

Attn: Ms. Laura Friend

Dear Ms. Friend:

Further to our earlier submission to the Natural Resources Conservation Board March 22 Hearing, we would like to add the following comments:

Re Topic 3:

b) Dam Safety

We have serious concerns regarding the safety of the proposed Springbank Off-Stream Reservoir. Because of its location in the midst of communities and because the City of Calgary is only 18 km downstream, SR1 has been given the “Extreme” hazard rating which requires that it be designed to protect from a Probable Maximum Flood (PMF) or the Flood of Record. Alberta records show that floods 30% larger than the “estimated” 2013 flood occurred in 1879 and 1897 on the Bow AND ELBOW Rivers. However the proponent has advised that the Design Flood is for 1240 m³/s in spite of the fact that they report the Probable Maximum Flood figure is 2,770 m³/s.

In the Preliminary Design Report,

https://www.nrcb.ca/download_document/2/83/10664/20201218-at-sir-to-nrcb-re-preliminary-design-report submitted to NRCB by Alberta Transportation and Stantec, the

proponents advise that the Flood of Record was the June 2013 flood despite having advised in an earlier submission that “Several large historically observed floods occurred in 1879, 1897 and 1902 on the Bow AND ELBOW rivers prior to the beginning of systemic hydrometric monitoring Notice that incorporating historic flood records increases the magnitude of the 100 year to 1000 year flood peaks by 26% to 34%.”

In this Preliminary Design Report submission - under 3.2 Flood of Record – they described how they reached the crucial calculation for the Flood of Record: “Due to damage during the event, official data from gauging stations at Elbow River at Bragg Creek (05BJ004) and Elbow River at Sarcee Bridge (05BJ010) are unavailable. Water Survey Canada (WSC, 2015) supplied preliminary peak instantaneous flow for the Elbow River at Bragg Creek and Sarcee Bridge as 1150 m³/s and 1240 m³/s respectively. The City of Calgary provided an ESTIMATED inflow flood hydrograph into Glenmore Reservoir for the 2013 flood event based on reservoir flow and outflow analysis. The ESTIMATED INFLOW HYDROGRAPH PROVIDED BY THE CITY IS CONSIDERED THE FLOOD OF RECORD FOR THIS PROJECT.

In www.AdviceWaterManagementBowRiver-May-17-2017 the Bow River Basin Council advised, in a report to the City of Calgary (See 3.2 Floods) “One key difference between the estimated peak flows from the early 1900s and those measured during the 2005 and 2013 flood events is that the more recent events were moderated considerably by the existence and operation of six sizeable storage reservoirs upstream of Calgary (see Table 1). These reservoirs stored water and reduced peak flow downstream in Calgary by approximately 600 cms in 2013. Taking this into account would put the naturalized 2013 flood peak for the Bow River at Calgary (upstream of the Elbow River) at about 2400 cms – approximately the same peak as the 1879 and 1897 flood events”.

As the 2013 flood affected all the rivers in the Bow Basin river system, of which the Elbow is part, it is probable that the naturalized flood peak for the Elbow River was also much higher than the “ESTIMATED’ 1240 m³/s figure used as the design capacity for SR1 and wrongfully claimed to be the “Flood of Record”.

Question 1: When building such vital infrastructure as a dam – especially one with an “Extreme” hazard rating, is it acceptable by Canadian Professional Engineers to use “estimates” on which to base the design capacity for what is classified as an Extreme Consequence dam?

On February 16, 2011, the President of The Canadian Society for Civil Engineering wrote a letter to the Minister of Transport, Infrastructure and Communities, The Honourable Chuck Strahl. On behalf of the CSCE, he advised:

“CSCE is concerned that infrastructure decisions in Canada are not being made with adequate consideration for the long term. Short term investment decisions, based solely on the lowest capital cost, are in the long term more expensive to taxpayers, disruptive to industry and the economy AND A RISK TO PUBLIC SAFETY.

In a time of limited funding for infrastructure, Canada needs to be making the best possible use of federal tax dollars. You have an opportunity to direct investment in Canada toward infrastructure projects which will be examples for generations to come of your government’s long term vision and commitment to the future of this country.

Canada USED to build for the long term and the federal government led this effort. In response to federal government leadership civil engineers were expected to meet the challenge – and we did. We built for the long term.

In recent years however the vision of the long term has faltered. Canada is not building infrastructure that we will celebrate 100 years from now.

UNLIKE IN THE PAST, CIVIL ENGINEERS ARE NO LONGER INVOLVED IN THE INITIAL PROJECT ANALYSIS AND DESIGN. CIVIL ENGINEERS ARE ONLY ENGAGED AFTER THE DECISION TO BUILD

HAS BEEN MADE, TO ENSURE THAT WHAT OTHERS HAVE DECIDED TO BUILD CAN BE BUILT SAFELY.

CSCE rejects this abdication of responsibility for infrastructure analysis and design that has been pushed upon us and seeks an opportunity to help the federal government identify and support good infrastructure decisions. To this end CSCE recommends to the federal government

2. That national standards of sustainable infrastructure be developed with the assistance of the Canadian Society for Civil Engineering and be used to assess projects requesting federal funding.....

We will also lobby for the essential role that civil engineers can play in this long term visionary process.”

Engineers must build for “worst case scenario”, so we are sure an “estimated Probable Maximum Flood” design capacity would not have been used if CSCE had been involved in the choice of SR1.

The public need to trust “That national standards of sustainable infrastructure” have been developed with the assistance of the Canadian Society for Civil Engineering and are being used to assess projects such as SR1 that, if not built to the highest safety standards, could greatly endanger our City of Calgary and adjacent areas.

Since 2015 the regulators have repeatedly requested an official stamped, signed, copy of the Initial Design Concept from Stantec Consulting Ltd, providing their Permit to Practice and giving certification by their Professional Engineer in charge of the Project.

A Sign-Off Sheet was finally submitted in their December 18, 2020 submission as part of the Preliminary Design Report. However above the signatures of the seven Professional Engineers was the following caveat:

“In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages OF ANY KIND, if any, suffered by it OR ANY OTHER THIRD PARTY as a result of decisions made or actions taken based on this document.”

This raises an important question. Who will be accepting responsibility? Will it be Alberta Transportation, Alberta Environment and Parks, the engineers and bureaucrats who give regulatory approval for SR1 to proceed, or our elected officials in the Municipal, Provincial and Federal governments who are trusted to “serve the public interest”? Or will it be the unknowing “other third party” - the public and the taxpayers?

APEGA – the Alberta Engineering and Geoscience Association – have recently updated the Engineering and Geoscience Professions Act. They advise “For more than 100 years APEGA has been the authority on ethical, professional and technical competency to ENSURE THAT ALBERTANS ARE PROTECTED. This is why we’ve moved forward in making more than 160 recommended revisions to the Engineering and Geoscience Professions Act. This updated version of the Act will support ONGOING PUBLIC SAFETY, improve transparency and accountability, as well as PROVIDE MEANINGFUL CONSEQUENCES FOR THOSE WHO FAIL TO MEET THESE STANDARDS.”

Because a dam to be built on the outskirts of Calgary must be built to the highest safety standards, we believe it is of vital importance that SR1 is put on hold until the Alberta Legislature tables and votes on the Updated Engineering and Geoscience Professions Act.

Question 2: Will IAAC and NRCB respect the authority of APEGA Regulations on the ethical, professional and technical competency of those who are involved in building critical infrastructure, that affects the safety of the public, by waiting until the updated version of the Engineering and Geoscience Professions Act is tabled and voted on in the Legislature ?

Regarding 8.1 Effects of Accidents or Malfunctions – See Page 119/176 in the Draft EIA.

“An off-stream dam failure or breach could occur due to flooding. Additionally, overtopping could occur if the floodwater volume exceeds the probable maximum flood design and the emergency spillway fails to operate as anticipated (due to design error or debris blockage), or if the diversion inlet gates fail to shut once the reservoir reaches maximum capacity.”

“A dam failure or breach would result in inundation of surrounding areas, federal lands, lands used for traditional and non-traditional uses, as well as residential and commercial property and would have the potential for human injury or LOSS OF LIFE.”

As SR1 design capacity is less than the estimated requirement to protect from a 2013 flood, and the Flood of Record was 30% larger than the estimated 2013 flood peak, it seems there is a very high probability that an off-stream dam failure or breach will occur. This would have disastrous consequences for the over 1.3 million people who will be directly affected.

Deltares, the consultant hired to evaluate SR1 advised, under Additional Considerations:

“Temporary storage of water in a detention area 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. When floods up to the size of the 2013 flood would be avoided, BUT ANYTHING ABOVE WOULD NOT BE REDUCED IN SIZE, THE AWARENESS OF THE PEOPLE IN THE FLOODPLAIN WILL FURTHER DECLINE, MAKING THEM (AND SOCIETY AT LARGE) EVEN MORE VULNERABLE.”

The Proponent stated: “Failure or breach of the off-stream dam during a design flood could release up to 77,771,000 cubic meters of water. The Proponent predicted that the probability of a design flood occurring any given year would be 0.5 percent.”

“The Proponent concluded that following the application of safeguards and contingencies, NO accidents or malfunctions would be of unacceptable risk. Further the Proponent stated that the likelihood of of the aforementioned accidents or malfunctions is low; therefore there is a low likelihood that a significant adverse environmental effect would occur as a result.”

Since the consequences of a dam failure or breach releasing 77,771,000 cubic meters of water upstream of Calgary would be a catastrophic event with the probability of much loss of life, we find this conclusion “no accidents or malfunctions would be of unacceptable risk” incomprehensible and dangerous, especially when the conclusion is based on an assumption that a flood of larger capacity than 77,771, 000 is not a likely probability, despite the fact that massive flooding due to extreme weather events has been happening regularly in Canada and the US in recent years.

Quebec dams which are built to the 1-1000 year level have been severely tested on more than one occasion during the last five years.

See: <https://www.thestar.com/news/Canada/2019/04/25/Quebec-officials-warn-of-possible-dam-failure-on-rouge-river-affecting-250-people.html>. It reports:

“Simon Racicot, director of production and maintenance with Hydro-Quebec, told reporters the dam at Chute Bell was built to withstand what he called a millennial flood. ‘That means a flood that happens every 1000 years’ he said. Hydro workers discovered earlier in the day the millennial level of water had been reached. ‘We are confident that the structure is solid.... We are entering into an unknown zone right now – completely unknown.’”

“According to the utility’s website, the concrete dam was built in 1942, is 19 metres high and also 60 metres long. It has the capacity to hold back 4 million cubic metres of water.”

This dam is not close to a large city and in the midst of communities as the proposed SR1 would be, yet Quebec have built it to the 1-1000 year level (not smaller than 1-100 year level) and it still was severely tested by an extreme weather event such as are happening regularly across Canada and the U.S. in the last few years.

Question 3: Why did the Alberta Government not access Federal Infrastructure funds available such as the \$3.2 billion allocated to Alberta in the 2014 Federal Budget for water infrastructure as a result of the 2013 flood; or the billions available on acceptance of an Application to the Disaster Mitigation and Adaptation Fund or the Investing in Canada Plan, in order to have sufficient funding to design a dam to the Probable Maximum Flood level as required?

Summary:

- . SR1 has an “Extreme” hazard rating which demands it must be built to withstand a PMF.
- . The PMF is acknowledged as being 2,770 m³/s
- . The Design Flood is 1,240 m³/s
- . The Design Capacity of SR1 is one third less than the Design Flood of 1,240 m³/s

Question 4. Why did the Alberta Government remain committed to the SR1 project after it was acknowledged in the required hazard rating assessment in 2015 that it was rated as an “Extreme” consequence dam, demanding it be built to the PMF level?

The 2013 flood was a devastating event for Calgarians. Many are still suffering from physical, mental and financial harm and stress caused by the flood. We saw the distress of those whose homes and businesses were flooded, those who were unable to work or reach their homes in the downtown area and we wondered how this could happen in an advanced country such as Canada. Calgary has been built on a floodplain where two large rivers – the Bow and the Elbow – converge, so we, as citizens, expected that effective flood management would be in place upstream, since being close to steep, snow-capped granite mountains ensures an unacceptable risk of spring floods. There are at least six upstream dams on the Bow river capable of reducing spring high flows, but – after the 2013 flood – we learned that there is only the Glenmore Reservoir on the Elbow River and it was shown to be ineffective in protecting a city that has grown so much since 1934. If SR1 cannot provide full protection to Calgarians from a known threat, leaves many residents still at risk from overland and groundwater flooding, leaves upstream communities such as Bragg Creek, Tsuut’ina Nation, Redwood Meadows unprotected, except for berms (which have proven useless in floods in 2005 and 2013 – and caused more harm from rip rap washing away and water getting trapped behind them)) why have our provincial and municipal governments focused only on SR1, since July 2014, and refused to consider alternatives recommended in government department reports and by the CEAA).

An Alberta Watersmart Report – “2013-Great-Flood-and-Action-Recommendations-Feedback.pdf.” on Page 6/134 – under “1. Anticipate and plan for more extreme weather events”.

“Alberta, and specifically southern Alberta, should be prepared to experience larger and more frequent extreme weather events in the future, including both floods and droughts. This is important because these events have huge impacts on people and on our economy. These impacts are costly and are likely to become more costly as Alberta’s population grows.”

“... flood and drought events in the past were far more severe than we have experienced during the mid to late 20th century. The pre-historic record (Figure 1) suggests that we should be prepared for extreme weather events that are worse in terms of severity and frequency than the ones we have experienced in recent history. For example, the 2013 flood was one of five similar sized flood events on the Bow River in 130 years (Figure 2). History would suggest that we should consider the recorded maximum and minimum flow levels in our infrastructure and response planning. As a further complication, this planning must take drought into account, as flooding and drought can occur right after one another (e.g. 2001 and 2002 were major drought years, while 1995, 2005, 2011 and 2013 were major flood years) or even in the same year.”

Question 3: Do you firmly believe that SR1 is designed to take into consideration and can fulfill the above stated WaterSmart recommendations to protect from “extreme weather events that are worse in terms of severity and frequency than the ones we have experienced in recent history?”

Thank you for your attention. We look forward to receipt of your responses.

Respectfully,

David & Noelle Read,

Members – Flood and Water Management Council.

