Assessment of Alternatives for Mine Waste Storage for the Blackwater Gold Project

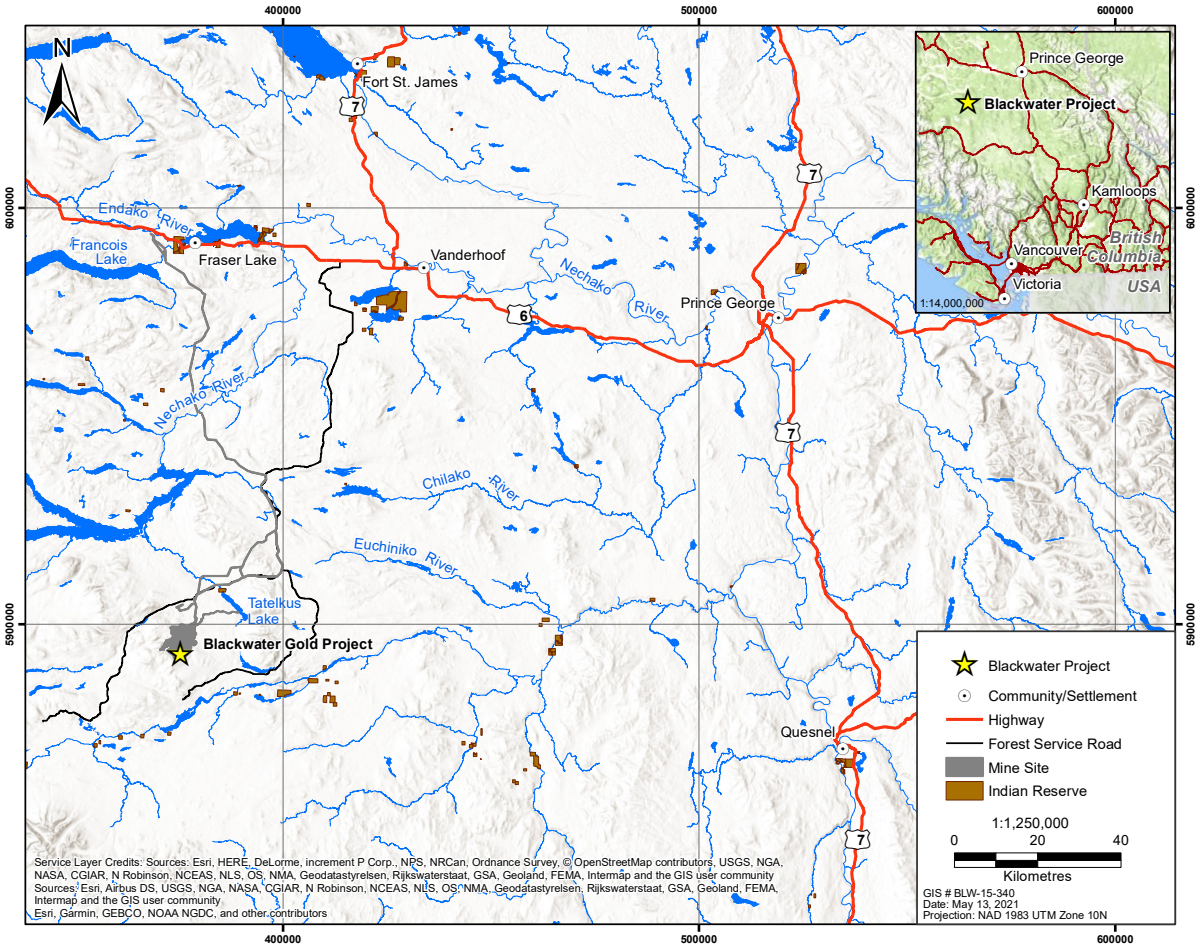
June 2021

Overview

BW Gold LTD. (BW Gold) is proposing to construct, operate, decommission and abandon the Blackwater Gold Project (the Project or Blackwater). On April 15, 2019, the Project received a positive Decision Statement pursuant to the *Canadian Environmental Assessment Act*, 2012, and later in 2019 received Environmental Assessment Certificate #M19-01 pursuant to the BC *Environmental Assessment Act* (2002). BW Gold completed a pre-feasibility study in 2020 to optimize the Project, including optimization of mine waste disposal options.

The mine site will cover an area of approximately 4,400 hectares to accommodate the mine, including the open pit, tailings storage facility (TSF), mill, stockpiles, water management structures and infrastructure. Mine waste produced over the life of mine includes 334 million tonnes (Mt) of tailings and 467 Mt of potentially acid generating (PAG) and potentially metal leaching non-acid generating (NAG) waste rock to be stored in the TSF. Overburden and NAG waste rock (estimated 140 Mt) will be used in the construction of TSF dams and haul roads, with the remaining 60 Mt stockpiled on site. Low grade ore is classified as PAG and has been characterized into two categories: lower and higher grade based on the gold equivalent. The low grade ore (111 Mt) and high grade ore (11.5 Mt) stockpiles will be co-located at one stockpile location.

The TSF, waste rock and overburden, and low grade ore stockpiles will overprint waters frequented by fish, therefore an amendment to Schedule 2 of the Metal and Diamond Mining Effluent Regulations (MDMER) is required in order to proceed. Environment and Climate Change Canada (ECCC) oversees the Schedule 2 process. Before the amendment can be recommended to the Governor in Council by the Minister of the Environment, BW Gold must prepare an assessment of alternatives for mine waste disposal, a fish habitat compensation plan, and participate in consultation of possible amendments to the MDMER. This document summarizes the alternative assessment, prepared in accordance with ECCC *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* available at: https://www.canada.ca/en/environment-climate-change/services/managing-pollution/publications/guidelines-alternatives-mine-waste-disposal.html



The Blackwater Gold Project is located approximately 112 km southwest of Vanderhoof and 160 km southwest of Prince George British Columbia (BC). The mine site is centered at latitude 53°11'22.872" N, and longitude 124°52' 0.437" W (375400 E, 5893000 N) on National Topographic System sheet 93F/02.

The alternatives assessment followed ECCC's seven-step process as described below:

Step 1: Identify Candidate Alternatives. This step identified a list of possible alternatives that are reasonable, conceivable, and realistic alternatives for the TSF, waste rock and overburden, and low grade ore stockpiles.

Step 2: Pre-Screening Assessment. At this step, the alternatives were screened to identify and eliminate alternatives with critical flaws. A critical flaw is a flaw that is so unfavourable that it alone is sufficient to eliminate an alternative from further consideration as it would result in the Project to be inoperable or unachievable.

An additional step (Step 2A) was completed to screen TSF candidates that have significant risk to the Project. In the high level risk assessment, TSF candidates were screened out from further assessment based on safety (physical stability), environmental, and technical execution hazards. The lowest risk candidate for each tailings technology (slurry, paste, and filtered tailings) and the most "physically stable" candidate were carried forward to the characterization of alternatives in Step 3.

The additional step was not completed for the waste rock and overburden, or low grade ore stockpiles where alternatives without critical flaws were carried forward to the characterization of alternatives in Step 3.

Step 3: Alternatives Characterization. This step involved characterizing each remaining alternative within four broad categories, or accounts, based on technical design and execution (technical account), potential biophysical effects (environmental account), potential effects on people (socio-economic account), and financial costs (economics account).

The ECCC Guidelines suggest that criteria related to physical stability or safety of impoundments be included within the technical account. However, due to the high emphasis on physical safety of the TSF, physical stability was assigned its own account for the assessment of TSF alternatives.

Step 4: Multiple Accounts Ledger. Based on the characterization in the previous step, relevant and differentiating sub-accounts and indicators were identified in Step 4. A multiple accounts ledger was prepared to describe the indicators.

Step 5: Value-Based Decision Process. The value-based decision process included both objective ("scoring") and subjective ("weighting") components. The weighted merit rating of each candidate alternative was calculated based on the scores and weightings and the results were compared; alternatives with a higher weighted merit rating were preferred.

Step 6: Sensitivity Analysis. A sensitivity analysis was conducted to explore the influence of the weighting regime and identify potential areas of bias and subjectivity.

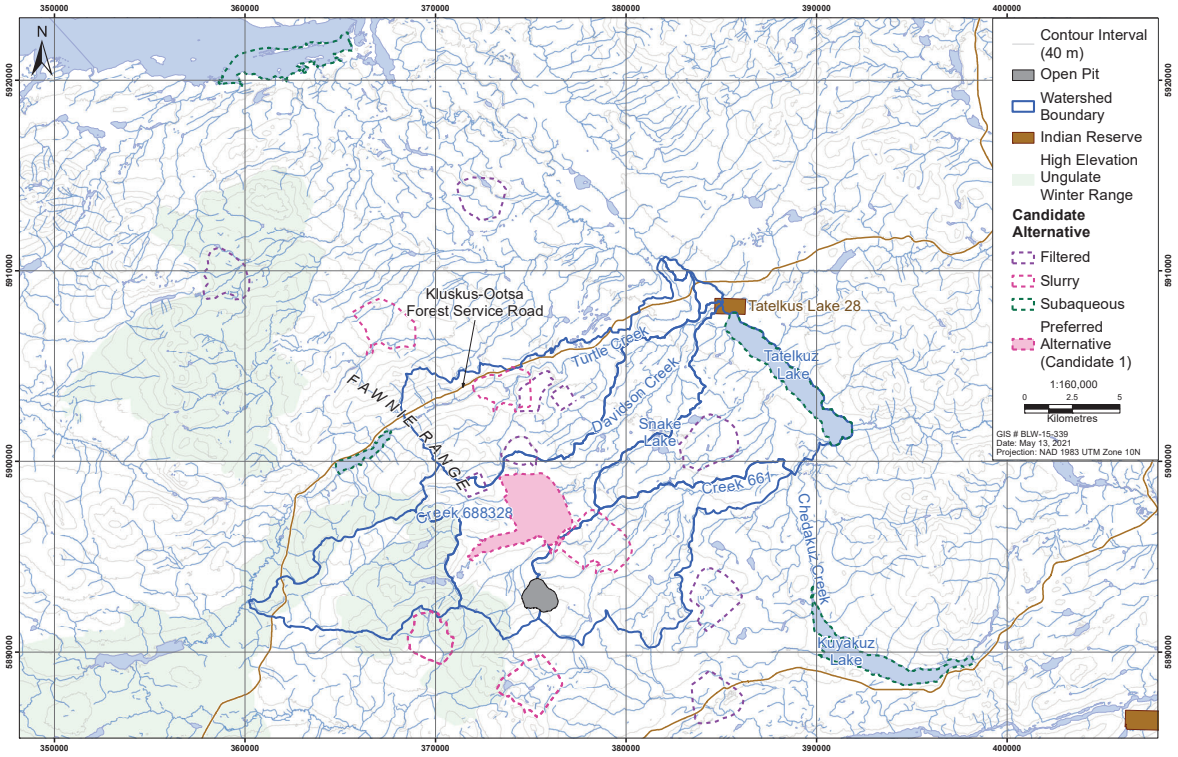
Step 7: Documentation and Reporting. The alternatives assessment process is summarized and the results are described.

Summary of Tailings Storage Facility Assessment

Twenty-three candidate alternatives were identified that met the threshold criterion of suitable terrain and storage capacity. The candidates included different locations as well as different methods for management of mine waste (slurry, paste, and filtered tailings). The pre-screening assessment eliminated 10 candidates based on fatal flaws and the remaining 13 candidates were carried through to a high level risk assessment. The risk assessment identified four candidates with the lowest risk profile for each of the distinct tailings and waste rock technologies. Those four TSF candidates were carried forward into the Multiple Accounts Analysis (MAA).

Based on the outcomes of the MAA—considering technical, physical stability, environmental, human, and economic factors—the preferred alternative TSF location/technology is Candidate 1: thickened slurry tailings with submerged PAG and potentially metal leaching NAG waste rock (indicated in the figure below). Technical advantages of Candidate 1 include best management of seepage through development of a long tailings beach, and limited geochemical risks (i.e., metal leaching/acid rock drainage is minimized) associated with saturation of waste rock by submergence under water within the TSF. Candidate 1 also scored highest in the environment and socio-economic accounts because less dust would be generated (with a slurry deposition) and limited seepage with water storage kept away from the dam by a large beach. The sensitivity analyses indicated that the overall rankings are relatively insensitive to other value systems because Candidate 1 scores highest in all other sensitivity runs, with the exception of when only the physical stability account is considered. Candidate 22 scored highest with respect to physical stability because it met many of the best available technology principles (e.g., water not stored within the active waste storage facility and dry, compacted tailings promote strength). However, it did not score high in the other accounts because of the technical challenges of operating a filtered TSF at the Project throughput and the geochemical risks associated with unsaturated storage of PAG waste rock.

Preferred Location for the Tailings Storage Facility (Candidate 1)



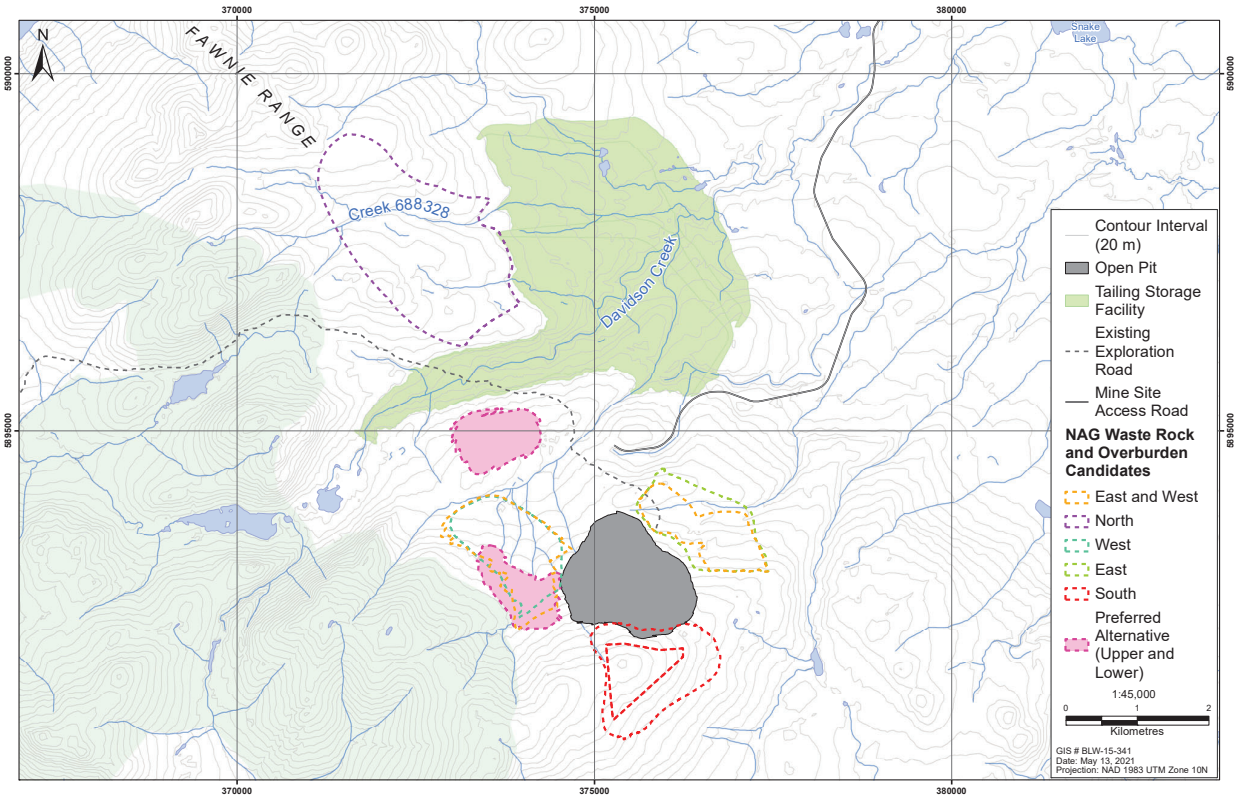
Summary of Non-Acid Generating Waste Rock and Overburden Stockpile Assessment

A screening threshold distance of 10 km from the open pit was applied to identify six NAG waste rock and overburden stockpile candidates. Two candidate alternatives passed the pre-screening step and were brought forward for characterization and assessment in the MAA (separate from the tailings assessment). The results of the NAG waste rock and overburden MAA indicated that Candidate 1 (upper and lower) is the most appropriate candidate, with the highest rating (indicated in the figure below). Although Candidate 1 has a slightly larger footprint when compared to Candidate 2 (west), the dual stockpile design has the ability to split the waste into two streams and reduces overall waste haulage distances. In addition, the two stockpiles provide more flexibility for a phased approach/ramping up the mine throughput by providing more space for the low grade ore stockpile. This important aspect in terms of flexibility will support the project economics associated with a phased mining development. For both sensitivity analyses, Candidate 1 remained the preferred alternative and Candidate 2 scored lower as a result of technical challenges and complexities and greater potential impacts to air quality, surface water, terrestrial ecosystems, and fish and aquatic habitat.

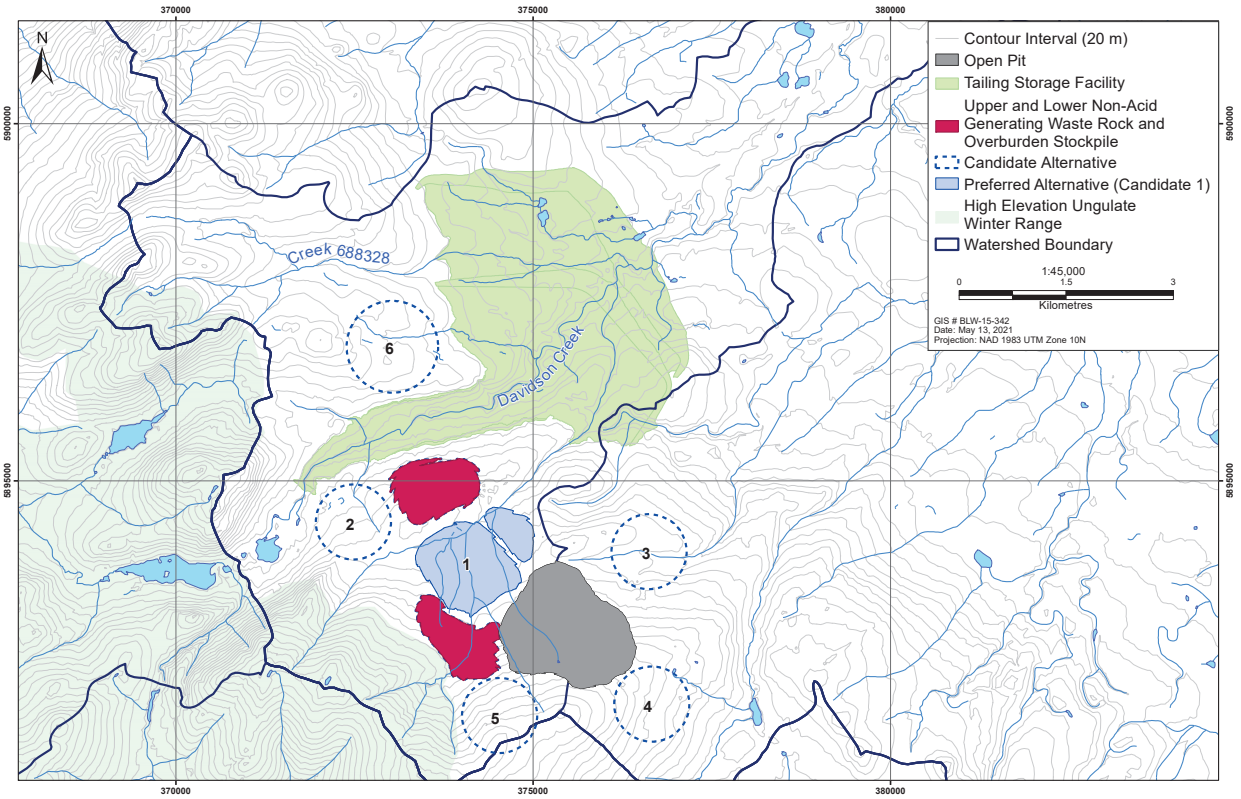
Summary of Low Grade Ore Stockpile Assessment

Based on the cost of hauling ore to stockpiles, a screening threshold distance of 5 km from the open pit was applied to identify six low grade ore stockpile alternatives. Candidate locations were also based on the prior selection of the TSF location and the NAG waste rock and overburden stockpiles' location, such that the preferred locations for either was not available for the storage of low grade ore. Following the pre-screening assessment, two low grade ore candidate alternatives were deemed acceptable for further characterization. Both candidate alternatives were located in the same general area (which would already be disturbed by the mine site) and utilize the same technology for their construction, operation, closure, and post-closure; therefore, a full characterization of the alternatives' environmental, technical, and socio-economic considerations was not deemed necessary. Following a qualitative comparison of the two candidates, Candidate 1 (north of the open pit) was preferred over Candidate 2 for all characteristics considered (with the exception of impact to fish habitat). Candidate 1 (low grade ore stockpile immediately north of the open pit) is the preferred location for the Project because it has better technical considerations (gentler slopes and ease of water treatment), meets design criteria, and is less costly than Candidate 2.

Preferred Location for the Non-Acid Generating Waste Rock and Overburden Stockpiles (Upper and Lower)



Preferred Location for the Low Grade Ore Stockpiles (Candidate 1)



Summary of Engagement with Government, Indigenous Nations, and the Public

Federal, provincial and local governments, Lhoosk'uz Dené Nation (LDN), Ulkatcho First Nation (UFN), Nadleh Whut'en First Nation (NWFN), Stellat'en First Nation (StFN), Saik'uz First Nation (SFN), Nazko First Nation, Skin Tyee Nation, Tsilhqot'in National Government, Nee-Tahi-Buhn and Métis Nation (collectively referred to as Indigenous groups), and the public were consulted on the alternatives assessment during the federal and provincial environmental impact assessment processes.

The approach to the alternatives assessment has been a collaborative process by seeking input from Indigenous groups and regulators on the overall methods and decisions throughout the MAA. The LDN, UFN, NWFN, SFN, and StFN had an opportunity to comment on the alternatives assessment during Environmental Assessment Office (EAO) meetings with the Project Working Group and the proponent. Key 2015 meeting dates were June 18 (UFN), July 8 (NWFN), July 20 (SFN, NWFN, StFN), August 13, October 8 and 13 (Working Group), and October 19 and 21 (LDN). Key 2016 meeting dates were February 12 (LDN, UFN), June 7 and 8 (Working Group). At these meetings, feedback was sought on initial alternatives assessment candidates, risk critical flaw criteria, MAA decision points, and sensitivity analyses.

The public had an opportunity to comment on the 2015 Environmental Impact Statement (EIS), which included the alternatives assessment report, during the BC Environmental Assessment Office public comment period held from January 20 to February 19, 2016. Government agencies and Indigenous groups also had opportunities to comment on the alternatives assessment during the EIS review.

Since acquiring the Project in August 2020, BW Gold has continued to engage with LDN, UFN, NWFN, SFN, and StFN on a regular basis to provide updates on the Project, including 2020 pre-feasibility study and federal and provincial permitting applications.

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