
To:	Matthew Hebert Alberta Transportation	From:	John Menninger, P. Eng. Stantec
File:	110773396	Date:	December 18, 2020

Reference: Comparison of SR1 Interim Design Report (2017) and Preliminary Design Report (2020)

This memorandum summarizes the revisions incorporated into the Final Preliminary Design Report (September 25, 2020) relative to the Draft Preliminary Design Report (March 31, 2017), also referred to as the Interim Design Report. The Preliminary Design for SR1 was completed through an iterative process that incorporated multiple rounds of geotechnical data collection, input from the future operator Alberta Environment and Parks and an external review process with the Project Review Board. Evolution of a project's design, including estimated construction costs, is standard as additional data becomes available, stakeholder outreach and regulatory compliance tasks are completed, and reviews from the client and operator are incorporated.

Notable changes from the Interim Design Report to the Final Preliminary Design Report (PDR) are summarized below. Some of these changes were also identified in the Introduction to Alberta Transportation's responses to Round 2 Natural Resources Conservation Board and Alberta Environment and Parks supplemental information requests filed on June 23, 2020.

Geotechnical Exploration and Laboratory Program

- *2017 Interim Design Report:* The report included the results of the initial geotechnical exploration program that took place from March 21 to August 23, 2016 and included 135 boreholes and 20 cone penetration tests (CPTs).
- *2020 Final Preliminary Design Report:* Additional field work was performed over two mobilizations in 2018. This work included an additional 20 boreholes, CPTs and 14 test pits and trenches. This additional work was focused on the Debris Deflection Barrier, Low Level Outlet Works and Off-stream Storage Dam.

Debris Deflection Barrier

- *2017 Interim Design Report:* The design considered debris management but did not recommend construction of a structural system for preventing debris from entering the Diversion Inlet.
- *2020 Final Preliminary Design Report:* A 170-metre-long, 7-metre-tall Debris Deflection Barrier (DDB) is included in the Final PDR. The DDB structure, with concrete foundation and steel superstructure, parallels the river to promote the passage of debris downstream and through the Service Spillway. The structure will normally be in a dry condition except during flood events.
- *Reason for Change:* In response to stakeholder concerns regarding the accumulation of debris in the reservoir area and after further consideration of potential failure modes and coordination with the Project Review Board and stakeholders, the DDB was added to reduce debris accumulation in the reservoir area and the risks that large debris pose to the operation of the Diversion Inlet gates and to the bridge piers and other structures in the Diversion Channel during a flood operations event.

Reference: Comparison of SR1 Interim Design Report (2017) and Preliminary Design Report (2020)

Fish Passage Features

- *2017 Interim Design Report:* The interim design did not address fish passage, as assessment of project effects were on going.
- *2020 Final Preliminary Design Report:* The Final PDR adds a series of three rock v-weirs downstream of the Service Spillway to stabilize the existing riverbed and limit step heights for fish passage. The downstream side of the v-weirs are lined with a cobble apron as protection against erosion and undermining, and to form plunge pools that act as a refuge for migrating fish.
- *Reason for Change:* The fish passage elements were added to mitigate for potential project effects and facilitate movement of fish through the Service Spillway.

Diversion Channel

- *2017 Interim Design Report:* The interim design includes side slopes on the diversion channel at 4H:1V. Rip rap provides mitigation for scour at critical embankment segments, only.
- *2020 Final Preliminary Design Report:* The Final PDR revised side slopes to 3H:1V in soil and 2H:1V in rock. For certain sections, a 5-metre-wide bench is included at the soil/bedrock interface. Additional riprap protection was added to the channel bottom for sections excavated through soil.
- *Reason for Change:* The channel side slopes were steepened based on a revised approach to the management of groundwater during construction. The additional riprap reduces risks for erosion within the channel during planned operations.

Off-stream Storage Dam Embankment

- *2017 Interim Design Report:* The interim design Dam embankment includes a typical section with 3.5H:1.0V sides lopes with 5-metre wide horizontal benches located every 10 vertical metres. A 32-metre-wide, 6.5-metre-tall rock toe buttress was included at the upstream toe for taller segments of the dam.
- *2020 Final Preliminary Design Report:* The Final PDR revises the typical dam cross section with 3.5H:1.0V side slopes with 10-metre wide horizontal benches located every 10 vertical metres. A 6 m tall rock toe with a 10 m top width is added to improve stability where foundation soils are deepest.
- *Reason for Change:* Design adjustments to the dam cross section reflect additional soils testing performed during the second geotechnical exploration program and additional analyses performed for the time rate of construction condition.

December 18, 2020

Matthew Hebert

Page 3 of 3

Reference: Comparison of SR1 Interim Design Report (2017) and Preliminary Design Report (2020)

Low-Level Outlet Works

- *2017 Interim Design Report:* The interim design Low Level Outlet Works (LLOW) is located within the unnamed creek valley. The gate control structure is integral with the intake structure and utilizes a submerged hydraulic operator for gate operations.
- *2020 Final Preliminary Design Report:* The Final PDR revises the location of the LLOW approximately 200 m southwest of the interim design location. A separate gate structure is included with two in-line gates midway up the upstream slope. Intake channels and discharge channels were incorporated to connect the unnamed creek to the LLOW.
- *Reason for Change:* The location was revised based on additional geotechnical information to reduce potential risks to the structure from the variable foundation conditions within the unnamed creek. The additional gate structure was added at the request of the future operator (AEP) to improve maintenance and operations access.

Stantec Consulting Services Inc.



John Menninger P. Eng.
Senior Principal

Phone: 513-842-8200

john.menninger@stantec.com

c. E. Monteith, D. Brescia, M. Wood, Y. Carignan, W. Speller