediment deposition.

416. Mr. De Carlo confirms these facts in Ex. 395, Tr. p. 2125 when he states that in the 10 to 100 centimetre category, vegetation assessment assumes all grasses and shrubs are lost.

417. AT's 2018 sediment deposition modelling on vegetation also indicates that 88.13% of the baseline grasslands in the reservoir will be affected by sedimentation. Ex. 218, pdf 83.

418. This implies that a significant portion of the baseline native grasslands and shrubs will be lost in the reservoir area as well as be permanently lost from permanent project's structures and construction areas. Ex. 2, page 20 provides a breakdown of the size of the areas affected by the project's structures.

2016 Project Summary, Ex 2, page 20	**HA**	**Acres**
Diversion Structure Area	93	230
Division Channel Area	136	336
Reservoir Area	884	2184
Dam, Outlet Works Area	348	860
	1461	**3610**

419. As noted by Dr. Osko in his report, Ex. 271, pdf 9, these grasslands provide a number of ecological goods and services including carbon and greenhouse gas storage, biodiversity and provide habitats for birds and invertebrates. A 10 to 100cm sedimentation deposition will obliterate these functions from the ecosystem.

420. Dr. Whitson in cross at Ex. 395 Tr. p. 2127 made it clear that the March 2021 revised analysis showed that the areal extent of sediment deposition was dramatically different than it was in the 2018 EIA and SIRs and that **the sediment plume is considerably larger than the size of the sediment plume back in the 2018 EIA (in the order of two, three times bigger).**

421. Despite this significant change in the areal extent of the sediment plume, AT did not consider it necessary to assess the impacts that this larger surface sediment deposition would have on vegetation and consequently, wildlife.

422. Mr. De Carlo's reasons for not conducting any additional assessment was expressed in Ex. 395, Tr. p. 2133 as being that Dr. Whitson's assessment was tailored towards land capability and was not related to revegetation potential. as such, it would have no effects on vegetation or wildlife. This rationale is without merit considering the larger areal extent of the sediment plume, the confirmed changes to soil PH and Dr. Whitson's confirmation of reduction in the soil's land capability at Ex.395, Tr. p. 2121 and 2129.

423. Dr. Whitson confirmed in Ex. 327 at pdf 191 to 192 and 197 that the soil texture and capability will change. Dr. Whitson also confirmed at Exhibit 395 Tr. page 2150 that the land capability class will not change even with mitigation. This implies that, given the larger sediment plume and textural change, there could be more widespread negative effects wherever native vegetation and wildlife habitat is involved. These negative effects that could impact revegetation were not assessed.

424. Mr. De Carlo said at Exhibit 395 Transcript page 2132 that "although there is a change in the distribution of sediment, the analysis and results provided in this IR response [Ex. 218 pages 83 through 86] is that the significance, determination, and conclusions of the vegetation assessment remain unchanged."

425. Given the larger area of sediment plume now involved and the change in textural classes, that impact on vegetation and revegetation will obviously be greater. Dr. Whitson stated that the land capability will not improve but we are having difficulty understanding how the vegetation will not be affected to any greater degree than what was assessed prior to the new sediment modelling. The fact that this revised modelling was filed in March 2021 after the SCLG had filed its evidence resulted in its effects on revegetation not being fully assessed and understood.

426. At a minimum, the calculations in Ex. 49, pdf 25, Table 1-10 should be looked at and, if necessary, a new map considered to replace Figure 1-20 in Exhibit 218 and a new table

provided to replace Table 1-22 in Exhibit 58 that Mr. Brescia referred to at Exhibit 395, Tr. page 2142. Without these, we cannot have a full understanding of the revised modelling on the ecosystem.

5.4 Wildlife and biodiversity

427. Many members of the SCLG recorded use of the PDA by wildlife. Ms. Marlene Dusdal produced at Ex. 251 a video recording of a large elk herd using portions of the PDA. Dr. Massey also recorded in Ex. 250, pdf 231 to 232 photos of Sibbald Elk herd using the project area.

428. Dr. Klepacki in Ex. 263, pdf 10 recorded sightings of large mammals including grizzlies, cougars, and Jumping Pound elk herd using the PDA especially the reservoir area.

429. Brian Copithorne noted in his submissions at Ex. 250, pdf 92 – 93 that in the over 60 years that he had lived on his property within the reservoir area, he had experienced the return of many wildlife species including various bird species (Harris Sparrow, Bald Eagle, Golden Eagle etc.) and mammals including whitetail deer, elk, red fox, black bear, grizzly bear, grey wolf, bobcat etc.

430. Mr. Brian Copithorne further noted at pdf 93 of Ex. 250:

> These birds and animals are the species that I have seen come in my lifetime and are in addition to many species that were here before. In recent weeks a Sow Grizzly and her two cubs have been observed on our family property within 100 ft of the area where the Diversion Channel for the Springbank Off-Stream Reservoir Project would be built. Her den is on my family property and is less than 750 meters from the project.
>
> Our family and our neighbours have always taken great care to protect and nurture wildlife on our properties. The huge increase in wildlife species and numbers that make this their home is great testament to our stewardship of the land. This area is an important wildlife corridor and needs to be preserved. The

> Springbank Off-Stream Reservoir Project is poorly conceived and was hastily thought out as a knee jerk reaction to the floods of 2013. A thorough environment review needs to be done before proceeding with this project that has the potential to seriously impact areas just outside of the city of Calgary.

431. Several of the wildlife reported by Mr. Brian Copithorne were not identified in AT's wildlife assessment reports in Ex. 32 and 70. The lack of accounting for the different wildlife types that use the area is attributable to the assessment methodology that AT used.

432. The methodology as stated in Ex. 32, pdf 25 focused on five key indicator species, such as olive-sided flycatcher, Sprague's pipit , northern leopard frog, elk and grizzly bear that could potentially be present in the area. The focus on these five species was determined based on the review of literature including government documents. Field surveys were directed at these targeted five species, as shown in Ex. 32, pdf 25.

433. The outcome of this limited assessment is that other wildlife species that can occur in the area are not accounted for. The SCLG submits that there is a need for additional baseline surveys to record the different types of wildlife species that use the PDA. The SCLG submits that AT should be required as a condition of approval to conduct additional baseline wildlife surveys of the project area.

434. The SCLG notes that AT has agreed in Ex. 125 to conduct a pre-construction wildlife surveys and to develop appropriate site-specific mitigation following such surveys. AT provided, in its response to Undertaking #47, further details regarding the proposed pre-construction wildlife surveys and the associated monitoring that would be undertaken. The SCLG submits that should the panel decide to approve the project, AT's commitment in this regard, as expressed in Ex. 125 and response to Undertaking #47 should be included as conditions of approval.

435. The SCLG has also expressed concerns with the project interfering with wildlife's migratory pathways especially the installation of rip rap along the diversion channel. Mr. Wood confirmed in Ex. 395 Tr. p. 2158- 2159 that the rip rap has been modified in many

areas to permit wildlife passage by filling voids with gravels and vegetative cover. The SCLG submits that should this project be approved, AT should be required as a condition of approval to place the rip rap in such a manner that permits wildlife passage and to fill any void in the rip rap with gravels and vegetative cover.

436. Maintaining wildlife connectivity to other habitat features in the LAA is essential to wildlife health and sustenance. As stated in Ex. 380, pdf 3, AT plans to install wildlife underpasses to support wildlife movement through the project area and across Hwy 22. The SCLG notes that the SNN may have a preference for overpass. The SCLG submits that a condition of approval should require AT to develop either an underpass or an overpass to permit wildlife movement through the project area. An assessment of the effectiveness of each approach should be undertaken before a selection of the appropriate pathway is made.

437. Wildlife safety prior to, during and post flood operations has been raised by the SCLG. Mr. Brescia was quick to point out in Ex. 395, Tr. p. 2164 - 2165 that AT had developed in Ex. 218 pdf 98 a monitoring and salvage plan to minimize potential effects of floods on migratory birds and amphibians species at risk.

438. While it is good to see that AT has plans for salvaging the migratory birds and amphibians species at risk, there is no plan in Ex. 218 or any of the filed materials regarding protecting other species of wildlife such as ungulates from the reservoir area during a flood event. AT relies on “expectation” that these larger wildlife or ungulates will find their way out of the reservoir pre-flood and during flood events. [Ex. 395, p. 2166 - 2167] Expectation is not enough. Concrete plans are needed to ensure all wildlife’s safety both prior to and during flood events. There should be plans to secure the reservoir area to prevent any wildlife getting in to the reservoir whether through inadvertence or curiosity. The SCLG submits that this should be included as a condition of approval.

5.5 Terrain and Soils.

Sedimentation and Terrain

439. Exhibit 327 pdf page 190 states that sediments over 10cm in depth have **increased 3x, from 260 acres to 790 (early release) and 832 acres (late release) for a design flood!** This change, dated March 11 is so material as to cause this project to be rejected. This is completely unacceptable at this late stage.

> The results of the revised modeling show that the extent of sediment deposition and particle size distribution under design flood scenarios was different than modeled for the environmental impact assessment (EIA). For example, under the design flood the extent of 10 to 100 cm thick sediment is now 319 ha (early release) and 337 ha (late release) compared to 105 ha in the EIA (Volume 3A, Section 10, Table 10-11). Areas with greater than 1 m of flood sediment, however, are reduced by about 35 ha compared to the EIA. The EIA (Volume 3B: 9.2.3.1) stated that flood sediments would be dominated by sand-sized particles, with sandy loam to sand textural classes expected (confirmed with Round 1 AEP IR390), whereas the updated modelling shows a range of textural classes from sand to heavy clay as discussed below.

440. Meanwhile, sediment complexity was acknowledged in 2014 by AMEC in Exhibit 275, pdf page 14 who suggested that:

> Detailed hydraulic and sediment transport analysis is required to better establish key structure parameters and to estimate the performance of this structure within the Elbow River flood regime. This analysis should be considered a priority in establishing parameters including weir crest and diversion invert levels, and future operating procedures to ensure that excessive volumes of larger sediment are not diverted out of the river system into the diversion channel during extreme floods. Hydraulic and sediment transport modelling assessment may be required following preliminary office study assessment which would include input from a sediment transport specialist.

441. Ms Robinson provided us with some images in Ex. 355 that would be comparable in terms of what the sediment from the project might look like. These images show waves of sediment, it is grey and expansive. Obviously, this type of sediment will be left behind in the diversion channel, diversion inlet, and the reservoir.

442. When the sediment deposits, does it fill in all the low-lying areas so that it effectively creates a flat surface? Is it fair to expect that the area we can see on Exhibit 218, page 85 will change from its natural topography to a more even topography? The SCLG submits that it is likely that the sediment deposition will change the terrain of the PDA and likely affect groundwater patterns.

443. Reviewing Exhibit 218, pg 85, it is obvious that there will be sediment deposits in the various water bodies in the reservoir. Is this sediment just left here in these water

bodies? What is the consequence of that? Brain Copithore uses the Spring north of Springbank Road for his home's water supply. There is not enough information on this to determine these impacts.

444. Mr Wood's assertions on Day 9, when asked about cumulative build up, stated that most of the 10 floods over the last 100 years were relatively small and that 2013 was the largest by far. This raises several considerations: 1) a cumulative sediment deposit assessment was not completed. At the very least, a cumulative assessment of the 10% reservoir sediment storage allowance should have been done. 2) why was a cumulative sediment forecast not used in assessing the historical information? 3) If we really don't need to worry too much because most floods are small, what is the purpose of this project?

445. Ms. Robinson and Dr. Massey's submissions in Ex 250 report that weeds are the first species that is successful following a flood event. The pervasiveness of weeds will change the terrain of the area. AT's position is that it will manage these weeds through the use of herbicides and other options. Use of herbicides in an area that contains surface water bodies such as the unnamed creek can result in the contamination of the water body. The SCLG submits that use of herbicides in controlling weeds in the area should not be allowed.

446. It appears that there will be sediment build up in the Diversion Channel. Pg 50 of Exhibit 159 states "After 120 hours, sediment deposition in the Diversion Channel downstream of the Diversion Inlet had a maximum depth of approximately 4.0 m tapering to approximately 0.1 m of deposition after 800 m downstream." 4 metres of sediment deposit is a lot of sediment. Although AT has operating costs for sediment removal, it has not provided volumes of sediment to be removed, or the location for the sediment to be removed, so costs cannot be independently estimated.

Soils

447. The project's impacts on agricultural capability of soils in the PDA are adverse, high magnitude and significant. Dr. Whitson at Ex. 395, Tr. p 2126 confirmed these

conclusions as being applicable despite the results of his revised modelling on soils. The revised modelling confirms that the aerial extent of the reduction in agricultural land capability is up to 3x larger than was predicted in the 2018 EIA and SIRs. [Ex. 395, p. 2127]

448. The project would impact soil quality significantly. Ex. 94, pdf 16 states:
"construction of the project would result in a significant effect on soil because there will be a change in soil quality or quantity resulting in a reduction in agricultural land capability that cannot be offset through mitigation or compensation measures (this occurs in the off-stream reservoir)."

449. It is important to note AT's conclusion i.e. the reduction in agricultural land capability cannot be offset through mitigation or compensation measures.

450. It is important to put Dr. Whitson's revised modelling into context. As confirmed by Dr. Whitson in Ex. 395, Tr. p. 2152, the revised modelling is a one episode/event analysis of late release design flood. Dr. Whitson could not provide a similar estimate of what the soil distribution would be like after two flood design events. Ex. 395 Tr. p. 2152. However, he was able to predict in Ex. 395 Tr. p. 2153 to 2154 that textural properties would vary, that the soil would remain in a fairly youthful state following a flood event and that a lot of human effort would be required to make the soil a functioning ecosystem although not an agricultural system.

451. Although Dr. Whitson's revised modelling results indicate the presence of more clay and silt textured soils than sandy soils, revegetating clay and silt soils is not as easy as Dr. Whitson initially made out in Ex. 327, pdf 191. Dr. Whitson confirmed this and pointed out in Ex. 395, Tr. p. 2155 that while clay soils have more moisture retention capability and could work well in a drought-prone environment, there are difficulties associated with revegetating clay soils that he did not consider at the time he made the statement in Ex. 327, pdf 191. This clarification is yet another proof that the revegetation of the soils in the reservoir may not be successful.

452. Dr. Whitson further states in Ex. 395 Tr. p. 2129 lines 17-19 that "if this project is approved, this land is not going to have an agricultural use. The land capability is not that important going forward." While the reservoir lands will not have any agricultural value, the loss of this agricultural land capability has implications for the proposed land use as grazing lands. Whether or not the soils capability will support enough vegetation mix to support grazing remains to be seen. It is a "wait and see game" as confirmed by Mr. Brescia in Ex. 406, Tr. p. 2312.

7.0 CONCLUDING REMARKS

453. Rejecting this project should spur immediate innovation and create a substantial budget for the City of Calgary to pursue flood-proofing projects downtown, fully within the purview of the City of Calgary. These could include new floodwall-type projects that would protect against the Bow and Elbow flooding. The increased Glenmore Reservoir capacity is an example of such a project that is already complete.

454. Approval of SR1 would be a triumph of politics over process. The Proponent tried to play down the negative elements of SR1, including air, water and environment by stating most floods are small, and big flood events are so rare. If there is no worry about these big floods, what is the rush? Send this project back to the drawing board.

455. The SCLG is concerned that the various, secret compensation agreements have resulted in a biased presentation before the NRCB. Rocky View County should be here as an intervener, representing its residents, as should Tsuut'ina Nation. Why was Alberta Transportation trying to avoid having any parties participate as an intervener in the process?

456. It is not the fault of this Panel, the regulators, or the Springbank residents who have raised concerns, that this project has dragged on for years. The Ignasiak report [Ex. 275, pdf 129] clearly points that out. The responsibility for the delays falls squarely on the Proponent's shoulders. Rejecting SR1 will create uncertainty for future flood risk for the City of Calgary, but pursuing a flawed and inferior project with an indefinite lifespan due to anxiety about near term flood risk is not in the public interest.

457. The SCLG requests the Board reject the SR1 application.

458. I would like to thank the Board Panel Members, Board counsel and Board staff, especially Ms. Friend and the document managers, the hearing participants and their counsel and of course Ms. Vespa and Ms DiPaolo for running a very efficient and collegial hearing. It was much appreciated by the SCLG members, our expert witnesses, Ms. Okoye and me.

459. I would also like to thank Ms. Karin Hunter for her tremendous efforts in assisting Ms. Okoye and me with the navigation of the voluminous record relating to MC1 and SR1. I relied heavily on her encyclopaedic memory and attention to detail and am very grateful to her.

ALL OF WHICH IS RESPECTFULLY SUBMITTED THIS 6TH DAY OF APRIL 2021.

SCLG by its legal counsel,

ACKROYD LLP

<Original signed by>

Ifeoma M. Okoye and Richard C. Secord

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