From: [redacted]
To: Laura Friend
Subject: SUBMISSION - NRCB #1701 APLICATION Pre-Hearing Responce TO HEARING 22 March.
Date: Thursday, February 25, 2021 10:14:27 PM
Attachments: image002.png
Drones reveal how flooding altered the Elbow River.docx
Sign-off Sheet.oxps

NRCB

My original NRCB participation purpose was to have been an advocate for sensible scientific comprehensive environmental design planning for the environmental devastating flood source as the watershed project site. SR1 does not engender a coexistence of natural resource environmental sustainability with wild life, aquatic occupation and human planned needs for landscaped developability. It was originally conceived as a "single sourced" storage dam location "off-stream".

Original IDC Initial Design Concept should have been comprehensively researched and taken place 7 years earlier than the December 2 2020 NRCB Email; which was exactly as I had done with the Flood Mitigation Panel Chair Allan Markin.

The agenda items for the pre-hearing included:
a) a discussion of the major issues to be examined at the hearing;
b) the appropriate scope and jurisdiction of the review;

The Pre-Hearing was to determine SR1 natural resource status and issues. After submitting 2 Pre-Hearing proposals for "Project Need and Justification". The successive step is to take place within the Hearing stage where the issues are to be presented without a comprehensive feasibility analysis. I presented the issues and justified their relevance by the SUBMISSIONS and their scientific impact ,,,,to be dealt with during the Hearing.

My instructions were to present a one page proposal to describe only 2 elements of conditions for the Panel to include in the hearing Topics. My SUBMISSION included, under Health Risks, scientific research which would identify the issues which would continue if the SR1 was built as the only watershed flood control IDC to exist to protect the Natural Resource Conservation of the devastated geomorphological changing conditions as shown on the ATTACHMENT of a before and after flood Drone GPS Survey by Dr. Chris Huggenholtz, University of Calgary Professor of Geology.

Additional scientific research issued the tantamount prescription for examining the, yet to be determined, number of Elbow River and tributary toilet faeces and urine storage tank facilities which were emptied and flushed into the Glenmore Reservoir and potential SR1 ponding time to settle as TTS. The potential transfer of Covid-19 would have a health risk to both reservoirs.

However the total number of sanitation waste storage facilities is yet to be released by AEP Infrastructure Manager, who on December 1 2020 was yet to be given the "permission" of Alberta Transportation in Edmonton to release my request of November 30 2020. An Forwarded AT SR1 has still not answered the Dec 1 2020.

Surveys in North America have shown that public parks visitor occupation hve increased by over 800%. As a regular Elbow and Kananaskis visitor we have seen all parking lots filled and overflow parking along roadways HW 66 and 40, to where the toilet facilities are yet open and available to contamination storage and accessible to all increased septic tank transfer to the AEP sewage disposal staffing.

NRCB Pre-Hearing Panel Technical and scientific experience's to qualify Submissions decisions:

- True Copies annotated below;
- bachelor of science in agricultural economics and a master of science in agricultural economics;
- bachelor of science in agricultural engineering;
- subsurface soil geology
- soil science
- The remaining concern is what geotechnical, geospatial, scientific health risks qualifies a Panel to ignore current scientific factual momentum of Covid-19 wastewater life cycle contamination.

My Pre-Hearing scientific, technical, engineering and sanitation health risks as presented were more scientifically presented than any other participant. The following is the Panels copious decision upon my scientific SUBMISSIONS:

- . *"Charles Hansen stated that he does not live in either the Elbow River flood area or near the proposed project site. Mr. Hansen stated that he would be directly affected as a user of the City of Calgary's water distribution system. Mr. Hansen asserted that there is a potential for COVID-19 to contaminate the City of Calgary's Glenmore Reservoir water supply as a result of sewage contamination from flooding of upstream holding tanks. The Board finds this to be an unsupported assertion that appears to have little, if any, relation to the proposed SR1 project. As such, it does not satisfy the first measure of the closeness test".*
- *The Board finds this to be an unsupported assertion that appears to have little, if any, relation to the proposed SR1;*
  - This is absolutely the opposite if any professional experience has any planning evaluation to follow the rules of the Pre-Hearing. It stated that the purpose was to identify issues of environmental coexistence to Natural Resource Conservation.
- To what extent does the Panels technical experience render such critique of the evidence I provide as follows:
  - Cranfield University Researcher Dr, Zhugen Yang Sensor Technology isolation of COVID-19 from faeces and urine survives to transport within the wastewater treatment systems
  - CHEO Research Institute an University of Ottawa measured the City of Ottawa COVID-19 levels of contamination measured and tested within the wastewater treatment system viral signal increased matched the reported 120 new cases and 5 times viral from July 2020 to October 2020, with continual cases rising.
  - Stanford University "How to identify factors affecting COVID-19 transmission" "environmental characteristics transmission via surfaces, air, fecal matter in sewage treatment systems", by Alexandria Boehm Civil engineering & Krista Wigginton Civil & Environmental Engineering professor University of Michigan

The Topic context have benefited from this participation because they include my subjected critique,

Topic 1: Project Need and Justification
a) Project purpose and need
b) Social and economic project costs and benefits
c) Alternatives considered

Topic 4: Water
a) Hydrology
b) Surface water quality
c) Aquatics
d) Hydrogeology
……..e). Sensitivity of project water elements to changes or variability in climate parameters "Identify stages or elements of the Project that are sensitive tochanges or variability in climate parameters, including frequency and severity of extreme weather events and discuss the potential impacts over the life of the Project."

Topic 1a): Project Need and Justification:

- The Project would not be needed if a comprehensive Watershed examination and functional evaluation as has been done with Mr. Hebert and Mr. Speller March 202,. IR 3-45 ERRORS & OMMISSIONS.

Topic 1c): Alternatives considered

- SR1 IDC did not evaluate any functional Alternative to store flood Upstream and avoid the Aquatic fish population cost and distruction, as shown below.

Topic 4c) : Water – Aquatics

- ***QUOTE from AT SR1 Stantec VOLUME 3B Submission to CEAA:*** *Introduction March 2018*
  SPRINGBANK OFF-STREAM RESERVOIR PROJECT ENVIRONMENTAL IMPACT ASSESSMENT VOLUME 3B: EFFECTS ASSESSMENT (FLOOD AND POST-FLOOD OPERATIONS)
  1.0 INTRODUCTION This volume of the Springbank Off-stream Reservoir Project EIA addresses the environmental effects of the flood and post-flood phases of the Project. The scope of the assessment is described in Volume 3A. Any changes to the scope for the flood and post-flood phases are described. These changes may involve changes in the definition of effects characteristics or the addition of concerns from the public and Indigenous groups specific to the flood and post-flood phases. The existing conditions of the VC are described in Volume 3A. Existing conditions for the flood and post-flood phases, specific to the assessment of effects on some VCs, are described. The Project interactions with the VC are described. The components and activities that may interact during the flood and post-flood phases are: • reservoir filling • retention of water in the reservoir • soil drainage and drying • reservoir drainage and maintenance • reservoir sediment partial cleanup • drained reservoir • channel maintenance • road and bridge maintenance • flood damage cleanup and restoration.

2.2 AQUATICS
a. As required provide the fish population assessment and update SIR 68 and SIR 75 as required to reflect the new information.
2.0 FISH MORTALITY
2.1 Fish Mortality Estimates
2.1.1 Entrainment Estimates
2.1.2 Mortality Estimates
2.2 Discussion of Effects to Fish Populations
2.2.1 Significance of Fish Mortality

- **Subject: Risk to fish populations on the Elbow River- Springbank Off Stream Reservoir Project**
  Paul Christensen Senior Fisheries Biologist Resource Stewardship Division, Fish and Wildlife

  AEPFM is of the opinion that certain aspects related to operation of the project pose significant risk to fish populations in the Elbow River system between Elbow Falls and Glenmore Reservoir
  Mitigation for Entrained Fish
  .....AEPFM's experience in 2013 whereby it attempted to rescue fish in ponds and isolated side channels that became stranded by the flood when water levels receded. Ultimately, large ponds proved to be very difficult to effectively rescue fish as warm water temperatures quickly rose and subsequently became an attractant for avian predators to consume dead and moribund fish.
  .....alternative offsets should be pursued in consultation with Fisheries and Oceans Canada and other regulatory agencies in alignment with AEP-FM fisheries management objectives (FMOs).

- **Therefore the** flood damage cleanup and restoration Is far more than 'The AEP expense to attend to the "Post Flood" entrapment ponding. This leads to the Alternative **Topic** 1: c) Alternatives considered. An NRCB approved built SR1 will continuously render the "Post Flood" degradation of the fish population

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ANALYSIS of City's Engineering Submission Ignorance of SR1 Facts:

- Ignorance of 2013 SR1 1240m³/s River flow, 50% subdivided at the Diversion Channel renders residual vector flow flooding of 640m³/s,
- over their record of flooding starting at 120m³/s. Therefore at a *110m³/s No-flooding-Flow over the Glenmore Reservoir,* the balance of 530m³/s will render a Floodway flow into the Flood Fringe and Flood Plain and continue about 60% Elbow River 2013recorded inundation, Not including,
- Environment and Climate Change increases recorded by Watersmart Alberta, Deltares Consulting Holland, *"Consultant Deltares' "Additional Comments", SR1 could be overcome by a flood as large, or larger than the 2013 flood and "the awareness of the people in the floodplain will further decline, making Calgary subjected to* ***implosive amount of inundation*****".**
- The City of Calgary published a Flood Advisory measure of any flooding vector flow from the Glenmore Reservoir into the Elbow River built-up urban occupation as shown on the ATTACHMENT City of Calgary issued on

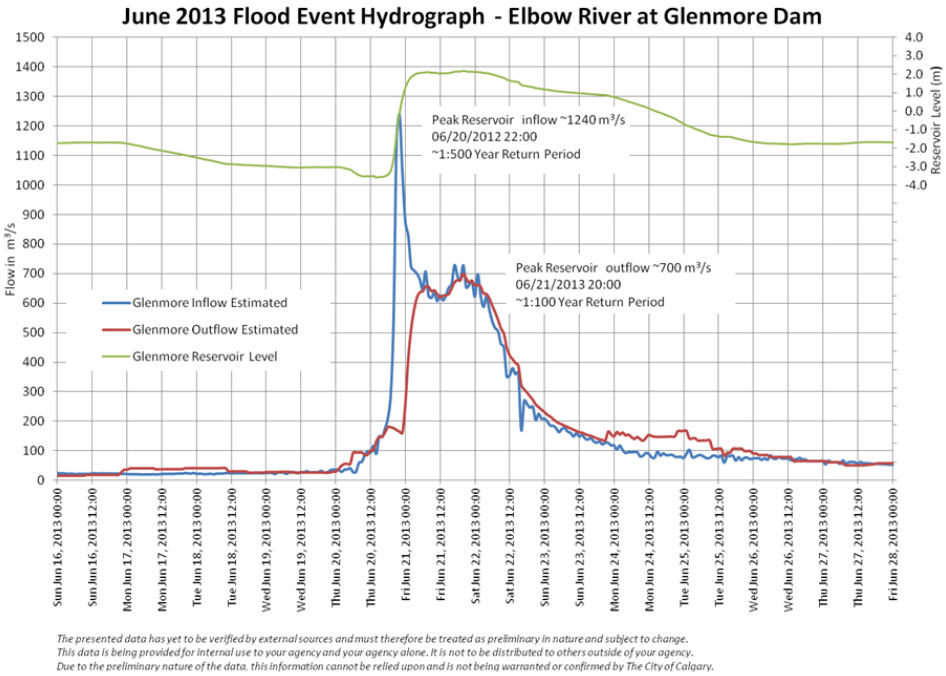
ELBOW RIVER FLOW RATES 05/13/2020

Flood readiness.

Understand.
Prepare.
Stay informed.

Elbow River flows	Impacts in Calgary
Greater than **11 m3/s**	Some pathways may be impacted.
Greater than **50 m3/s**	Unsafe boating conditions; watch for boating advisory.
Greater than **120 m3/s**	Potential basement flooding due to higher groundwater. Flooding in some streets and parks.
Greater than **150 m3/s**	Overland flooding in some communities. Evacuation may begin. View our flood maps to see which areas would be affected.

- Therefore SR! storage has been **inadequate** from any initial consideration. Its IDC shows a 160m³/s flow design into the flood full Glenmore Reservoir which flood flow was 1240m³/s inflow And 700m³/s OUTFLOW as below:



December 8 2020 IDC of ORIGINAL Decisional IDC from Stantec Vice President in 2013/14 (Reference: CEAA Registry Documents)

Springbank Off-Stream
Storage Project
Preliminary Design Report
Prepared by: Stantec Consulting Ltd Calgary, AB

… December 8, 2020.

Sign-off Sheet (True Copy)
"…….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 decision*s made or actions taken based on this document".

Original IDC Initial Design Concept should have been comprehensively researched and taken place 7 years earlier exactly as I had done with the Flood Mitigation Panel Chair Allan Markin

Does the NRCB by Approving this SR1 IDC Project agrees for all the 3rd party public that Such third party *agrees*….. *shall not be responsible*

CONCLUSIVE NRCB OPTIONAL CHOICES:

1) APPROVE a Project that does not meet Natural Resource Conservation of the sequential irregular catastrophic flood within the Elbow River Watershed when options to IR3-45 exist.
   - Risk being accountable to 3rd Party damage when the flood flow into Calgary exceeds 120m³/s
   - Risk a guaranteed continual degradation of the Elbow River fish population.
   - Risk the regular Post Flood cost excess to AEP-FM.
2) APPROVE a project which does not render an Upper & lower Watershed Natural Resource Conservation wildlife, aquatics and natural habitat co=existence with human and climate needs.
3) DISAPPROVE #1701 to relieve NRCB 3rd Party liability.
4) DISAPPROVE #1701 to prevent increased visitor occupation toiletry COVID-19 sewage flood evacuation into SR1 & Glenmore Reservoirs TSS.
5) DISAPPROVE #1701 to submit to the Preservation of Natural Resource Conservation of the source of the need to store flooding kinetic vector force flow which results in regular geomorphological deformation to the Elbow river bed and its tributaries.

Respectfully Submitted

Charles Hansen----DYMAXION URBAN ARCHITECT PLANNER
B ARCH – MAJOR THESES URBAN DESIGN INFRASTRUCTURAL PLANNING
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Drones reveal how flooding altered the Elbow River

The study began before the 2013 flood, giving researchers a unique view of how the landscape changed

•

Researchers are using drone technology to assess and study the aftermath of the Calgary floods from two years ago.

The study began in 2012 as a test for the use of drone technology to map river systems and fish habitats in the Elbow River.

After the 2013 floods, researchers were able to re-visit the area and map it once again. This allowed them to assess how significant the changes in landscape were by comparing very precise and accurate 3-D maps and models of the area from before and after the floods.

"We don't have a lot of opportunities to examine what floods do to the landscape and we don't usually have the conditions before the flood to use for reference, so this was an opportunity to have that before and after," says Chris Hugenholtz, an associate professor in the department of geography at the University of Calgary.

A 3-D shape of the river is difficult to get using traditional geographic methods of research. Aerial mapping allows researchers to take photos from all angles and combine them to reconstruct the shape of the river.

The team's research concluded that the flood completely restructured the flow in the area of the Elbow River by Redwood Meadows. They found that there were locations along the bank where up to 150 metres had been eroded. The findings were published online recently in the Earth Surface Processes and Landforms journal.

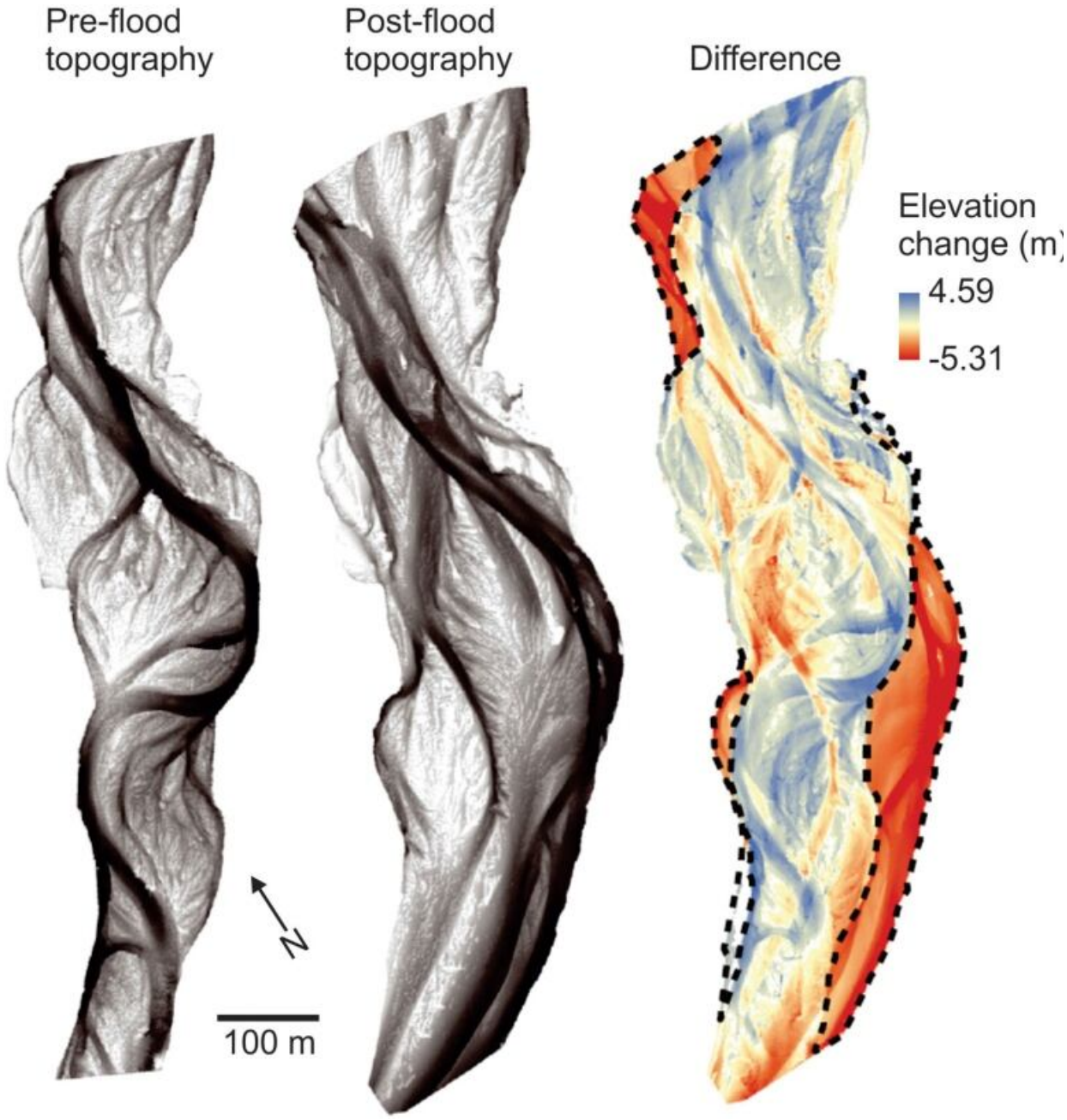
Aaron Tamminga, a PhD student at UBC who led the project and the publications related to the research, says it will take a larger flood than before to re-shape the landscape in any significant way in the future.

"The river readjusted after such a big restructuring event," he says. "Smaller events cannot rework things as easily."

Going forward, Hugenholtz says he hopes to improve this use of drone technology to support emergency and disaster management.

"We're looking to partner with different organizations in the city and province to figure out ways of implementing technology to give more operational measurements and to understand what's taking place," he says.

The study involved researchers from the University of Calgary and the University of British Columbia.


Pre-flood
topography
Post-flood
topography
Difference
Elevation
change (m)
4.59
-5.31
N
100 m

Sign-off Sheet

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APEGA Permit Number: P258

2020-12-08

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Revision	Date	Description
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0-A	December 8, 2020	Re-Issued Rev. 0 to fix electronic display errors. No new content or revisions incorporated.