Barrick Gold Inc.
TD Canada Trust Tower
Suite 3700, 161 Bay Street
PO Box 212
Toronto, Ontario
M5J 2S1

May 21, 2018

Mr. Ian Parsons
Regional Coordinator - Water Resources Division
Indigenous and Northern Affairs Canada
Bldg 918, P. O. Box 100
Iqaluit, Nunavut
X0A 0H0

Via email to: ian.parsons@canada.ca

Subject: **Cullaton Lake Water License 1BR-CUL1118 – Closure and Reclamation Plan Response to INAC / Arcadis Presentation**

Dear Ian:

Please find attached a letter response from our Closure and Reclamation Plan consultant addressing the various items outlined in your April 27th, 2018 presentation.

Sincerely,

Paul J. Brugger, P. Eng. | Closed Properties Manager – Eastern Canada Sites
Phone: (705) 632-1871
Mobile: (807) 631-4895
Email: pbrugger@barrick.com

Cc Stephanie Autut, Executive Director, Nunavut Water Board
Allison Brown, Canadian Closed Sites Manager
Michael McCarthy, Senior Counsel

Attachment: As stated

PALMER
ENVIRONMENTAL
CONSULTING
GROUP INC.

470-630 Granville Street, Vancouver, BC, V6C 1V5
tel: 604-629-9075; www.pecg.ca

May 18, 2018

Paul Brugger
Cullaton Lake Property Manager
Barrick Gold Corporation
1084 County Rd 8
Campbellford, Ontario
K0L 1L0

Dear Mr. Brugger:

Re: Responses to INAC Review Comments on the 2017 Closure and Reclamation Plan

On June 30th, 2017, Palmer Environmental Consulting Group (PECG) prepared an updated draft Closure and Reclamation Plan (CRP) (PECG, 2017a) for the Cullaton Lake mine site property in Nunavut for Barrick Gold Corporation (Barrick), which was provided to Indigenous and Northern Affairs Canada (INAC). The CRP was reviewed by INAC and its consultant, Arcadis and a conference call was held on April 27, 2018 between INAC, Arcadis, Barrick and PECG. Review of the CRP by Arcadis resulted in 4 main topics/recommendations and a list of minor additional comments. These comments are addressed in this letter.

Topic 1: Final Abandonment and Restoration Plan

1. *A Restoration and Abandonment (A&R) Plan for the Cullaton Lake Mine was developed in 1991 by Trow Consulting Engineers on behalf of Corona Corporation (Trow, 1991). It was then revised by Homestake Canada Inc. and accepted in 1996, referred to herein as the Final A&R Plan (Homestake 1996).*
2. *Progressive reclamation of the site commenced in 1991 and Barrick reports that remediation was completed by 2002.*
3. *In 2005, after reviewing historic water quality objectives and closure activities, Barrick concluded that it had completed the decommissioning activities and objectives described in the Final A&R Plan.*
4. *Subsequent independent reviews (e.g., BGC 2011; Lorax 2009) determined that some aspects of the actual remediation did not fully conform with the Final A&R Plan. For example, the thickness of the tailings cover is reportedly less than prescribed in the design documents. Deposits of residual ARD waste rock were also left unmitigated.*

Depending on the situation, discrepancies between the approved plan and the final status of the site could, in theory, result in unacceptable environmental impacts

INAC Recommendation 1:

Barrick should prepare a summary demonstrating that all material aspects of the Final A&R Plan were implemented. The rationale for any discrepancies should be presented with evidence that the overall objectives of the A&R Plan have still been achieved.

Barrick Response

Following acquisition of the site in 2003, Barrick determined that closure activities carried out by the predecessor had been completed according to the 1996 A&R plan with the exception of the following items:

1. The design thickness for the cover placed on the dry portion of the tailings was 1.4m, with the intent of drawing the measured permafrost active layer fully into the cover, thereby permanently maintaining the underlying tailings in a frozen state. In practice, this cover thickness was not achieved and Barrick understands from discussion with the predecessor that there was insufficient local borrow material to accomplish the design thickness, even with taking material from the Tailings Pond 2 dam to make up volume for use as cover material.
2. The cover on the landfill portion of the quarry pit was to be a minimum of 1 m thick and heaped to allow for settlement. The existing cover is flat and fill settlement has caused a number of subsidence areas and exposed scrap metal to appear. Where practical, holes will be filled with available fill materials hauled using the quad and trailer from the airstrip.
3. The presence of ARD generating waste rock at Shear Lake was first identified in 2000. No records exist indicating the previous owner knew about it (only 3 samples had been tested, according to MEMI (in BGC 2007)). In 2003, URS reported on the results from 11 rock samples collected from the far side of the road, away from Shear Lake. This low grade ore/waste rock was subsequently interred in to the newly constructed Encapsulated Waste Rock Facility (EWR), in 2005. The sulphide content of that material ranged from <0.02% to a maximum of 1.17% sulphide-sulphur; with 5 samples having significant sulphide content of 0.36% S or more and the other 6 samples containing 0.08% S or less. This consolidation and encapsulation remediation work removed enough of the loading from the Shear Lake site that it subsequently became possible to identify another, much smaller, area of acid generation located upstream of the road, nearer to Shear Creek. This residual material was reported by Gartner Lee in 2008 to contain less than 0.11% Sulphide-Sulphur and was ascertained by Lorax (AECOM 2009) to have limited long term acid generation potential. Most of this material is located between the creek and a bedrock knoll adjacent to the lake. The bedrock directs the flow of contact water towards the creek, rather than the lake, with most of the contact water entering the creek just upstream of the road (and monitoring station SW9). According to Lorax, the seepage chemistry measured in the field and in laboratory extractions appears to represent both the current condition as well as the future condition. The lack of remaining acid generating sulphide in the waste rock indicates that the measured seepage chemistry is not likely to deteriorate further. Apart from low pH levels measured in the leachate extracts, all metal concentrations measured from waste rock seepage are below their respective MMER limits. Monitoring in Shear Creek shows only slight exceedances of CCME Water Quality guidelines within a short reach of Shear Creek immediately downstream of SW9.

Barrick reviewed and assessed the rationale for the above discrepancies in the context of further remediation. Based on site reconnaissance, Barrick confirmed that the additional fill material necessary to bring the closure measures for Items 1 and 2 to design specifications provided for in the 1996 A&R plan was not available in the immediate area. Distant (>5km) sources were contemplated but there is no longer sufficient waste rock available at the site to construct additional access roads and Barrick considers that the disturbance caused by constructing additional access roads to find and open distant borrow pits is not warranted given the good water quality observed at the site.

Consideration had also been given to collecting the waste rock in the Shear Lake portal area and encapsulating it in a similar manner to the low grade material in the EWR. However, although subsequent run-off water confirms low pH water is present, it is localized, is not leaching significant metals and appears to have a minimal effect on the overall drainage leaving the Shear Lake area. For this reason and the fact that in order to implement the design specifications of the A&R plan additional fill material would also have to be sourced from locations that are not proximate to the site, Barrick considers additional remedial measures are not warranted. Despite these discrepancies, the overall objectives of the A&R plan have still been achieved.

Topic 2: BGC Mine Closure Review

1. *In 2011, BGC Engineering Inc. conducted a "Site Inspection and Mine Closure Review" of the former Cullaton Lake Gold Mine. The assignment was a follow-up to prior reviews conducted by BGC on behalf of INAC to determine if Barrick had met its obligations for closure and restoration of the mine site, as required under the Final A&R Plan (Homestake 1996).*
2. *BGC determined that the site had not yet achieved a condition of physical and chemical stability sufficient to reduce the residual risk liability of the site to a level that would be acceptable for relinquishment of the property back to the Crown. While multiple deficiencies were identified, the tailings impoundment area emerged as the key area of concern. BGC's report included multiple recommendations to address these deficiencies.*

Since 2011, Barrick has taken multiple actions to address known information gaps, some of which are directly related to BGC's recommendations. Despite this progress, it is unclear if all of BGC's concerns have been addressed.

INAC Recommendation 2:

Barrick should explicitly demonstrate that the multiple concerns identified by BGC have been addressed. In the event Barrick has not addressed a particular recommendation from BGC, a detailed rationale for not acting on the recommendation should be provided. This information should be presented in a consolidated summary.

Barrick Response

A response was provided by Barrick to AANDC in a letter dated June 11th, 2015 that largely addresses the concerns identified by BGC (2007). Schedule "A" contains an updated version of that response, with an additional column to address any updates to the original June 11th, 2015 responses.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

Topic 3: Thurber Dam Safety Review

1. *BGC (2011) concluded that, in order to maintain the water cover on the tailings, Dam 1 will have to be indefinitely maintained as a water/tailings retention structure. It was therefore recommended that a comprehensive dam safety review (DSR) be performed in accordance with current Canadian Dam Association (CDA) Dam Safety Guidelines.*
2. *Barrick commissioned Thurber Engineering Ltd. to perform the DSR which was finalized in 2016. In general, Thurber concluded that closure efforts to date have largely been successful in restoring the land to near natural conditions.*
3. *With the exception of potential modifications to conform with CDA wind setup and wave runup requirements, no improvements to the dam safety management were considered necessary in the short term.*
4. *However, in the long term, Thurber recommended that consideration be given to decommissioning Dam 1 (i.e., eliminating its ability to store water). While this recommendation was supported by a number of compelling arguments, Barrick has not acted on the recommendation. Specifically, the decommissioning of Dam 1 has not been included in the current version of Barrick's Closure and Reclamation Plan (draft CRP) (Palmer 2017). Barrick's decision to not act on Thurber's recommendation warrants a detailed explanation but none has been provided to date.*

INAC Recommendation 3:

A detailed description should be provided to explain why Thurber's recommendation to decommission Dam 1 has not been accepted by Barrick. The description should include a summary of the pros/cons of decommissioning the dam as well as a high-level life cycle analysis of monitoring and maintenance costs for a hundred-year time frame.

Barrick Response

Barrick considered the recommendation by Thurber for the decommissioning of Dam 1 and has included a long-term option for progressive decommissioning of Dam 1 in the draft CRP (PECG, 2017a). Section 5.3.9.2 of PECG (2017a) presents the concept of progressive decommissioning of the structure. While the tailings have been categorized as potentially acid generating, the sulphide content of the tailings is low. While oxidation is underway, the time to depletion of reactive sulphides in oxidizing material may be relatively short (e.g., a few decades). A long-term plan for controlling the potential for ARD and elimination for the need for a water cover (and thus a tailings dam) would be the progressive lowering of the pond water level and allowing small incremental amounts of tailings to become exposed to the atmosphere which would initiate oxidation of the sulphides. Once the top layer has been relatively depleted of its sulphide content, the water level would be lowered another incremental elevation until eventually, the tailings pond would be drained down to a level that no longer requires Tailings Dam #1. To reduce the pond level, the invert of the outlet spillway would be lowered by a specific amount (e.g., 0.1 m to 0.2 m) and the resulting water quality in the tailings pond and receiving watercourses would continue to be monitored as part of the scheduled monitoring activities. The magnitude of incremental drawdown is within the range of interannual variability in active layer penetration, and so would not create an unusual incremental degree of oxidation.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

Topic 4: Perpetual Care and Relinquishment

1. *BGC (2011) states that if the tailings water cover is to be maintained, this will require perpetual care, maintenance, inspection and monitoring.*
2. *Thurber (2016) states: "No dam is completely weatherproof. The longer the dam needs to be maintained, the greater the exposure to the effects of weathering. Freeze-thaw cycles will continue to act on the dyke and have potential to cause long term deterioration both externally (weathering) and internally (piping). The life of the spillway may also not be indefinite without some maintenance in the long term."*
3. *As indicated in the draft CRP (Palmer 2017) Barrick will not be seeking to relinquish any of the tenures comprising the Cullaton Lake property in the short term, and intends to continue holding and monitoring the Cullaton Lake property until an appropriate time for relinquishment.*
4. *S. 7 and Appendix F of the draft CRP (Palmer 2017) provide an estimate of anticipated post-closure costs for a 30-year period (i.e., from 2017 to 2047). That estimate includes approximately $200k of line items that are potentially relevant to the maintenance of the dam structure (including a "one-time contingency allowance" and repair of spillway rip rap every 20 years). However, the cost estimate does not present the basis of the estimate.*

INAC Recommendation 4:

Barrick should specify the timeframe within which it anticipates relinquishing the Cullaton Lake Mine. Taking into consideration the requirement for indefinite monitoring, care and maintenance associated with a water cover (per BGC and Thurber), Barrick should indicate the costs of such activities over a 100-year time frame. The estimate should include: a) a "basis of estimate" with a detailed description of the activities and requirements associated with each assumed maintenance event (mob/de-mob, camp, crew size, duration, direct costs, etc.); and b) a contingency for the potential future decommissioning of Dam 1 and subsequent management of the tailings that are currently below water cover.

Barrick Response

Barrick plans to manage the Cullaton Lake Mine in the long-term. The cost estimate provided in Table 7-1 of the draft CRP (PECG, 2017a) has been expanded to include a projection over 100 years, and is attached as Schedule "B". A summary is provided below, in Table 1.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

TABLE 1. SUMMARY OF CLOSURE COST ESTIMATE OVER A 100-YEAR TIMEFRAME

Monitoring and Maintenance Activity	Cost over 10 years	Cost over 100 years*
Charter Flight from Thompson capable of transporting one quad and 2 or 3 people	$54,000	$202,500
Geotechnical Monitoring (every second year)	$34,000	$127,500
Water Quality (every second year – with geotechnical)	$71,500	$268,125
Sediment/Benthic Invertebrates (every fourth year – with WQ)	$26,500	$99,375
Dam Safety Review (every 10 years)	$44,000	$165,000
Scheduled maintenance (every 10 years - Airstrip, signage, survival shack, local access trail)	$20,000	$75,000
Scheduled maintenance (every 20 years) – spillway/rip-rap	$50,000	$187,500
Contingency allowance for unscheduled maintenance	$100,000	$375,000
Grand Total	**$400,000**	**$1,516,000**

** In 2018 $, after Year 10, costs are discounted at 3%.*

a) Basis of Estimate

- Frequency of the scheduled tasks is presented in Table 1.
- Maintenance to the airstrip would require a second flight to site plus rental of a quad with a blade and 3 labourers for 12 hours.
- Brushing and maintenance of the local access trail, repairs to the shack, or replacement of signage at the site would require 2 labourers for 10 hours and would occur at the same time as the water quality sampling and geotechnical monitoring. An extra flight would not be necessary.
- Riprap repairs on the TP1 spillway would require two additional flights to site plus rental of a quad with a trailer. Costs were estimated under the assumption that the flights would bring labourers and equipment to site. The work would involve amending the existing riprap layer in locations where stones have shifted. Additional stones may be placed around the edges of the armour layer. Riprap stones can be readily sourced onsite. There is presently a stockpile of stones at the airstrip. The quad and trailer would be used to bring the riprap stones from the airstrip to TP1.
- The shoreline of the tailings pond may need stabilizing infrequently, possibly following an extreme flood or wind event. An allowance is included for such activities, coincident with other scheduled site monitoring work and was included in the same cost estimate for the scheduled maintenance every 20 years. Stabilization of the dam face and tailings beach could be accomplished using bioengineering (e.g., willow staking) to establish some vegetation to armour the beach from wind wave action. Willow (or another suitable species) stakes would be prepared beforehand and brought to site. The work would be completed by a 2 to 3 person crew, using hand tools and an ATV with trailer to bring the materials from the airstrip to TP1.
- The cost estimate over 100 years is presented in terms of present value, assuming a 3% discount rate, applied after Year 10.
- The contingency allowance is taken as an additional ~30% on top of the anticipated expenses. A contingency rate at this level is higher than the range typically selected for a cost estimate at the Feasibility level of cost estimation. Given the work described in the monitoring and maintenance portion of the CRP has all been conducted recently by Barrick, the known costs are well defined

and there is a high level of confidence in the estimate. A lower contingency rate in the range of 10% to 20% would, in fact, be appropriate (RPM 2015).

b) Potential Future Decommissioning of Dam 1

Progressive reduction in the spillway invert elevation can be accomplished during the regular maintenance site visit (every 20 years). The spillway modifications would involve a very small amount of earthwork and would be done using hand tools. The work would involve removal of about 0.1 m of riprap, and excavation of the spillway using hand tools to reduce the invert elevation. The ongoing tailings pond water quality sampling (every second year) would be used to evaluate the effect of the progressive water level lowering on pond water quality.

As mentioned above, as part of the maintenance of the dam, planting of willow stakes (or other suitable species) is going to serve to reclaim the dam shell and enhance the natural revegetation of the dam, and tailings surfaces exposed near the water's edge. Given the time frame for future relinquishment is potentially on the order of decades, there will be plenty of time for vegetation to take hold.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

Additional Topics

These additional topics were identified during the April 27th, 2018 conference call. Responses are provided below in Table 2.

TABLE 2. INAC ADDITIONAL TOPICS AND BARRICK RESPONSES

Topic	Issue	Recommendation	Barrick Response
Waste Rock Seepage Mitigation	*S.1 of the draft CRP indicates that passive treatment will be used to treat waste rock seepage. Subsequently, in S.5.2.4 of the same document, Barrick states that passive treatment has been ruled out as an option. The position is subsequently reversed again in S.5.2.9.*	*Clarify whether passive treatment will be used to treat waste rock seepage.*	Section 5.2.4 refers to options that URS Norecol, Dames and Moore Inc. considered in arriving at the final decision to encapsulate the waste rock at Shear Lake. Section 5.2.9 of the draft CRP (PECG, 2017a) refers to a contingency for treatment of ARD. Passive treatment was not selected as the closure option. It is a possible alternative if monitoring indicates a need for it.
Underground Inspections	*S.1. of the draft CRP states that "…annual underground inspections following the mine closure and the reclamation works have shown that the sites have remained geotechnically stable".*	*Confirm whether underground inspections are part of the post-reclamation monitoring regime.*	Underground inspections are not part of the post reclamation monitoring regime. The information meant to be conveyed was that underground inspections took place following the cessation of operations in 1985. These continued until closure activities were initiated in 1991. Most of the underground inspections were completed by Peter White, a mining engineer with Royex, the owner at the time. Mr. White provided a formal statement on the geotechnical stability of the underground workings and the thickness of the permafrost in August 2007.
Post-closure Monitoring Frequency and Duration	*S.7 of the draft CRP indicates that monitoring would occur once every two years for a duration of 80 years, after which the frequency would be reduced to every 5 years.*	*The statement implies Barrick supports the need for a monitoring duration that extends beyond the period included in the draft CRP post-closure cost estimate (i.e., 10 or 30 years). Please confirm.*	Barrick proposed a 10-year time frame for the bond estimate to coincide with the duration of the Water Licence. The amount of bonding would be revisited with each licence renewal. Barrick has provided an estimate based on a 100-year closure time-frame in this response (see Schedule "B").
Mine Inspector Records	*S.5.1.2.2 of the draft CRP states that the drawings detailing mine closure and*	*Barrick to indicate why this documentation is not available and whether the*	NWT Mine Inspector records were searched in 2006 by the Inspector and Barrick was subsequently advised that no plans officially marked as closing plans exist. Plans that were

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

Topic	Issue	Recommendation	Barrick Response
	reclamation work for the underground workings at the B-Zone *and Shear Lake Zone, as required by the NWT Mine Health and Safety Regulations, are not available.*	*NWT Mine Inspector records in Yellowknife have been reviewed to identify all pertinent documentation of the site's operational and closure history.*	signed and dated August 1985 were found and submitted to INAC by letter dated January 16th, 2007. A response email from D. Abernethy dated January 22nd, 2007 acknowledged the issue has been addressed.
Climate Change	*Some aspects of the original A&R Plan were contingent on assumptions that are linked to climate. For example, Tailings Area #1 was covered, in part, to raise the level of permafrost in the tailings. The draft CRP does not present information describing how climate change might affect the post-closure environmental performance of the site.*	*Barrick to identify and characterize potential adverse impacts of climate change on the long-term performance of the closure strategy.*	Climate change models generally predict increases to average annual air temperature in Canada's far north over the 21st century (NRCan, 2014). With higher temperatures, there is potential for the depth of the active layer (i.e., the layer of soil on the surface that thaws during the warm months) to increase. This would result in a thicker layer of thawed tailings at the end of the warm season. Using the NRCan climate change models as a reference, the portal plugs and the EWR pile would be unaffected by climate change over that timeframe. Tailings saturation controls sulphide oxidation within tailings beach above the existing permafrost layer and would continue if the permafrost layer were to degrade. A water cover over the tailings would need to be maintained in TP1 to control the potential for sulphide oxidation. The climate change models (Chassé et al, 2013) indicate net precipitation will increase in the north with warmer temperatures, and thus the water needed to ensure saturation will continue to be available. Therefore, it is not anticipated that adverse impacts would result from climate change on the long-term performance of the closure strategy.
Ground Temperature Monitoring	*In S.5.3.8 of the draft CRP Barrick indicates they will re-install four thermistors in the tailings. However, the draft CRP also states that the thermistors will not be replaced when they eventually fail. This decision was made*	*The decision to not re-install any thermistors that fail in the future should be deferred until at least five years of additional ground*	Barrick agrees with this approach and will make the determination after consulting with NWB / INAC and following a performance assessment after sufficient data has been gathered during the term of the next water license renewal.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

Topic	Issue	Recommendation	Barrick Response
	without evaluating the data that will be acquired by the new thermistors.	*temperature monitoring data are available.*	
Kognak River Monitoring Stations	*The proposed long-term monitoring program does not include sampling stations that are immediately downstream of the B-Zone drainage pathway within the Kognak River. As a result, no monitoring data will be available to validate that the B-Zone discharge is not resulting in unacceptable impacts to the Kognak River.*	*Barrick to add a full aquatic monitoring station immediately downstream of the B-Zone discharge to the Kognak River.*	The B-Zone discharges into the same drainage channel that drains Tailings Pond #2. As part of the Adaptive Monitoring Plan for long-term monitoring, this drainage channel will be sampled as site SW33. It will be a full aquatic monitoring station with water quality, sediment quality and benthic invertebrate sampling. See Table 6-2 in the CRP (PECG 2017a).
Shear Lake Benthic Sampling	*Based on Figure 3-3 of the draft CRP, benthic sampling within Shear Lake has not been included in the long-term monitoring program. This appears to be an oversight given the potential for interactions between the mine wastes (e.g., waste rock) and the lake which is habitat to valued species such as grayling.*	*Barrick to include benthic sampling from Shear Lake in the long-term monitoring program.*	While there is a very small deactivated diversion berm constructed of Shear Zone orthoquartzite waste rock located at the northern end of the Shear Lake, almost all the Shear Zone mine loadings go directly into Shear Creek, downstream of the lake. Water quality sampling in Shear Lake shows that there are no significantly elevated metal levels in Shear Lake, nor has the water chemistry changed significantly since 2000 (Lorax, 2009; PECG 2017a, b). AECOM's 2008 ecological risk assessment concluded that sediment quality in Shear Lake was generally good and that metal concentrations were below the upper CCME or similar Ontario MOE sediment quality guidelines (AECOM, 2009). Fish sampling by AECOM (2009) also suggests the fish captured in Shear Lake were healthy and not impacted by ambient water quality. Metal levels in the fish tissue was well within the human consumption guideline for mercury and other metals were comparable to fish from other undisturbed northern lakes. As we do not believe that Shear Lake is a receiving environment that is at risk from mine impacts, we do not agree with the recommendation to sample benthic invertebrates in Shear Lake.
Habitat Characterization	*S.3.4.3 of the draft CRP indicates that no work has been done to characterize fish habitat immediately downstream of the tailings ponds.*	*Barrick to present the rationale for not performing fish habitat assessments*	A habitat characterization was recommended by PECG and has been planned since mid-2017 as a follow up to 2016 studies (PECG 2017b). It is currently being scheduled to fit in

Topic	Issue	Recommendation	Barrick Response
	This appears to be an oversight given the nature of the discharge from the facility.	*downstream of the tailing ponds.*	with other site activities planned for 2018. The report for this characterization will be added to the closure documents.
Timing of Annual Monitoring	*The draft CRP indicates that sampling will be carried out as late in the open water season as practical (e.g., early September). It is likely that contaminant loadings will peak earlier in the season (e.g., in the period following freshet). As a result, monitoring may under-estimate potential impacts to surface water receivers. In contrast, under the current water license, the Surveillance Network Program (SNP) requirements include water sampling during the peak flow periods at stations 940-23 (quarry pit) and 940-24 (area of seepage from the quarry pit to tailings pond #1). The requirement for sampling during "peak flow" (i.e., freshet) does not align with Barrick's plan to sample late in the season.*	*Barrick to present the rationale for performing water quality monitoring late in the open water season.*	The timing of the monitoring was moved to early September in 2015 at the request of INAC (BGC recommendation) in order to time the monitoring with the anticipated lowest level of the permafrost active layer. Water quality monitoring data, as reviewed in PECG 2017a also confirms that data from late August/early September shows the highest concentrations, whereas freshet sampling results tend to exhibit highly diluted concentrations. Quarry Pit 940-23 does not flow – it represents the quality of water cover over the north part of the machineries landfill. In addition, water has never been observed to flow from the pit to tailings pond No 1. The water level in the pit is lower than tailings pond #1.
Engagement	*The draft CRP states that it is based on Guidelines for Closure and Reclamation of Advanced Exploration and Mines (MVLWB/AANDC, 2013). That document clearly indicates that proponents are to undertake engagement when developing CRPs and monitoring plans. S.2.4 of the Cullaton Lake draft CRP indicates there was no formal engagement on the original A&R Plan, nor the recently submitted draft CRP. Barrick has, however, stated it is willing to participate in engagement activities if requested by the Nunavut Water Board (NWB).*	*Barrick should proactively engage with relevant stakeholders on the Cullaton Lake draft CRP (i.e., without being directed by NWB). The level of effort associated with the engagement activities should be commensurate with the unique status of the site (i.e., a closed site requiring long-term monitoring, care and maintenance)*	Barrick understands that the license renewal process includes a component for public comment and that it would rely on responses within this review to identify any engagement requirements. In other jurisdictions the regulator identifies the communities that the proponent should engage with, in order to avoid complications with overlapping asserted rights and Barrick would prefer this approach.

Topic	Issue	Recommendation	Barrick Response
Indigenous Involvement	*Best practices in northern mine decommissioning and long-term monitoring typically include provisions for active involvement by indigenous peoples. Depending on the circumstance, this often includes employment, training and contracting opportunities. The draft CRP does not describe how Barrick intends to involve indigenous peoples in the long-term care of the Cullaton site.*	*Taking into consideration future requirements for work at the site, Barrick to indicate if and how it will encourage indigenous involvement in the long-term care of the Cullaton Lake site.*	While Barrick supports the involvement of local indigenous people, site access logistics and the limited activities performed are considered to be not conducive or economically attractive to local indigenous involvement i.e. the current and proposed program is typically a 1-day event per year serviced from Thompson, Manitoba by the sole fixed wing charter company that will fly to the site. Site access from Arviat is difficult to establish without a commitment to an extended program that would justify re-positioning aircraft to that community from a southern location. Should the need arise for an extended program, Barrick will make the arrangements for operating out of Arviat and actively seek out local resources that include an indigenous component.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

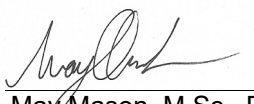
Closing Remarks

Please pass on our thanks to Arcadis and INAC for their detailed review of the CRP. We trust that the responses provided herein serve to alleviate any outstanding concerns the reviewers have. We look forward to discussing these with Barrick, Arcadis and INAC further later this month and subsequently updating and finalizing the draft CRP. We would anticipate revisiting the monitoring and maintenance schedule every second time the Water Licence is renewed (i.e., every 20 years), as a minimum.

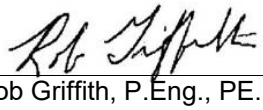
Yours truly,

Palmer Environmental Consulting Group Inc.

Prepared By:

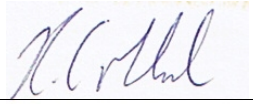


May Mason, M.Sc., R.P.Bio.
Senior Aquatic Ecologist



Rob Griffith, P.Eng., PE.
Senior Hydrotechnical Engineer

Reviewed By:



Rob Marsland, M.Sc., P.Eng.
Senior Environmental Engineer

Approved By:

Rick Palmer, M.Sc., R.P.Bio.
Senior Fisheries Biologist

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

References

Aboriginal Affairs and Northern Development Canada (AANDC), 2014. BR-CUL1118 – Outstanding Reclamation Issues at Cullaton Lake Mine Property – Barrick Gold Incorporated – Barrick Gold Corporation. April 4, 2014.

AECOM, 2009: Barrick Gold Inc. Existing Conditions Report and Screening Level Aquatic Ecological Risk Assessment for the Cullaton Lake Mine Site. July 9, 2009.

BGC, 2007: Cullaton Lake Mine – 2006 Site Inspection Report and Mine Closure Review. Prepared for Indigenous and Northern Affairs Canada. Prepared by BGC Engineering Inc. March 30, 2007.

Brugger, 2017. Cullaton Lake Gold Mines - Water Licence 1BR-CUL1118 – Annual Water Licence Report 2016. Prepared by P.J Brugger and Associates on Behalf of Barrick Gold Inc. March 2017.

Chassé, J., Lambert, N. and Lavoie, D. 2013. Precipitation, Evaporation and Freshwater Flux over Canada from six Global Climate Models. Canadian Technical Report of Hydrography and Ocean Sciences No. 287: viii + 47 p.

exp, 2014. Cullaton Lake Mine, 2014 Tailings Dam Inspection. Prepared for Barrick Gold Inc. September 18, 2014.

exp, 2016. 2016 Tailings Dam Examination Cullaton Lake Gold Mine, Nunavut Licence 1BR-CUL1118. Prepared for Barrick Gold Inc. November 22, 2016.

exp, 2017. 2017 Tailings Dam Examination Cullaton Lake Gold Mine, Nunavut Licence 1BR-CUL1118. Prepared for Barrick Gold Inc. September 28, 2017.

Homestake Canada Inc. (Homestake), 1996. Cullaton Lake Gold Mines Ltd. Final Abandonment and Restoration Plan. Submitted to The Department of Indian Affairs and Northern Development Land Division and the N.W.T. Water Board. Vancouver. March 1996.

Lorax Environmental Services (Lorax), 2009: Geochemical Considerations of Tailings and Waste Rock - Cullaton Lake Mine. Prepared for Barrick Gold Inc. March 2009.

Marsland Environmental Associates (MEA), 2016. Cullaton Lake Mine 2016 Mass Loading Model. November 17, 2016

NRCan, 2014. Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation. Natural Resources Canada.

Palmer Environmental Consulting Group In. (PECG), 2017a. Cullaton Lake Mine Close Site: Closure and Reclamation Plan. Prepared for Barrick Gold Inc. June 2017.

Palmer Environmental Consulting Group In. (PECG), 2017b. Cullaton Lake Mine Close Site: 2016 Aquatic Monitoring Report. Prepared for Barrick Gold Inc. January 2017.

Runge Pincock Minarco (RPM), 2015. Perspectives: Minimum Engineering Study Requirements Update. Issue No.128 – June 2015.

Steiner, N., Azetsu-Scott, K., Galbraith, P., Hamilton, J., Hedges, K., Hu, X., Janjua, M.Y., Lambert, N., Larouche, P., Lavoie, D., Loder, J., Melling, H., Merzouk, A., Myers, P., Perrie, W., Peterson, I., Pettipas, R., Scarratt, M., Sou, T., Starr, M., Tallmann, R.F. and van der Baaren, A. 2013. Climate change assessment in the Arctic Basin Part 1: Trends and projections - A contribution to the Aquatic Climate Change Adaptation Services Program. Canadian Technical Report of Fisheries and Aquatic Sciences No. 3042: xv + 163 pp.

Thurber Engineering Ltd. (Thurber), 2016. Cullaton Lake Mine Dam Safety Review. Report to Barrick Gold Corporation. Calgary. July 20, 2016.

Trow Associates Inc. (Trow), 1991. Abandonment and Restoration Plan. Cullaton Lake Gold Mines Ltd. Prepared for Corona Corporation. Reference No. F-90132-A/E. Thunder Bay. May 7, 1991.

PALMER
ENVIRONMENTAL
CONSULTING
GROUP INC.

Schedule "A"

Issues Raised by INAC with Barrick Responses

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
3.1	Air Strip - To safely access the mine site in the future and be able to carry out yearly water quality sampling as per the water license (#1BR-CUL1118) as well as carrying out other possible reclamation activities maintenance of the runway and apron area will be required.	Barrick agrees that regular maintenance of the airstrip and apron areas is important for continued access for on-site monitoring purposes and intends to perform maintenance activities on the airstrip starting with the 2015 campaign.	Airstrip maintenance activities were initiated in 2015. Additional grading and shrub removal is scheduled for 2018.
3.2	Area Adjacent to Air Strip – It is recommended that Barrick store their fuel drums in such a way as to minimize the risk of a spill (i.e., store fuel drums off the ground, in secondary containment, etc.). Barrick should also collect and remove any empty fuel drums adjacent to the apron area belonging to them.	All of the fuel drum caches at the Cullaton site belong to third parties and it is apparent that most have been abandoned. As a result, Barrick has initiated a program to identify the owners and demand immediate removal.	Several of the third party owners that abandoned fuel at the airstrip no longer exist and as a result Barrick has been removing these from the site, at its cost, as transport space allows (i.e. as backhauls during site inspection trips). As of January 2018, the fuel drum inventory has been reduced from the original 38 to 8 full drums. The remaining drums, along with empty drums, should be offsite by the end of 2020.
4.1	Access Road – All road reclamation work appears to be complete in accordance with the Final approved A&R Plan. AANDC however recommends a plan to monitor the condition and accessibility of the road until abandonment and reclamation activities have been completed should be outlined in a revised A&R Plan.	The access road condition will be added as a documented inspection and maintenance item during annual inspections.	Post-Closure monitoring includes inspection of road crossing swales (i.e., deactivated culvert crossings) for stability and blockages. If blockages are observed, they will be cleared to prevent damming of streamflow behind the access road.
5.1.2	Shear Zone Encapsulated Waste Rock – AANDC recommends that Barrick provide a plan on how to monitor and maintain cover stability to ensure that erosion rills and cracks do not develop in the cover until vegetation becomes re-established. The re-vegetation plan should be included in a new A&R Plan. AANDC suggests	As noted in Section 5.1.1 of the AANDC Letter, vegetation is becoming re-established on the EWR cover. As part of Barrick's Adaptive Management Plan, the physical condition of the cover will continue to be monitored during the annual inspection and any observed deficiencies will be addressed during the following annual inspection.	Pursuant to Part D, Article 8e of Water Licence 1BR-CUL1118, the condition of the encapsulated waste rock cover at Shear Lake is to be monitored by a geotechnical engineer for erosion until vegetation is sufficiently established so as to stabilize the cover. At the time of the 2016 site inspection, the inspector noted the vegetation continues to take hold and is helping to reduce erosion (Brugger, 2017). Under the proposed monitoring program, the

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
	that a 25 year monitoring period may be applicable (i.e. from 2001 to 2026).		encroachment of natural vegetation will continue to be monitored biennially for at least 25 years.
5.2.1, 7.1.2	Shear Lake Waste Rock Pile – …a pile of waste rock containing visible sulphides (pyrite) and identified as being PAG is situated along the east shoreline of Shear Lake, south of the portal. The high acidity (pH of about 2.0) of a pool of standing water adjacent to the waste rock is an indication that acid generation is occurring and that the waste rock presents a risk to the water quality of Shear Lake and Shear Creek. AANDC recommends further assessment of the waste rock and development of mitigation and remediation options as may be required to maintain geochemical stability, and that suitable options be included in a revised A&R Plan.	Mass Loading analysis performed by PECG in advance of April 15 Meeting and the Ecological Risk Assessment (ERA) performed by AECOM in 2009 demonstrated that neither the pH of the water nor the concentrations of constituents of concern within the water pose a concern for the environment. Barrick will institute an Adaptive Management Plan to ensure that any loadings will remain within the assimilative capacity of the receiving environment.	Recent work by PECG (PECG 2017a) are consistent with Lorax's work in the ERA (AECOM, 2009) where they concluded that because of the minimal presence of remaining sulphides in the residual waste rock, the water quality of the waste rock drainage is unlikely to get any worse over time. Water quality monitoring in Shear Creek will continue to provide confirmation that loadings and environmental effects are acceptable. Further details on the post-closure water quality monitoring is discussed in Section 6.2 of the CRP (PECG 2017a) Additional details are in Section 5.2 of the updated CRP (PECG 2017a).
Exec Summary	Shear Lake - Water Balance – A water balance should be established for Shear Lake so that a mass balance can be carried out to predict the effect of ARD/ML on water quality. This would include a sampling program for all streams draining into Shear Lake.	The Ecological Risk Assessment performed by AECOM in 2009 included a water balance. Results suggest that further loadings of metals or acid generating material to the environment from the site should be minimal and in equilibrium with the current water balance. In advance of the April 15 meeting, PECG performed a desktop mass loading assessment (PECG, 2015) to quantify the potential for water quality impacts to the receiving environment, the results of which were related to AANDC and NWB at the April15 meeting. PECG reported that mine loading sources are not likely to lead to exceedance of water quality guidelines in the Kognac River. As part of Barrick's proposed Adaptive Management Plan, Barrick will conduct an enhanced surface water quality monitoring	Various studies (AECOM, 2009; PECG 2017b) have shown that mine loadings from the Shear Lake and the Tailings Ponds will meet CCME water quality guidelines prior to entering the ultimate receiving environment, the Kognak River. Aquatic monitoring was completed by PECG in 2016 (PECG 2017b), which included an enhanced surface water quality program to verify previous mass loadings assessment, and sediment quality and benthic invertebrate community sampling. Results of this monitoring helped inform the development of an Adaptive Management Plan (AMP) described in the 2017 CRP (PECG 2017b). The AMP was designed to have sufficient spatial and temporal resolution to identify any trends indicating a change in ecological risk at the site. The program focuses on parameters which would reflect ecological effects in the

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
		program (additional sites and, in 2016, an additional site visit- for details, please see Schedule "B" [not attached; updated AMP is the CRP (PECG, 2017b)], and will continue to monitor the potential for future water quality impacts to ensure that any new loading will remain within the assimilative capacity of the receiving environment.	most discernable way, and at sites closest to potential mine influence. This approach will ensure early detection of any changes and provide confidence to regulators that management actions can be taken, if required, at the earliest opportunity.
5.4.1, 5.4.2	Shear Lake Diversion Dam – The breached remnants of the Shear Lake Diversion Dam are located at the north end of Shear Lake. AANDC recommends that since the Shear Lake Diversion Dam area was not included for reclamation under the original 1996 Final A&R Plan it should be included in a revised A&R Plan with reclamation options outlined.	Presently there are no plans to remediate this feature further since no effect on the surrounding environment has been observed. Should any negative influences be detected in the future they will be addressed at that time.	The deactivated Shear Lake Diversion Dam was identified to have been constructed with waste rock. While some acid generation may be taking place from that rock, the loading into Shear Lake that has been experienced to date has not resulted in adverse effects on aquatic biota in Shear Lake or Shear Creek. A geochemical assessment (Lorax, 2009) included in the ecological risk assessment (AECOM, 2009) has indicated that the rate of oxidation is not expected to increase because of the limited amount of sulphides present in the waste. Therefore, as indicated on June 11th, 2015, there are no plans to remediate this feature further since no effect on the surrounding environment has been observed. Should any negative influences be detected in the future they will be addressed at that time.
5.5.1, 5.5.2	Waste Rock Cover Borrow Area - On the east side of the mine access road, opposite the Shear Zone mine site, is an extensive cleared area stripped of topsoil. This area was the former waste rock dump, which has now been relocated into the EWR area. Reclamation of this area was not addressed in the 1996 Final A&R Plan or carried out as part of the waste rock relocation work. AANDC recommends that options to help speed up the natural re-vegetation process should be explored	Previous attempts in 2005 to artificially restart the vegetation on the encapsulated waste rock failed and for this reason Barrick elected to leave the site to re-vegetate naturally. Recent site photos indicate that this strategy is effective and the growth rate is acceptable given the short growing season. In the 2014 annual geotechnical report inspection notes (EXP, 2014), Exp noted that the sparse areas of vegetation are helping to reduce erosion.	Vegetation continues to grow in. No erosion identified (exp 2017).

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
	for the EWR borrow area at the Shear Zone Mine site area, and a re-vegetation reclamation strategy should be developed and included in a revised A&R Plan.		
6.2.1, 6.2.2	Covered Tailings Area - AANDC recommends further assessment of the tailings cover and development of mitigation and remediation options as may be required to maintain geochemical stability. Appropriate mitigation and remediation should be included in a revised A&R Plan.	In advance of the April 15 meeting, PECG performed a desk- top mass loading assessment of the Cullaton Lake site (PECG, 2015) to quantify the potential for water quality impacts to the receiving environment, the results of which were provided to AANDC and NWB at the April 15 meeting. PECG reported that mine loading sources are not likely to lead to exceedance of water quality guidelines in the Kognac River. As part of Barrick's proposed Adaptive Management Plan, Barrick will implement an enhanced water quality monitoring program (additional sites and, in 2016, an additional site visit - for details, please see Schedule "B" [not attached; updated AMP is the CRP (PECG, 2017a)] to verify the mass loading balance results and conclusions. These results will demonstrate whether or not the tailings cover is operating effectively. Additional remedial measures may be adopted, if warranted, based on observed results. In addition to the above, and further to our discussions at the April 15, 2015 meeting, Barrick will investigate the feasibility of cost-effectively installing replacement thermistors in the tailings dry cover that will provide meaningful data over a reasonably long period of time. A previous attempt at installing thermistors at the Cullaton Lake site was unsuccessful.	Barrick has committed to re-installing 4 thermistors at their original location in 2018. In addition, please see response to “Exec Summary” above.
6.3.1, 6.3.2	Tailings Pond #1 - Currently there are a significant amount of tailings around the outer perimeter of Tailings Pond #1 that have less than 1 m of water cover. With water cover of less than 1m there is potential for	In advance of the April15 meeting, PECG performed a desktop mass loading assessment of the Cullaton Lake site (PECG, 2015) to quantify the potential for water quality impacts to the receiving environment, the results of which were	Dilution calculations (PECG, 2017b) indicated that CCME water quality guidelines for those parameters of interest would likely be met in the creek downstream from Tailings Pond #2, prior to its confluence with the Kognak River.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
	the tailings to undergo oxidation. The geochemical stability of Tailings Pond #1 will depend on maintaining adequate water cover. AANDC recommends further assessment of the tailings cover and development of mitigation and remediation options as may be required to maintain geochemical stability. Appropriate mitigation and remediation should be included in a revised A&R Plan.	provided to AANDC and NWB at the April 15 meeting. PECG reported that mine loading sources are not likely to lead to exceedance of water quality guidelines in the Kognak River. As part of Barrick's proposed Adaptive Management Plan, Barrick will implement an enhanced surface water monitoring program (additional sites and, in 2016, an additional site visit - for details please see Schedule "B" [not attached; updated AMP is the CRP (PECG, 2017a)] to verify the mass loading balance results and conclusions. These results will demonstrate whether or not the water cover is operating effectively. Additional remedial measures may be adopted, if warranted, based on observed results.	Additional details are in Section 5.3 of the draft CRP (PECG 2017a). In addition, please see response to “Exec Summary” above.
6.4.2	Dam #1 - AANDC recommends that if dam #1 is expected to act as a long term tailings retention structure for Tailings Pond #1, a dam safety review based on current Canadian Dam Association (CDA) dam safety guidelines should be carried out. AANDC also recommends inspections and maintenance of Dam #1 as long as it is acting as a retention structure for Tailings Pond #1 unless otherwise indicated by a safety review. These recommendations should be outlined in a revised A&R Plan.	Barrick agrees with AANDC's recommendation to conduct a dam safety review based on CDA Dam Safety Guidelines and intends to complete such a review in 2015. Barrick will share this review with AANDC and the Nunavut Water Board and will be pleased to discuss the implementation of any recommendations with AANDC and the Nunavut Water Board.	Thurber (2016) carried out a Dam Safety Review in 2015. Barrick has shared this review with AANDC and the Nunavut Water Board. In terms of the Canadian Dam Association guidelines, Tailings Dam #1 was classified by Thurber as a Low Dam Class classification, with a low consequence of failure from any credible failure mode. Thurber recommended a risk-based approach, rather than a prescriptive checklist to address long-term requirements to achieve decommissioning of Tailings Pond #1. While periodic Dam Safety Reviews are part of the on-going monitoring and maintenance requirement under the water licence, implementation of the recommendations is not a closure requirement. That said, Thurber (2016) and exp (2016), recommend the frequency of the formal geotechnical inspection to be carried out once every three years. Instead, Barrick proposes to complete geotechnical inspections every two years, in

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
			order to align frequency with the proposed water quality sampling programs, as shown in Table 6-3. After a further 20 years of biennial geotechnical monitoring (including 2 more Dam Safety Reviews), the frequency required going forward will be revisited as part of a future water licence application process.
6.4.3, 6.4.4	Dam #1 Upstream Slope - Erosion is taking place along the entire upstream slope of the dam, with approximately 1 m of erosion having taken place near the spillway inlet. It is apparent that the eroded embankment materials are not self-armoring and may support a cycle of erosion by wave action, slumping and washing away of the material, followed by more wave action on the newly exposed slope. The crest of the dam is sufficiently wide such that there are no immediate concerns that erosion would breach across to the downstream side, but there may be longer term effects. Woody vegetation has also become established on the upstream slope of Dam #1. AANDC recommends that erosion protection measures be designed and implemented for the upstream slope area of Dam #1 to mitigate erosion. Ongoing vegetation management is also recommended to reduce upstream slope erosion. Erosion mitigation measures should be outlined in a revised A&R Plan.	The 2015 Dam Safety Review will evaluate the effects of the noted erosion on the upstream slope of the dam and vegetation growth on the upstream dam slope. Barrick will review all recommendations (including any recommendations concerning erosion mitigation and vegetation management) in the Dam Safety Review with AANDC and the Nunavut Water Board.	Thurber (2016) carried out a Dam Safety Review in 2015 in accordance with the Canadian Dam Association guidelines. Barrick has shared this review with AANDC and the Nunavut Water Board. As noted by Thurber (2016), both the upstream and downstream sides of the dam has evidence of small erosion scars. However, the scars are not increasing in size according to the previous inspections by Barrick and EXP personnel, and are stabilizing due to accelerating vegetation growth. Based on review of previous slope stability studies and field observations, Thurber concludes that the embankments are stable.
6.4.5, 6.4.6	Dam #1 Crest - The crest of the dam is about 15 m wide and shows no signs of settlement or cracking at this time, however, there is a concern that evident ponding of water on the crest has the potential to degrade the integrity and stability of the dam.	The 2015 Dam Safety Review will evaluate the effects of the water ponding on the crest of the dam. Barrick will review all recommendations (including any recommendations concerning grading of the dam crest) in the Dam Safety Review with AANDC and the Nunavut Water Board.	Thurber (2016) carried out a Dam Safety Review in 2015. Barrick has shared this review with AANDC and the Nunavut Water Board. In terms of the Canadian Dam Association guidelines, Tailings Dam #1 was classified by Thurber as a low Dam Class classification, with low consequence of failure of any credible

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
	AANDC recommends grading of Dam #1 to prevent ponding of water on the crest and to ensure stability and integrity of the dam.		failure mode. Thurber recommended a risk based approach, rather than a prescriptive checklist to address long-term requirements to achieve decommissioning of Tailings Pond #1. Onsite inspections showed no evidence of physical distress of the dam. Costs for long-term maintenance of the dam and spillway are included in the updated closure bond estimate included in the CRP. Recommendations for maintenance work will be made during the biennial geotechnical inspection.
6.4.8	Dam #1 Downstream Slope I Downstream Toe Area - AANDC recommends further assessment of the integrity and effectiveness of the downstream slope and toe area of Dam #1 to determine if the seepage areas nearby are associated with Dam #1 and Tailings pond #1. AANDC also recommends that further assessment of the vegetation growth on Dam #1 be undertaken. AANDC recommends the development of mitigation and remediation options as may be required to maintain geochemical stability of Dam #1. The details of which should be outlined in an A&R Plan.	The 2015 Dam Safety Review will evaluate the effects of the noted seepage and vegetation growth on the downstream slope and toe area of the dam. Barrick will review all recommendations (including any recommendations concerning the seepage areas and vegetation management on the downstream slope and toe area of Dam #1) in the Dam Safety Review with AANDC and the Nunavut Water Board.	Thurber (2016) carried out a Dam Safety Review in 2015. Barrick has shared this review with AANDC and the Nunavut Water Board. In terms of the Canadian Dam Association guidelines, Tailings Dam #1 was classified by Thurber as a Low Dam Class classification, with low consequence of failure of any credible failure mode. Thurber recommended a risk based approach, rather than a prescriptive checklist to address long-term requirements to achieve decommissioning of Tailings Pond #1. In general, Thurber (2016) indicates that the embankment slopes of Tailings Pond #1 were observed to be stable, and have been reported stable over the past decade. While seepage ponds are present on the downstream side of Tailings Pond #1, based on observations conducted on TP1 by Messrs. P. Brugger and D. Georgiou over the past eight years, it appears that the seepage ponds has been steady, and the extent of the seepage ponds has not increased with time. While no evidence of dam internal soil erosion has been observed to date, the condition of the

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
			dam at the wet spots or seeps will be monitored during the scheduled inspections.
6.5.2	Quarry Landfill – AANDC recommends that the quarry area should be backfilled to the design thickness required as per the approved 1996 Final A&R Plan. AANDC recommends that a revised A&R Plan include the quarry landfill and water filled pit along with remediation options to rectify the outstanding issues with this area.	Barrick acknowledges that the landfill cover design thickness was not achieved and commits, as part of its Adaptive Management Plan, to monitor the quarry landfill as part of its inspections and to address any subsidence issues that are observed.	The quarry pit is visually inspected regularly by Barrick on trips to Cullaton Lake. The 2017 inspection showed that the quarry pit landfill remain largely unchanged. Most of the affected areas are occupied by arctic ground squirrels. Barrick commits to filling the voids in the quarry pit landfill in 2018 and periodically fill new voids as they appear.
6.6.2	Borrow Area Tailings Pond #1 – AANDC recommends that since this component was not specifically addressed in the approved 1996 Final A&R Plan that it be included in a revised A&R plan to address the potential remediation of the borrow area. It is also recommended that shoreline erosion in this area be remediated in conjunction with the till cover and the upstream slope of Dam #1.	Previous attempts in 2005 to artificially restart the vegetation on the borrowed area failed and for this reason Barrick elected to leave the site to re-vegetate naturally. Recent site photos indicate that this strategy is effective and the growth rate is acceptable given the short growing season. For Barrick's response to AANDC's second recommendation, please see response to AANDC recommendation in ss. 6.4.3-6.4.8.	As stated in the June 11th, 2015 response, previous attempts to enhance the vegetation in the Borrow Area by Tailings Pond #1 have been met with limited success owing to the short growing season. Natural revegetation has been slow but effective.
6.8.2	Diversion Ditch – AANDC recommends that since this component was not specifically addressed in the approved 1996 Final A&R Plan that it be included in a revised A&R plan to address the potential remediation of the diversion ditch.	The diversion channel has re-vegetated and, as a result, no further work is planned.	The diversion channel serves as a flow path around TP#1 and is at a lower elevation than the impoundment. It is expected that the diversion channel now behaves similarly to natural aquatic habitat.
7.0	General Water Chemistry of Site – There are three major areas of concern with respect to site water quality and geochemistry, 1) the long term impact of waste rock drainage on Shear Lake water quality, 2) the dry and sub-aqueous tailings ARD and/or metal leaching (ML) impact on the long term water quality of Tailings	The Ecological Risk Assessment performed by ERA (AECOM, 2009) determined that the risk of potential future water quality impacts was low. PECG performed a desk-top mass loading assessment (PECG, 2015) to quantify the potential for water quality impacts to the receiving environment; the results of which were related to AANDC and NWB at the April15 meeting. PECG reported that mine loading sources are not likely to	Various studies (AECOM, 2009; PECG 2017b) have shown that mine loadings from the Shear Zone and the Tailings Ponds will meet CCME water quality guidelines prior to entering the ultimate receiving environment, the Kognak River. Aquatic monitoring was completed by PECG in 2016 (PECG 2017b), which included an enhanced surface water quality program to verify previous mass loadings assessment, and

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
	Pond #1, and 3) the water balance analyses of Shear Lake and Tailings Pond #1. The assessments of the water quality and geochemistry of the waste rock and tailings need to be critically evaluated to determine future requirements for mine closure. The potential for future water quality impacts related to ARD/ML is one of the major outstanding liability issues for this site.	lead to exceedance of water quality guidelines in the Kognak River. Barrick proposes instituting the Adaptive Management Plan described above to continue to monitor the potential for future water quality impacts and manage any detected water quality impacts if and when they arise.	sediment quality and benthic invertebrate community sampling. Results of this monitoring helped inform the development of an Adaptive Management Plan (AMP) described in the 2017 CRP (PECG 2017b). The AMP was designed to have sufficient spatial and temporal resolution to identify any trends indicating a change in ecological risk at the site. The program focuses on parameters which would reflect ecological effects in the most discernable way, and at sites closest to potential mine influence. This approach will ensure early detection of any changes and provide confidence to regulators that management actions can be taken, if required, at the earliest opportunity.
7.21, 7.2.2	Tailings Impact on Water Quality of Tailings Pond #1 - Studies from a Barrick contractor have shown that recent water quality samples of Tailings Pond #1 have met Water Licence criteria despite the fact that the dry cover was not constructed as designed and has failed to prevent oxidation and to maintain the tailings in a frozen condition. There appears to be no immediate threat to surface water quality associated with the tailings impoundment area, however, there is an apparent longer term risk from ongoing oxidation of the tailings under the cover, which may lead to acid production, and from ongoing metal leaching into Tailings Pond #1. A significant amount of tailings around the outer perimeter of Tailings Pond #1 is covered with less than the 1 m of water required under the approved 1996 Final A&R Plan. The water quality in Tailings Pond #1 did not exceed any of the Water Licence limits, however the concentration	In advance of the April 15 meeting, PECG performed a desktop mass loading assessment of the Cullaton Lake site (PECG, 2015) to quantify the potential for water quality impacts to the receiving environment, the results of which were provided to AANDC and NWB at the April15 meeting. PECG reported that mine loading sources are not likely to lead to exceedance of water quality guidelines in the receiving environment.' As part of Barrick's proposed Adaptive Management Plan, Barrick will implement an enhanced surface water monitoring program (additional sites and, in 2016, an additional site visit - for details, please see Schedule "B" [not attached; updated AMP is the CRP (PECG, 2017b)] to verify the mass loading balance results and conclusions. Additional remedial measures may be adopted, if warranted, based on observed results.	Water quality parameters of potential interest at the tailings area were identified as those which have exceeded CCME guidelines at some point at the outlet of Tailings Pond #2 (at monitoring station 940-3, SW33) and included Al, As, Cu, Fe. Time series plots for those parameters are presented on Figure 3-5 in PECG (2017a). The plots demonstrate that no discernable trend in concentrations with time have been observed since 2001. The mildly elevated Al and Fe concentrations are most likely associated with the presence of low levels (<8 mg/L) of Total Suspended Solids (TSS). Dilution calculations (MEA, 2016 in PECG 2017a) indicated that CCME guidelines for those parameters would likely be met in the creek downstream from Tailings Pond #2, prior to its confluence with the Kognak River.

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
	of several parameters, including cyanide, did exceed CCME guidelines for the protection of freshwater aquatic life. AANDC recommends further assessment of the tailings cover and development of mitigation and remediation options as may be required to maintain geochemical stability. Suitable mitigations should be contained in a revised A&R Plan. AANDC also recommends that the dry cover should be re-designed or constructed to meet the approved 1996 Final A&R plan design criterion of 1.4 m to prevent further oxidation of tailings.	Accordingly, Barrick does not believe that the dry cover needs to be re-designed or constructed to meet the approved 1996 Final A&R plan design criteria of 1.4m.	Furthermore, Thurber (2016) indicated that the simple tailings cover (of approximately 1 metre of till revegetating with sown and natural vegetation) is working well and that a new cover design is not warranted.
7.3.2.	Water Balance Analysis of Shear Lake and Tailings Pond #1 – AANDC recommends that any revised A&R plan submitted to the Nunavut Water Board and should contain a hydrological assessment of Shear Lake and Tailings Pond #1 to establish a design flood based on a long term closure design of Dam #1. The dam and spillway should be upgraded accordingly to ensure that the dam can safely pass extreme flood events. Inconsistencies found throughout the water balance study for the tailings impoundment area should be reviewed and re-validated.	The appropriate inflow design flood will be discussed in connection with the 2015 Dam Safety Review. Barrick will review all recommendations (including any recommendations to upgrade the dam and spillway) in the Dam Safety Review with AANDC and the Nunavut Water Board.	See response to 6.4.2, 6.4.3 and 6.4.4. Thurber (2016) carried out a Dam Safety Review in 2015. In terms of the Canadian Dam Association guidelines, Tailings Dam #1 was classified by Thurber as a Low Dam Class classification, with low consequence of failure of any credible failure mode. Thurber recommended a risk-based approach, rather than a prescriptive checklist to address long-term requirements to achieve decommissioning of Tailings Pond #1. As part of the Dam Safety Review, NHC (Appendix D of Thurber, 2016) completed a hydrological assessment of Tailings Pond #1 to establish an inflow design flood for the low consequence dam (Low Dam Class).
8.0. 8.1	Security Estimate – The current security being held for the property is $50,000. This amount is insufficient to cover the design and remediation requirements noted	Barrick has prepared an updated security estimate in accordance with the Nunavut Surface Rights Tribunal and Nunavut Waters Act and AANDC's Mine Site Reclamation Policy for Nunavut. That	Barrick has prepared an updated security estimate in accordance with the Nunavut Surface Rights Tribunal and Nunavut Waters Act and AANDC's Mine Site Reclamation

PALMER ENVIRONMENTAL CONSULTING GROUP INC.

AANDC Reference	AANDC April 4, 2014 Issue / Recommendation	Barrick June 11th, 2015 Barrick Response	Barrick May 18th, 2018 Barrick Update
	above or to address the range of potential liabilities still associated with the site. AANDC recommends that Barrick prepare an updated security estimate based on an updated closure plan and in accordance with the Nunavut Surface Rights Tribunal and Nunavut Waters Act and AANDC's Mine Site Reclamation Policy for Nunavut.	estimate is provided, as indicated earlier, as Schedule "C" to our letter.	Policy for Nunavut. That estimate is provided, as indicated earlier, as Schedule "B" to our letter.
9.0	Submission of a Revised A&R Plan AANDC recommends that a revised A&R plan should be submitted to the Nunavut Water Board which addresses the issues and recommendations identified in this letter. Climate change considerations, not addressed in the previous approved Final 1996 A&R plan, should be incorporated into any revised A&R Plan.	Barrick respectfully disagrees with the AANDC's recommendation that Barrick submit a revised A&R Plan. Barrick closed the Cullaton lake site substantially in accordance with the approved A&R Plan for the site. Barrick's proposed Adaptive Management Plan can address any new risks that might arise at the site in the future.	A draft updated A&R Plan - “CRP” (PECG 2017a) was prepared and submitted to INAC on June 30th, 2017. A Final CRP will be submitted before July 31, 2018.
Executive Summary	Objectives of A&R Plan There is a need to re-visit the original objectives and design criteria in the approved Final Abandonment & Reclamation (A&R) Plan versus observed performance to identify additional reclamation or remedial measures.	The observed performance to-date indicates that the site is chemically stable, notwithstanding that some of the design criteria in the Final A&R Plan was not met. The additional monitoring data will indicate whether the same will hold true for the foreseeable future.	This was completed and included in PECG 2017a.

PALMER
ENVIRONMENTAL
CONSULTING
GROUP INC.

Schedule “B”

Updated Security Estimate

CULLATON LAKE MINE - LONG TERM SITE MONITORING COSTS (Expressed in 2017 Dollars)

		CLOSURE PERIOD		POST CLOSURE MONITORING																		100 YEARS
		Year (Y) 0		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11 - 20	Y21 - 30	Y31 - 40	Y41 - 50	Y51 - 59	Y61 - 69	Y71 - 79	Y81 - 89	Y91 - 99	101 YEARS	Post Reclamation
		2017	2018	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028 - 2037	2038 - 2047								2017 TO 2117	2018 - 2117
		Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Totals	Totals									Total
1 SITE MAINTENANCE																								
Fencing / Signage			$ 1,000									$ 1,000		$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 10,800	$ 11,000
Emergency Housing	Assume shack repairs every 10 years starting in 2018		$ 1,000									$ 1,000		$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 10,800	$ 11,000
Contingency allowance (unexpected maintenanc	One time (30%)											$ 349,900											$ 349,900	$ 349,900
Site Road Work - clearing shrubs, leveling, maint	Every 10 years starting in 2018		$ 3,000									$ 3,000		$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 32,400	$ 33,000
Repairs to Rip-Rap - Spillway	Every 20 yrs Starting in 2026											$ 50,000			$ 50,000		$ 50,000		$ 50,000		$ 50,000		$ 250,000	$ 250,000
Airstrip	Every 10 years starting in 2018		$ 15,000									$ 15,000		$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 162,000	$ 165,000
																								$ -
2 Site Monitoring (Excluding Thermister Installation)																								$ -
Geotechnical Inspections																								$ -
Routine Inpections	Starting in 2018 decrease frequency to every 2nd Ye	$ 11,350	$ -	$ 11,350	$ -	$ 11,350	$ -	$ 11,350	$ -	$ 11,350	$ -	$ -	$ -	$ 45,400	$ 45,400	$ 45,400	$ 45,400	$ 45,400	$ 45,400	$ 45,400	$ 45,400	$ 45,400	$ 456,270	$ 454,000
Dam Safety Reviews	Do every 10 yrs starting in 2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 43,840	$ -	$ 43,840	$ 43,840	$ 43,840	$ 43,840	$ 43,840	$ 43,840	$ 43,840	$ 43,840	$ 43,840	$ 429,632	$ 438,400
Routine Surface Water Monitoring																								$ -
Chemistry 4 locations	Starting in 2018 decrease frequency to every 2nd Ye	$ 28,640	$ -	$ 14,320	$ -	$ 14,320	$ -	$ 14,320	$ -	$ 14,320	$ -	$ 14,320	$ -	$ 71,600	$ 71,600	$ 71,600	$ 71,600	$ 71,600	$ 71,600	$ 71,600	$ 71,600	$ 71,600	$ 730,320	$ 716,000
Charter Flight Thompson to site	Starting in 2018 decrease frequency to every 2nd Ye	$ 21,500	$ -	$ 10,750	$ -	$ 10,750	$ -	$ 10,750	$ -	$ 10,750	$ -	$ 10,750	$ -	$ 53,750	$ 53,750	$ 53,750	$ 53,750	$ 53,750	$ 53,750	$ 53,750	$ 53,750	$ 53,750	$ 548,250	$ 537,500
Sediment / Benthic sampling	Every 4 years starting in 2018	$ -	$ -	$ 19,120	$ -	$ -	$ -	$ 19,120	$ -	$ -	$ -	$ 19,120	$ -	$ 57,360	$ 38,240	$ 57,360	$ 38,240	$ 57,360	$ 38,240	$ 57,360	$ 38,240	$ 57,360	$ 485,648	$ 497,120
Ecological Risk Assessment Monitoring																								
Aquatic - Fish Survey		$ -	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,000	$ -
Thermister installation at tailings		$ -	$ 110,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 110,000	$ -
TOTAL 2017 to 2037 FORECAST COSTS		**$ 61,490**	**$ 155,000**	**$ 55,540**	**$ -**	**$ 36,420**	**$ -**	**$ 55,540**	**$ -**	**$ 36,420**	**$ -**	**$ 507,930**	**$ -**	**$ 291,950**	**$ 322,830**	**$ 291,950**	**$ 322,830**	**$ 291,950**	**$ 322,830**	**$ 291,950**	**$ 322,830**	**$ 291,950**	**$ 3,601,020**	**$ 3,462,920**

3% Discount rate			0	1	2	3	4	5	6	7	8	9	10	20	30	40	50	60	70	80	90
			(55,540)	-	(36,420)	-	(55,540)	-	(36,420)	-	(507,930)	-	($217,238)	($178,743)	($120,280)	($98,966)	($66,596)	($54,795)	($36,873)	($30,339)	($20,415)
Years 1-10	$ 691,850	no discount																			
Years 11-20	$217,238	discounted																			
Years 21-30	$178,743																				
Years 31-40	$120,280																				
Years 41-50	$98,966																				
Years 51-60	$66,596																				
Years 61-70	$54,795																				
Years 71-80	$36,873																				
Years 81-90	$30,339																				
Years 91-100	$20,415																				
Total for 100 years	$ 1,516,094	Discounted after year 10																			