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Impact Assessment Agency of Canada (IAAC/CEAA)  
Attention: Jennifer Howe (IAAC / CEAA)

April 26, 2021

Re: Sediment & Air Quality

### Summary of Findings:

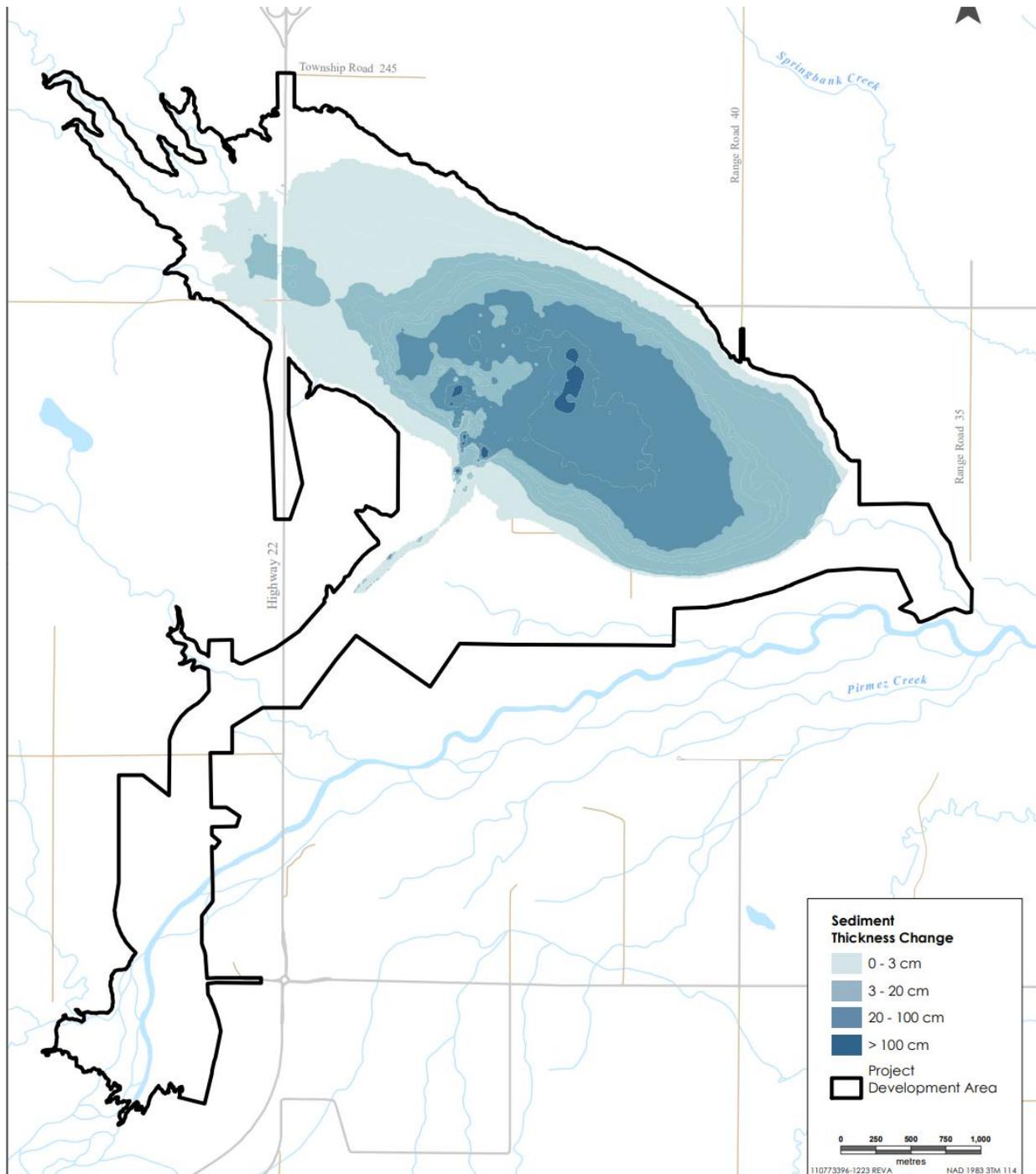
**The Proponent released new information on sediment and air quality on March 12, 2021. This new information has drastic implications for the Project and that impact the conclusions reached by IAAC on human health and on the environmental impact of the Project. Sedimentation is a serious environmental and health outcome that affects IAAC's report and conditions.**

#### Sediment:

In our view, sediment is the most problematic operational and environmental outcome of SR1. New sediment maps released by the Proponent in Exhibit 327 pdf page 190 show that sediments over 10cm in depth have increased 3x since the EIA in 2018, from 260 acres to 790 (early release) and 832 acres (late release) for a design flood! This change, dated March 12, is so material as to cause this project to be rejected. The magnitude of this change is completely unacceptable at this late stage. When did the Proponent realize this increase and what was the delay between identifying this increase and notifying the public? From pg 190, Ex 327, regarding sediment modelling:

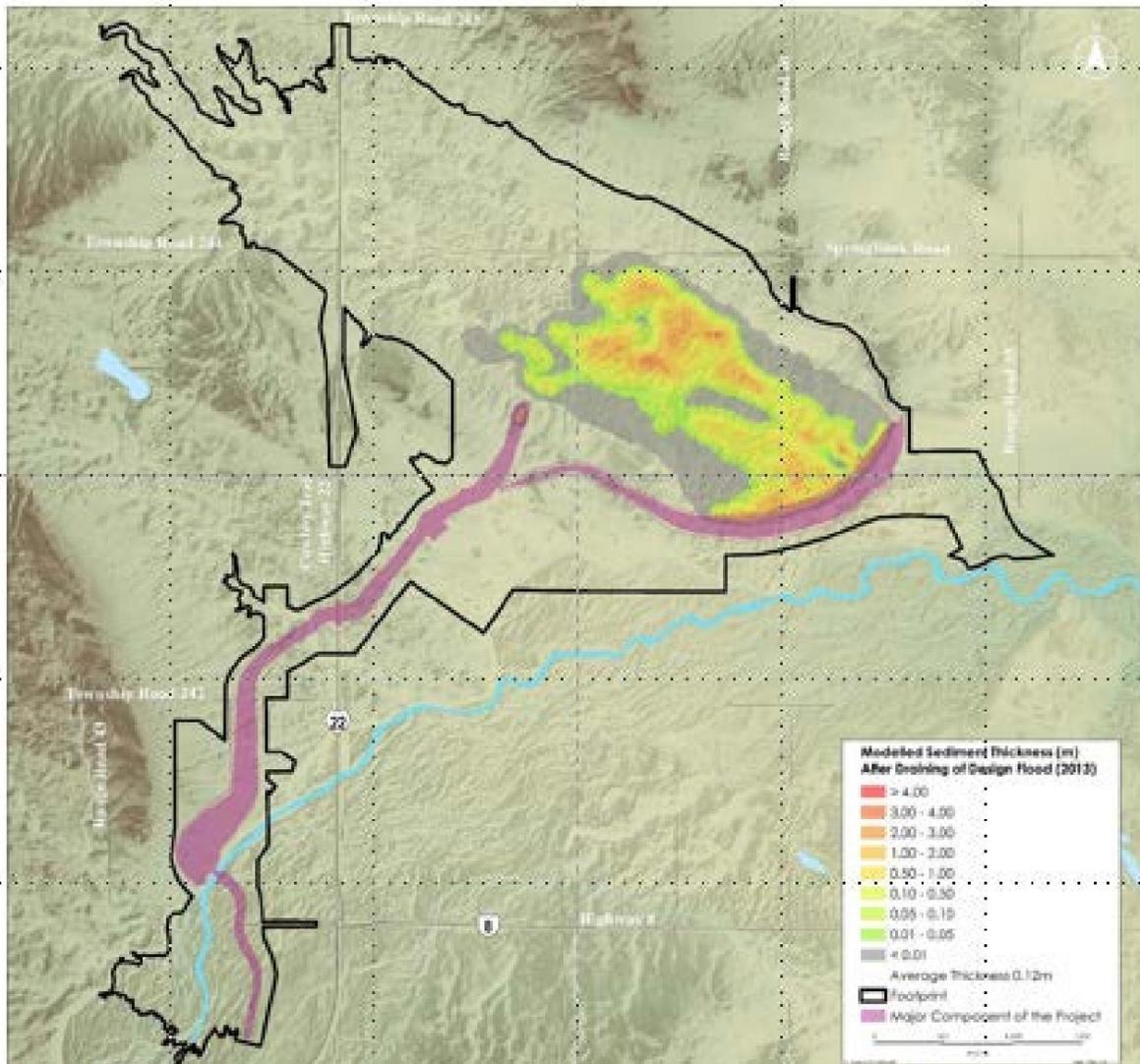
The results of the revised modeling show that the extent of sediment deposition and particle size distribution under design flood scenarios was different than modeled for the environmental impact assessment (EIA). For example, under the design flood the extent of 10 to 100 cm thick sediment is now 319 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.

From Page 196:



From the EIA (Ex 255, RVC Report, pdf pg 11):

## Appendix 1: Sediment Map (GoA Website 2018-05)



What are the impacts of this **additional 530 to 570 acres of sediment accumulation >10cm**? How does this impact plants, traditional uses, biodiversity? How does this impact the cost of reclamation post-flood? How does this impact the post-flood environment? In Ex 324, pdf page 17, the Proponent states “Desired cover is expected within one to two growing seasons following flood events for non-native areas and within three growing seasons for native areas. Potentially more than 10 years may be required for conditions to resemble baseline conditions.” There will not be 10 years between floods!

The various sediment maps provided by the Proponent are problematic and consistency over time is lacking. The most recent sediment map, Exhibit 327, pg 196, shows sediment deposition which varies greatly from Exhibit 218, page 85 (both show a late release flood). In Exhibit 327, the range is from 0-3cm, 3-10cm and 10-100cm? Whereas, in Exhibit 218, this is 0-3cm, 3-20cm and 20-100cm. This makes it difficult to assess the changes. Additionally, a range of 10cm-100cm or 20cm-100cm is too wide fully understand the sediment impacts. Further, Ex 218 shows the underlying topography, including water bodies, while Ex 327 does not.

The Proponent stated again and again that they didn't need to provide a forecast sediment accumulation over multiple floods, because SR1 would only have been used "10 times in the last 100 years". Again, as with flood magnitude, the Proponent is looking to the past to inform the future, which is an approach that does not account – at all – for climate change in the frequency or size of floods. If the frequency of flood increases, sediment accumulation increases. If the magnitude of flood increases, the sediment increases. What is IAAC's view on the Proponents assertion that the past predicts the future? What is IAAC's view on the Proponent's assertion that a cumulative sediment forecast does not need to be provided despite the fact that 10% of the reservoir, or 7 million m<sup>3</sup>, has been reserved for sediment?

From the SCLG final argument, page 104, regarding land capability:

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.

The 2020 Design Report highlights NEW significant sediment accumulation in the diversion channel and the inlet area. How will this sediment be managed post-flood? We have NO information about this, even though this sediment accumulation appears to be material:

- 1) pg 51 of Exhibit 159, states "Sediment deposition will occur in the headpond upstream of the Service Spillway." What is the depth and spread? What depths of sediment is expected? Will this sediment be removed? To where?
- 2) 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." Holy smokes! This is a huge amount of sediment. Will this sediment be removed? To where?

- 3) Pg 231 of Exhibit 159 mentions substantial costs of the unnamed creek restoration. Does this cost include sediment removal? If so, to where?

It is totally unclear, even after days of hearings, what the future of the reservoir is given sediment accumulation.

- **What does the post-flood sediment look like?**

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.

- **Does the landscape become uniform and flat?**

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? If so, sediment deposition will change the terrain of the PDA and likely affect groundwater patterns.

- **What happens to the existing water bodies under this sediment accumulation and over time?**

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? Does it just accumulate over time to the point where these water bodies are filled with sediment? What is the consequence of that? There is not enough information from the Proponent on this outcome.

- **What is the recovery of the land post-flood and what assumptions are required to ensure recovery is successful?**

The Proponent stated that, if watering is required for dust suppression or reseeding success, water would be diverted from the Elbow River. What about weed management? Herbicides are not supported by First Nations, but unless significant watering and manual weed interventions are undertaken, how is it possible to avoid massive invasive weed issues?

- **What is the impact of up to 10cm of sediment deposited over a vast area of reservoir?**

Will pollinating plants be covered in sediment? Will animals be able to survive off a landscape with a 2 or 3cm sediment deposition? What about 8 or 9cm? Can Traditional Use occur here? Will First Nations want to even come here? What about the public?

Again, the degree to which this sedimentation will affect this natural landscape is woefully inadequate. There is no precedent for this. There is no example to review, unless one looks to the dry lake beds of California. If SR1 lands become this “dry lake bed” of packed sediment, we are in for an environmental and health catastrophe.

From a biodiversity standpoint, this increased sediment plume has not been sufficiently reviewed for environmental impacts. From the SCLG Final Argument, pdf page 98:

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.

Additionally, from Exhibit 406, pdf pg 239, Mr Wallis also stated that "In the unlikely event that reclamation is successful, those grasslands will not have the full functionality and productivity for native plants and wildlife, including invertebrate populations."

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. Sediment deposition is inconsistent with these benefits. It does not appear that the Proponent considered the lost carbon storage of these native lands at all. Most of the SR1 land is uncultivated in an entirely natural state. This will be a tremendous environmental loss.

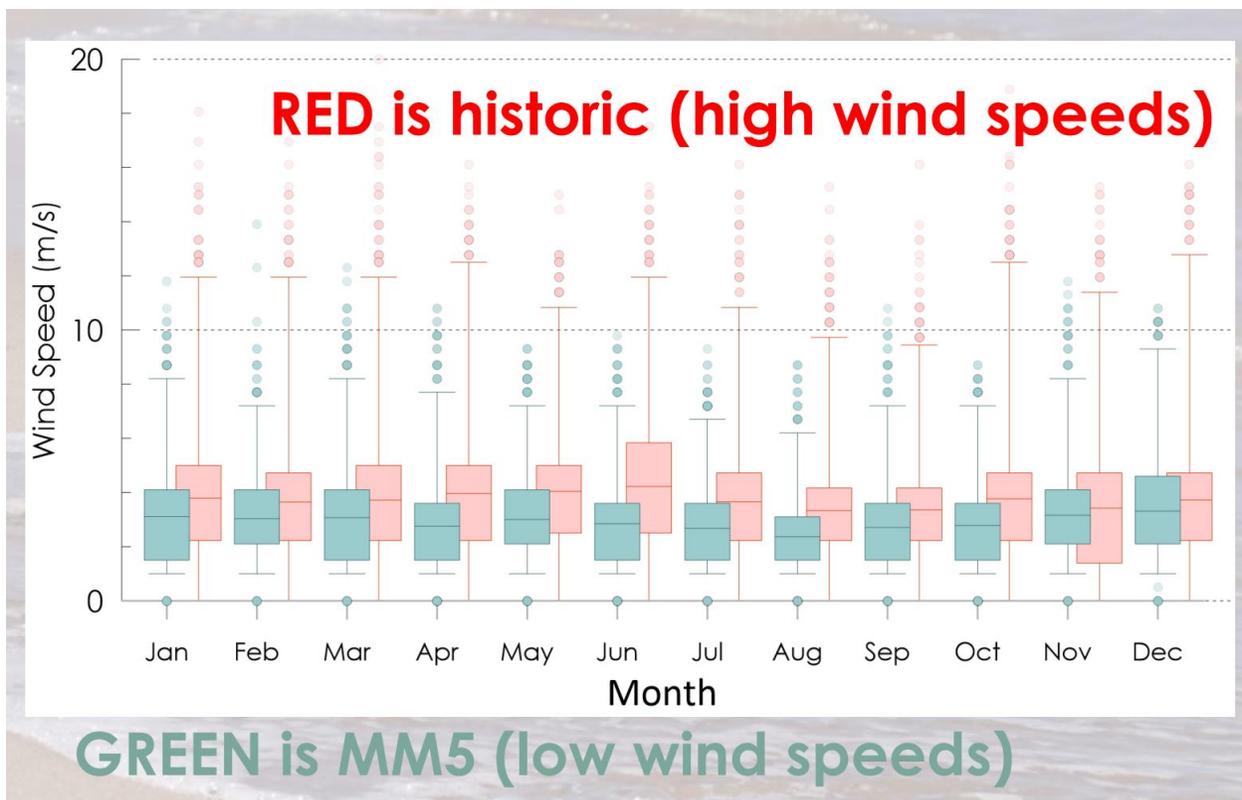
The significant increases in sediment "plume" announced two weeks before the NRCB hearing is unacceptable. After 7 years, we receive surprising and shocking information about the most impactful environmental outcome of the SR1 project! This is an indication that appropriate due diligence was not

performed prior to the EIA and in the nearly 3 years following the submission. How can an oversight of this consequence be acceptable? How can something so material to the environmental conclusions be accepted at the last minute and without independent review and comment? For our part, we cannot understand how this information is only coming forward now.

### Air Quality:

The review by the SCLG of air emissions modelling performed by Alberta Transportation raised serious concerns for our community. The SCLG expert highlighted key omissions and shortcomings of the Proponent's emissions modelling, all of which understate air emissions in a post-flood event. In fact, the SCLG expert caught a calculation error which doubled the Proponent's emissions in a 100 and 200-year flood event! That it took the SCLG achieving intervener status to catch this error is appalling. Human health impacts must be reconsidered by IAAC. As Dr Zelt stated **"The AT assessment of air quality was based upon misrepresentation of emissions area and strong bias underestimating the impacts."**

**From Dr Zelt's presentation (Ex 401), the following illustration shows the higher wind speeds in Springbank (red) that were not contemplated by the Proponent:**



**The Proponent's air emissions model cannot be allowed to stand as the basis for the human health conclusion by IAAC or the Proponent.**

NRCB Exhibit 414 Paragraphs 346 – 360 outlines the key concerns with the Proponent's air emissions modelling. It is abundantly clear that the Proponent's emissions modelling, and thus the human health

conclusions reached by IAAC are both incorrect. The importance of the erroneous emissions modelling cannot be overstated. This is the health of a community and its most vulnerable at stake. The Proponent stated repeatedly that large floods aren't common, so their conclusion of "not significant" for air quality outcomes is justified, because exposures are short-term in nature. This relies on several assumptions, none of which are proven:

- 1) That it is acceptable to intentionally expose residents to PM2.5 and PM10 at all. IAAC should note that the alternative at MC1 is not located in a community, its footprint was much smaller and most of its sediment would have been retained under water. SR1 is surrounded by a growing community, has an enormous sediment footprint, and the sediment is fully exposed to air!
- 2) That large floods are not common. Again, the Proponent is using the past to inform their view of the future. This is no longer a realistic foundation with which to view the future. For human health outcomes, we believe that regulators should be looking at the WORST CASE.
- 3) That flood frequency in the future will be similar to the past. Again, what is the basis for this? Is it not realistic to expect more frequent extreme weather events with climate change? If that is the case, more frequent small floods will deliver more sediment.
- 4) That sediment deposited in the reservoir creates temporary – not long-term – emissions issues. Although the Proponent now proposes to monitor air quality for 16 months, acknowledging the risk over a longer-term than before, the fundamental question is whether the emissions from deposited sediments can be effectively managed at all. IAAC should consider whether creation of this dry lake bed environment post flood is akin in any way to the dry lake beds in California, for which the air emissions have not been successfully managed. In California, the only truly effective approach appears to be "add water". IAAC should be acutely aware that there will be repeated use of the reservoir – in some instances this could be every few years, repeated accumulation of the sediment and interrupted growth patterns. Can this sediment be managed using conventional means? The Proponent was unable to provide a precedent for the sediment accumulation of SR1, so we believe that there is no justification for their confidence on this issue.

Further the Proponent refused to perform an "unmitigated" scenario for emissions. In the interest of conservatism, the Proponent should model "unmitigated emissions" for a period of time as the reservoir dries and during events where "adaptive management" is delayed (reporting, lack of resources, delay in response, etc.).

Dr Zelt's presentation, Ex 414, shows the PM2.5 particulates in an unmitigated design flood, below. It is clear that this is a huge human health issue that extends well into the City of Calgary's western edge and Tsuut'ina Nation.

- 2. Potential Impacts
  - What they didn't show you
  - **Same Assessment but NO CONTROLS**

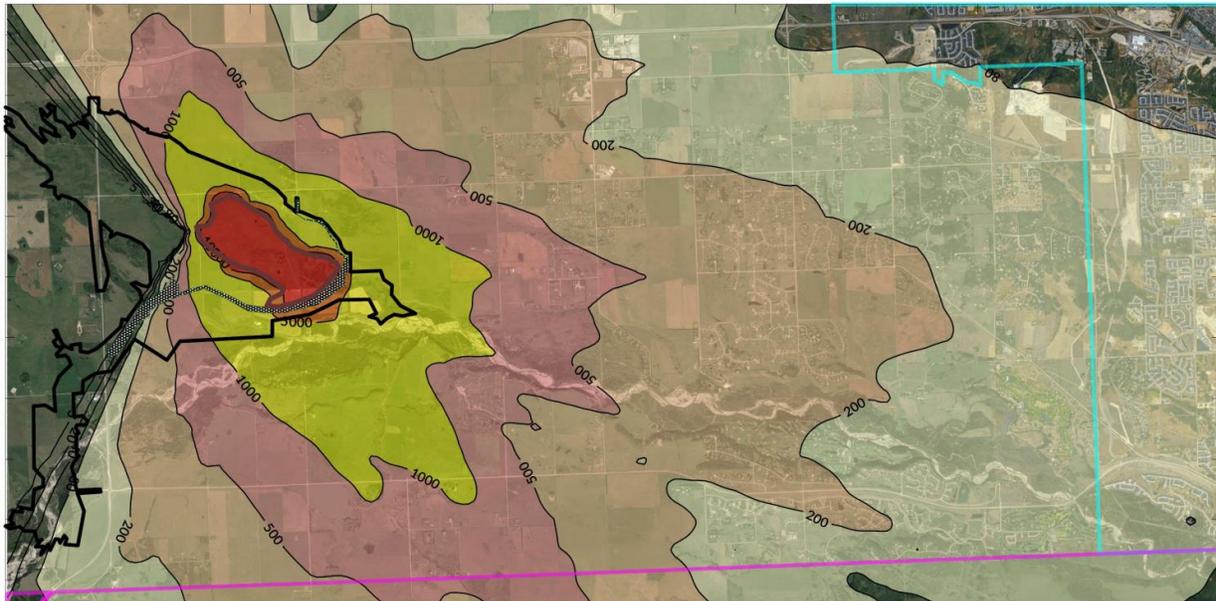


Figure A6: 1 hr 99.9<sup>th</sup> PM2.5 1:200yr

### “Adaptive Management”

At the NRCB hearing, the Proponent used the term “adaptive management” to define the post-flood paradigm. Regarding post-flood interventions, we ask IAAC to review the “adaptive management” plan with a critical eye. The sediment plume is a tremendous concern. There is much uncertainty regarding how this plume will dry, when and what specific actions will be undertaken as this drying process takes place. The SCLG was unable to get specific and detailed plans for the post-flood management process. The Proponent stated again and again that Alberta Environment and Parks will be responsible for this and therefore will prepare detailed plans. That is not good enough. This is too consequential and the stakes are too high to just say “it will all be okay”. Further, no budget for any of these so-called “adaptive management” operational processes is available. A few examples to illustrate the challenges of this adaptive management program:

- In a post-flood environment, fish rescue is theoretically taking place with people in the reservoir working along the shoreline as it dries. How can equipment with tackifier be in their working also, generating diesel fumes, kicking up sediment while these personnel are in there?
- The Proponent tried to reassure regulators that they would manage air quality issues as soon as they arise. This is unrealistic. Firstly, PM2.5 particles are not visible, so presumably a monitoring station will report an issue. What is the time between this and when an intervention occurs? Hours? Days? Weeks? As stated in the SCLG final argument “In high wind events, the dust emissions would reach homes 1km away from the project within one to two minutes”. Springbank has had multiple wind

warnings in the last month, with gusts at the Springbank airport reported at over 80km/hour. No amount of intervention can occur during these types of extreme wind events and once these events happen, it is too late!

- It is not realistic to apply tackifier before the area is graded, or sediment moved for drainage. This would be cost prohibitive because tackifier would need to be reapplied once the grading is completed. Tackifier and seeds are applied once the landscape has been graded and prepped. The Proponent appears to have NO IDEA whether the landscape must be reconstructed at all post-flood, which is dependent on the flood size and corresponding sediment plume depth and spread. Due to this uncertainty, the Proponent cannot possibly know that they will apply tackifier immediately following a flood to manage wind erosion.

We hope the IAAC sees the painful irony regarding watering of the reservoir for dust or reseeding. If it takes water to correct dust and air emissions, water will be diverted from the Elbow River! You end up using our most precious resource in a low-flow summer or autumn environment to add water to an area that never needed water before SR1. What a waste. MC1 could have stored water! SR1 will use excess water. Water licenses are a rare commodity in Springbank and it is inconceivable that a license will be required to solve a problem created by the Project.

## A Community's Future

Springbank is a growing community. Our air quality should matter and should be considered with gravity. Air quality effects will impact our future, our quality of life and our economic development opportunities. We highlight to IAAC that there are two large Area Structure Plans proposed for just east of the Project along Highway 8. The first, Elbow View ASP, with up to 18,000 residents is going before Rocky View Council next month (<https://www.rockyview.ca/elbow-view-area-structure-plan>). The second large plan along the south side of the Elbow River just east of SR1, we expect to see move forward within the next year or two. There is also a new development, the Acres (<http://the-acres.ca/>), approved this month by Rocky View Council. This development is on the east border of SR1 near where the unnamed creek meets the Elbow River, on the north side of the Elbow River. There is no doubt that development east of SR1 will continue. It would be naïve to think otherwise, given the long-term nature of the Project. How will this project impact and interact with these proposals over time?

Dr Zelt highlighted the risk of dust storms. Ms Noble called this “nuisance dust”. Well, to be clear, nuisance dust can cause physical reactions in asthmatics and people lung issues and dust sensitivities. Symptoms include: Itchy or burning eyes, throat irritation; skin irritation; coughing or sneezing; and/or respiratory or breathing difficulties, including asthma attacks.<sup>1</sup> Given the Proponent understated emissions, it did not consider that dust storms could impact the quality of life in Springbank, the Springbank airport operations (one of the busiest in Canada), Calaway Park operations (millions of visitors each summer). Nuisance dust (TSP) will travel far into the City of Calgary's western edge, as shown by Dr Zelt.

SR1 has real world impacts – over the long-run. Alberta Transportation has not earned the confidence of our community that these concerns are addressed, or that many of these concerns were even considered! We

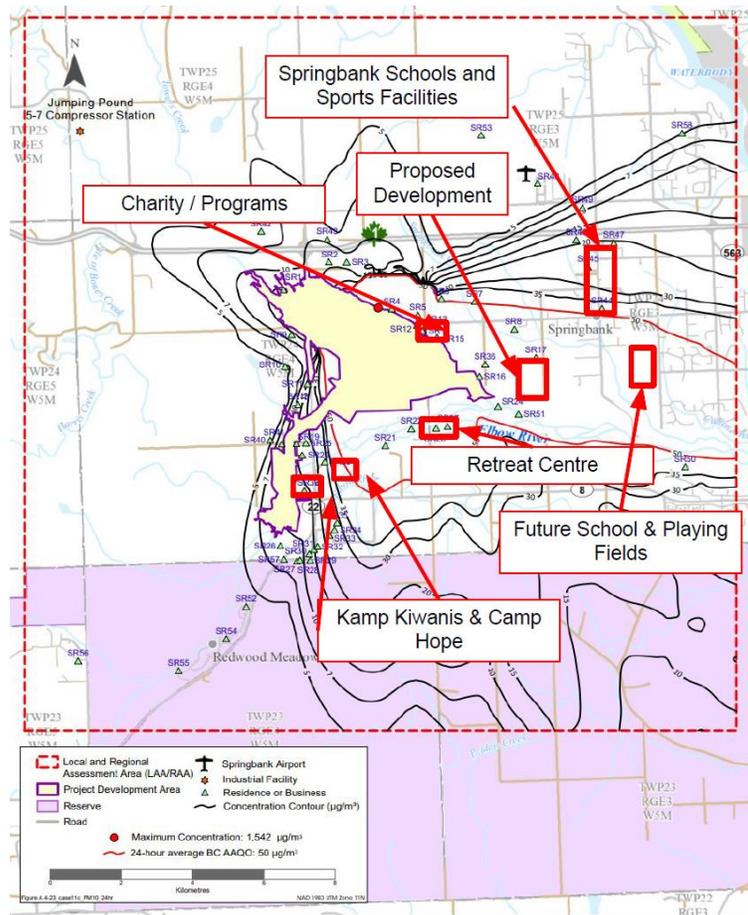
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<sup>1</sup> <https://www.health.act.gov.au/sites/default/files/2018-11/2018Jul06%20-%20Dust%20Storm%20Factsheet%20FINAL.PDF>

ask IAAC to use new information to update its human health conclusions. Further we ask IAAC to consider the broader implications of the sediment-related emissions and the risk to the operations of service providers such as Calaway Park and the Springbank Airport. We ask IAAC to note that camps for kids are in high-risk air emissions locations, while our schools and the bulk of homes in central Springbank are just east of SR1. From NRCB Exhibit 398, using the Proponents PM10 forecast (note that the Proponent does not want to monitor PM10, which we disagree with):

## Air Quality Map: AT PM10 Max 24-hour 1:200 Flood (A4-17)

Project Case  
Exhibit 327, pg 175



Maximum Predicted 24-hour average PM<sub>10</sub> Concentration  
(Case 4, Late Release, 1:200 Year Flood - Project Case)

## Conclusion:

We ask IAAC to reject this project due to the unacceptable last-minute changes to sediment projections, which are material and consequential. There has not been adequate time to review these new projections, nor consider how this massive increase in sediment impacts land use, the environment, and our air quality. Further, the poor quality of the air emissions modelling indicates a pervasive bias towards underestimating negative outcomes. The fact is that all SR1 outcomes within the local community continue to be negative. There is nothing positive – environmentally, socially, economically, biophysically, to our water, to our land, to our community. The promise of First Nations traditional use appears to be a fantasy. How can traditional use occur when nearly half the reservoir is covered in 10cm of sediment, and hundreds more acres are covered in less than 10cm? If you are to believe the Proponent, they do not need to provide a sediment forecast with cumulative sediment accumulation over time because big floods are so rare. We ask IAAC to weigh the

Proponent's assertion that big floods are so rare against the Proponent's assertion that this project needs to be built immediately.

Regards,

Karin Hunter

President, Springbank Community Association

CC. Dan Henn, RVC Reeve, Kent Robinson, Acting CAO, Rocky View County, Kim McKylor, RVC Councillor, Div 2, Mark Kamachi, RVC Councillor, Div 1, Kevin Hanson, RVC Councillor Div 3, Laura Friend, NRCB