THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Natural Resources
DIVISION OF MINING, LAND & WATER
Mining Section

550 West 7th Avenue, Suite 900B
Anchorage, Alaska 99501-3577
Minerals Property Management Main: 907.269.8642
Fax: 907.269.8649
Coal Regulatory/Abandoned Mine Lands Main: 907.269.8631
Fax: 907.269.8930
TDD: 907.269.8411

APMA A20196118- FIELD SUMMARY REPORT

Inspection Date:	October 21, 2019
Weather:	Broken Skies Progressing to Scattered, Winds Variable to 10 mph, Air Temp. Average 34° F
Agency Personnel:	Hollie Chalup (Mining Section), Joshua Brekken (ADFG)
Operator Contact:	Tim Havey, Director of Environment and Permitting, Pebble Limited Partnership
Pilot:	Solomon Loop, Soloy Helicopters
Inspection Objectives:	Annual Inspection

Operation Area:

The Pebble Project lies approximately 17 miles northwest of the communities of Iliamna and Newhalen. Located at the headwaters of Upper Talarik Creek, South Fork Koktuli River and adjacent to the headwaters of the North Fork Koktuli River, the Pebble Deposit is situated within the Nushagak/Mulchatna drainage system and Bristol Bay watershed. Topography varies from rolling hills to marshy lowlands and hosts several lake systems with dominant scrub coverage (*Salix*) or dwarf scrub tundra. The regional vegetation includes areas of forest, meadow, and scrub within riverine, lacustrine, lowland, upland, and alpine environments. Mammalian wildlife commonly observed in the operation area include *Ursus arctos, Alces alces, Rangifer turandus, Castor canadensis and Spermophilus parryii* among others.[1,2] Raptors, water birds, songbirds, and terrestrial birds are also commonly observed. The Pebble Deposit consists of two known contiguous hydrothermally altered sulfide copper-gold-molybdenum porphyry deposits hosted in the Kahiltna Terrane Batholith (Cretaceous); one near-surface (Deposit West), and one significantly deeper (Deposit East). The estimated mineral resources of both deposits are currently 80.6 billion pounds of copper, 5.6 billion pounds of molybdenum, and 107.4 million ounces of gold, in addition to other economically viable mineral resources[3].

Field Inspection Plan, Execution and Summary Schedule:

The Alaska Department of Natural Resources (ADNR) primary objectives for the field inspection were to inspect 2018 reclamation sites, 2019 drill sites and sites needing or undergoing repair. The inspection plan was designed to be carried out in a time-effective manner with priority on active drilling, reclamation conducted in 2018/2019, and repair sites. ADNR did not conduct a randomized inspection in 2019, however, ADNR intends to continue randomized inspections in 2020. Finally, ADNR identified nine structures and support facilities onsite for inspection: Main Supply Depot (which includes West Bay 4), West Bay 1, West Bay 3, Watershed, Acid Rock Drainage (ARD) Test Site, South Koktuli Mountain Repeater Station and the Pebble 1 Weather Station. The inspection plan was also designed to allow for selecting additional sites for inspection in an opportunistic fashion and as time allows.

ADNR staff arrived via Iliamna Air Taxi to the Iliamna Airport at approximately 11:15 am on 21 October 2019. ADNR staff briefly met with Tim Havey of PLP to review the inspection plan and conduct a safety meeting. Inspection staff received a helicopter safety briefing before embarking to the field. Inspections were conducted on the ground and at a low-level aerial hover.

---

[1] ABR, Inc., 2004-2008 Pebble Project Environmental Baseline Document. Chapter 16 Wildlife and Habitat – Bristol Bay Drainages.

[2] Holen, D. et al., 2005. Technical Paper No. 283. Harvests and Uses of Caribou, Moose, Bears and Dall Sheep by Communities of Game Management Units 9B and 17, Western Bristol Bay, Alaska 2001-2002.

[3] Pebble Limited Partnership. Accessed 22 October 2019 at: https://www.pebblepartnership.com/geology.

A total of 43 sites within the Pebble Project Area were inspected (Appendix C). Of the 43 sites inspected, ADNR staff observed six of the nine structures; the Acid Rock Drainage Test Site, Main Supply Depot including West Bay 4, West Bay 1, Watershed and the South Koktuli Mountain Repeater Station.

Field Condition Observations

Sky conditions on 21 October varied from overcast to broken skies with a ceiling of 2,100-6,600 feet and progressed to scattered cover later in the day, with variable winds up to 14 MPH.[4] A single bald eagle was observed near GH-18-393.

Findings

A summary of findings can be found below. A detailed description of all 2019 drill sites observed can be found below in Section 1.

1. Inspection of 2019 Drilling Sites

ADNR inspected the status of six (6) boreholes drilled in the 2019 exploration season to date. Drilling activity was conducted in a centralized cluster. The general area of activity encompasses six boreholes, six sumps, and support facilities for an active well pump test. Observations are addressed below.

1.1 Borehole P-19-90 (ADL 540399, Figure: 1) and Borehole P-19-92 (ADL 540399, Figure: 3)

The P-19-90 boring was installed in late September 2019. The P-19-92 boring was installed in early October 2019. At the time of inspection, a casing was installed at each borehole, and reclamation efforts had begun. The sumps were undergoing reclamation activities at the time of inspection as well. Overburden stockpiles were placed on liners. The reclamation conducted in 2019 will be inspected and evaluated again in 2020 or earlier as need warrants.

1.2 Borehole P-19-91 (ADL 540399, Figure: 2) and Borehole P-19-93 (ADL 540399, Figure: 4)

Borehole P-19-91 was installed in early October and P-19-93 was installed mid-October. The sumps were undergoing reclamation at the time of inspection. Surface reclamation was also ongoing at the borehole collars. Overburden stockpiles were placed on a lined barrier. The reclamation conducted in 2019 will be inspected and evaluated again in 2020 or earlier as need warrants.

1.5 Borehole PW-19-11 (ADL 540399, Figure: 5) and Borehole PW-19-12 (ADL 540399, Figure: 5)

Borehole PW-19-11 was completed in mid-September 2019 and was undergoing an active pump test during the time of inspection. PW-19-12 was installed in early October 2019 and was observed in a stable inactive state. Due to the increased diameter borings, the sumps are larger than customarily observed at the Project, however, well within the dimensions of comparable exploration activities across the State. The sumps were undergoing active reclamation with a miniature excavator. The pump test platform and supporting facilities were elevated on tundra pads and kept in a neat and orderly manner.

Repair Site Inspections

ADNR inspected the repair and reclamation status of three repair sites.

2.1 Borehole 9475 (ADL 540422, Figure: 6-7)

Borehole 9475 has produced water at its surface for several years. The operator has attempted multiple repairs using pressure grouting techniques between the surface and confining layers. This year, the operator planned to re-drill the hole reestablishing the entry point in bedrock, removing all material within the boring to the extent practicable and cementing the borehole from maximum depth to the ground surface to provide

[4] Weather observations were made by the inspector and verified against local climatological data at the Iliamna Airport (US WBAN:70340025506 (PAIL)) for October 21st, 2019. Data was accessed electronically at https://www.ncdc.noaa.gov/cdo-web/datasets/LCD/stations/WBAN:25506/detail on December 4, 2019.

for a continual material plug. At the time of inspection, two conjoined sumps were constructed, both approximately six feet long by four feet wide. Overburden stockpiles were placed on a lined barrier. The operator stated approximately 900 feet of cement and grout was injected into the borehole. There was no surface expression of water at the time of inspection. The operator is not required to cap the collar as the borehole is completed with a material plug. This site will be re-inspected to confirm successful closure and surface reclamation.

2.2 Borehole 3127 (ADL 516873, Figure: 8-9)

Borehole 3127 also exhibited surface expression of water surrounding the borehole. Repair efforts at this site mimic those employed at 9475 summarized above with the addition of sand material. The drill platform was still in place at the time of inspection and the borehole casing appeared to have been removed. The sump was nearly dry and stockpiled overburden was available to finish reclamation. This site will be re-inspected to confirm successful closure and surface reclamation.

2.3 Borehole GH08-156 (ADL 642443, Figure: 10)

Borehole GH08-156 has exhibited influence of surface water flow since 2016. Several attempts to repair in 2017 and 2018 were unsuccessful. The borehole was under active repair drilling at the time of inspection. The drill and supporting facilities were placed on elevated tundra mats. A small sump was in operation and overburden was stockpiled on a liner. This site will be re-inspected to confirm successful closure and surface reclamation.

2. Inspection of 2018 Reclamation Sites

ADNR inspected the reclamation status of boreholes drilled in the 2018 exploration season. Representative photos of reclamation at each site are provided in the attached Figures 11-32. All sites were found in acceptable condition according to AS 27.19, 11 AAC 97, and the terms of MLUP A20196118.

3. Site Structures

The Main Supply Depot including West Bay 4, West Bay 1, Watershed, the ARD Test Site and South Koktuli Mountain Repeater Station were observed. Structures are in acceptable condition, are adequately maintained and in support of drilling, maintenance, and repair activities conducted by the operator. All structures observed were temporary in nature and construction. Significant consolidation and removal of material from the Main Supply Depot was observed (Figure 33). Materials that were no longer necessary for support of exploration activities were burned onsite or backhauled to an appropriate disposal location in Iliamna.

Violations

No violations of MLUP A20196118 stipulations, AS 27.19 or 11 AAC 97 were observed during the course of this inspection.

Conclusion and Recommendations

ADNR finds the Pebble Limited Partnership operation is in good condition and is consistent with industry standards. The operator facilitates activities in a manner which prevents unnecessary and undue degradation of State land and water resources and is responsive to requests made by the Department.

All other maintenance, monitoring and repair activities shall be reported in the end of year Annual Exploration and Reclamation Report due December 31, 2019.

Inspector: _____ Date: 2020-02-25

Supervisor: _____ Date: _____

Report Prepared By: H. Chalup

Appendix A

Inspection Maps and Observations of Note

See Appendix C for an index of sites inspected.

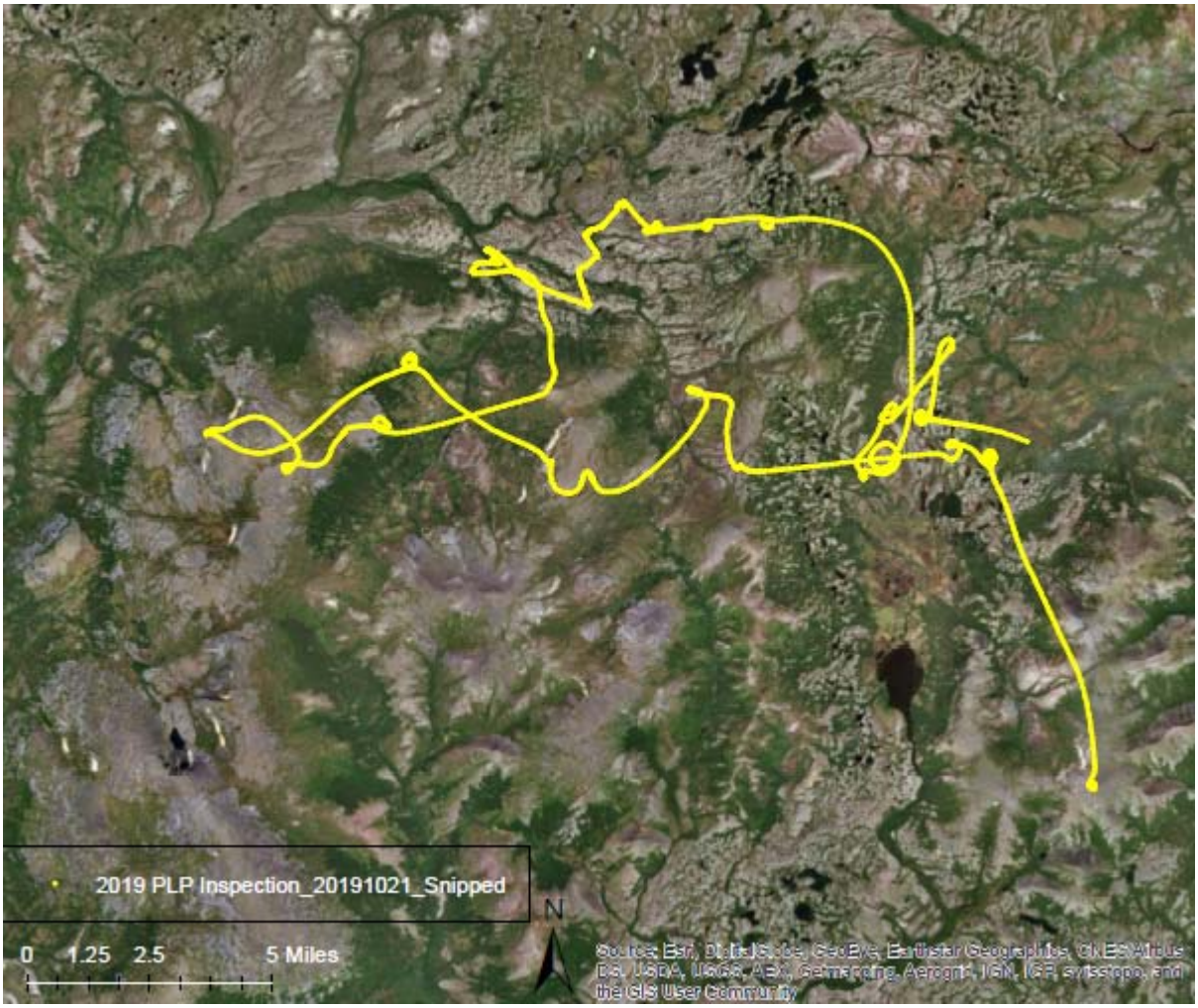


Figure 1 - ADNR staff conducted helicopter supported inspections at the Pebble Project, 21 October 2091

Observations of Note

1. P-19-90
21 October 2019

2. P-19-91
21 October 2019

3. P-19-92 (wrapped in plastic) *21 October 2019*	
4. Borehole P-19-93 *21 October 2019*	

5. PW-19-11 and PW-19-12 Sump Reclamation *21 October 2019* Casings for PW-19-11 and PW-19-12 were located upslope from photo on the pump test platform.	
6. Borehole 9475 *21 October 2019*	

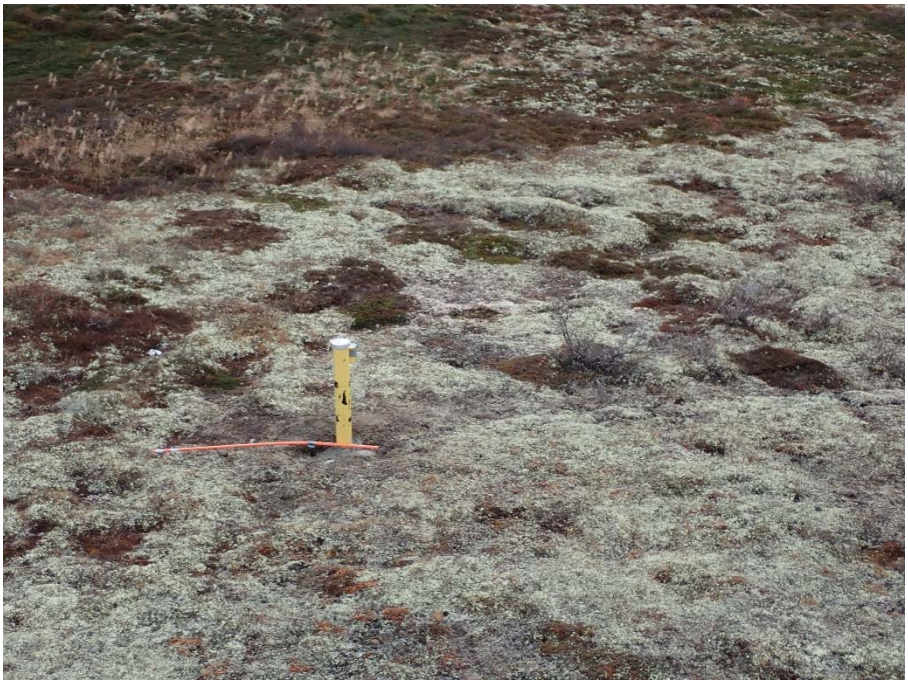
7. Borehole 9475 Sump *21 October 2019*	
8. Borehole 3127 *21 October 2019*	

9. Borehole 3127 sump
21 October 2019

10. GH08-156
21 October 2019

11. GH18-412S
21 October 2019

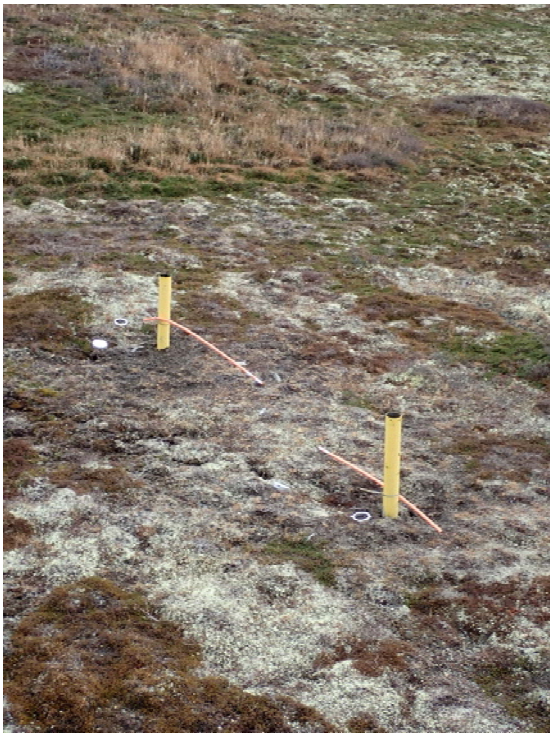
12. GH18-411S
21 October 2019

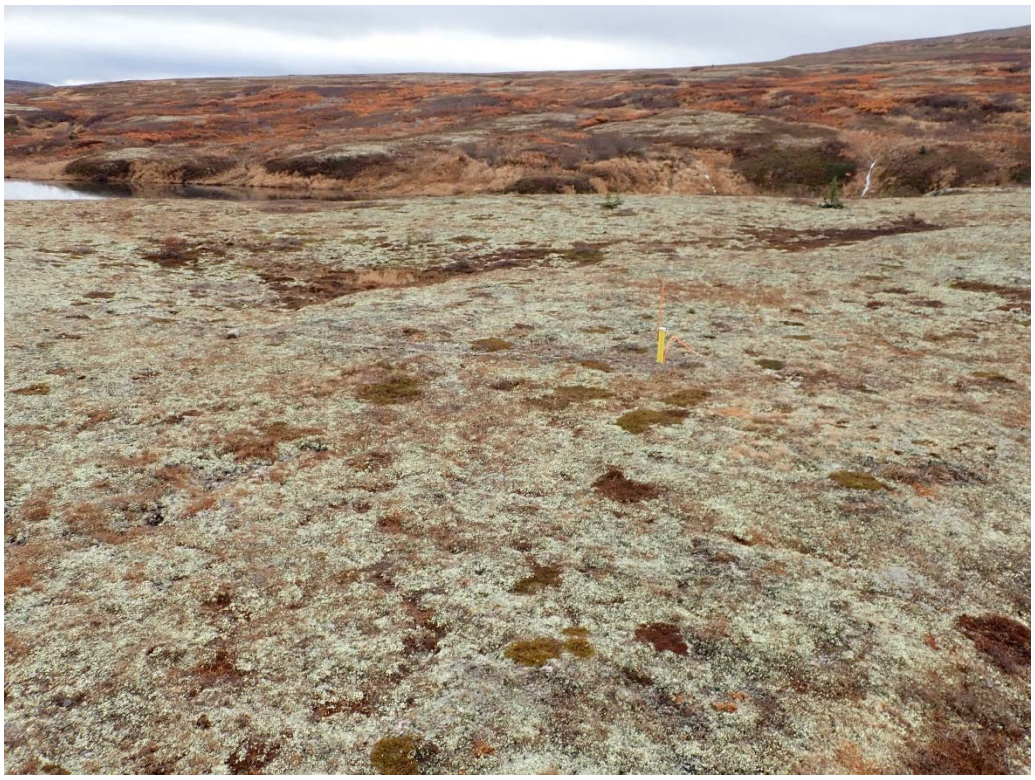


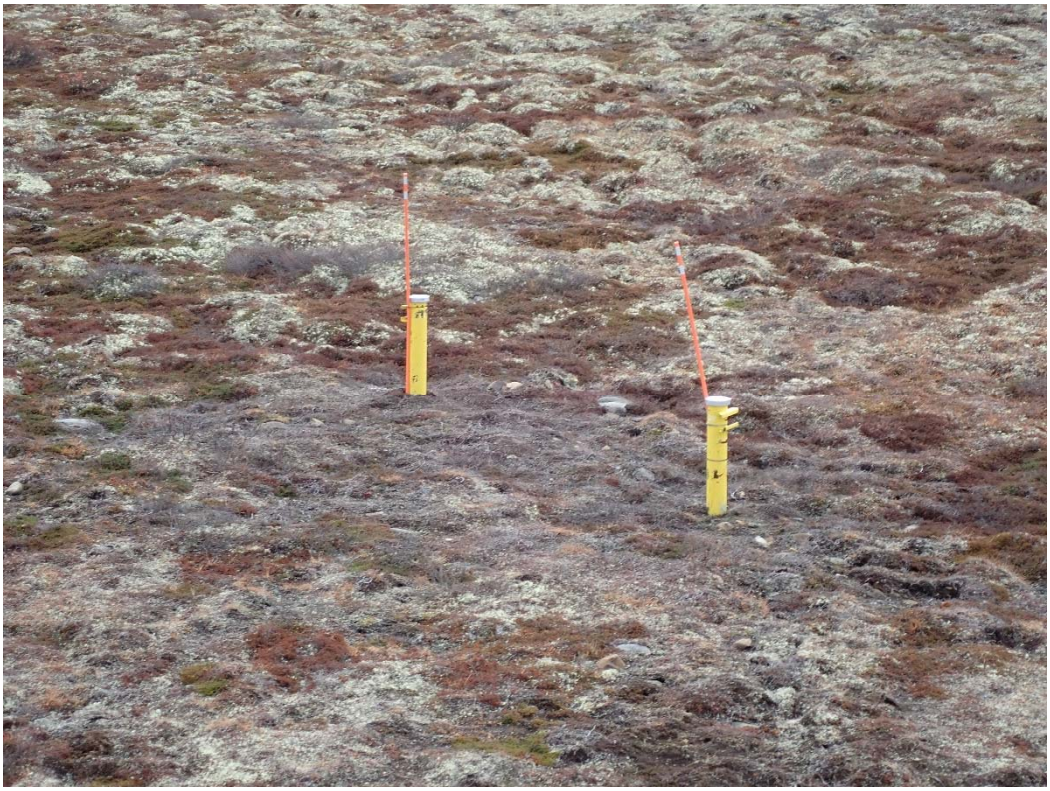
13. GH18-410S
21 October 2019

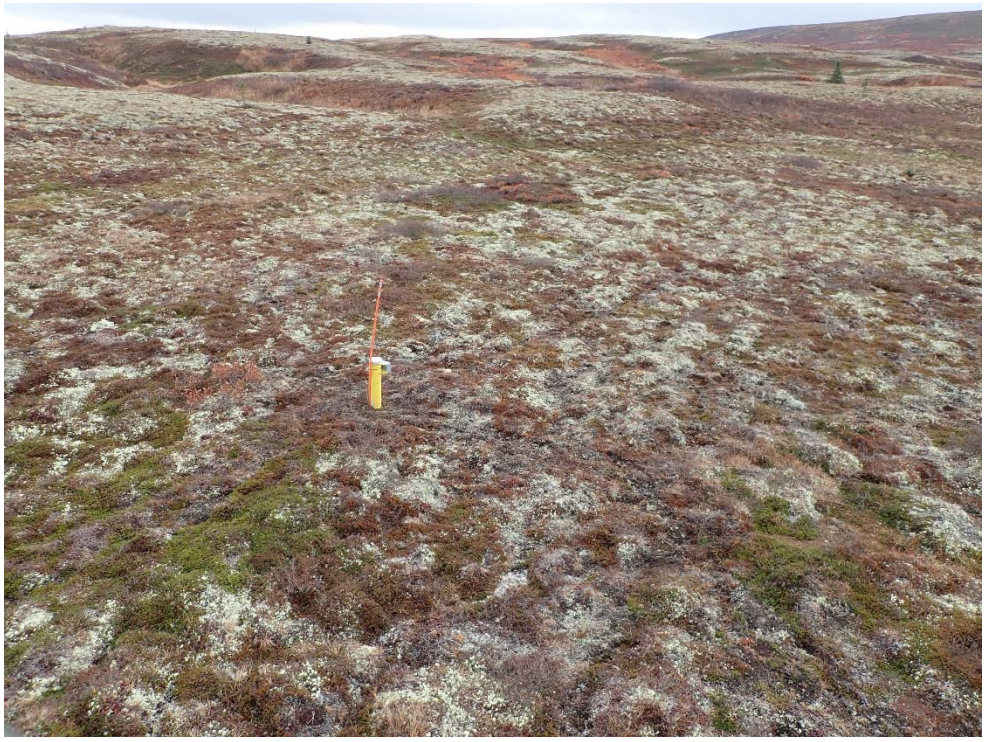
14. Boreholes GH18-401S, GH18-403S, GH18-405S
21 October 2019

As viewed from upper left to lower right. Borehole GH18-401S does not have a surface structure.

15. GH18-409S *21 October 2019*	
16. GH18-408S and GH18-407S L to R. *21 October 2019* Engineering crews were actively collecting data at the time of inspection. The operator was reminded to replace caps and subsequently provided photo documentation of cap replacement post inspection.	

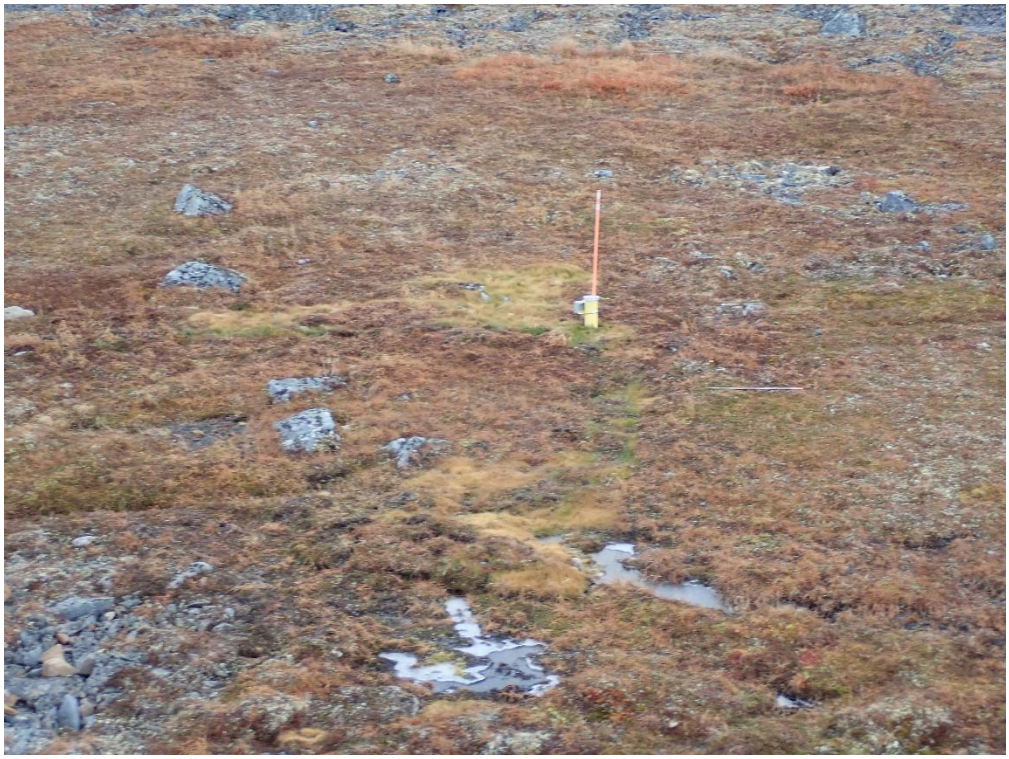
17. Borehole GH18-390S *21 October 2019*	
18. GH18-389S *21 October 2019*	

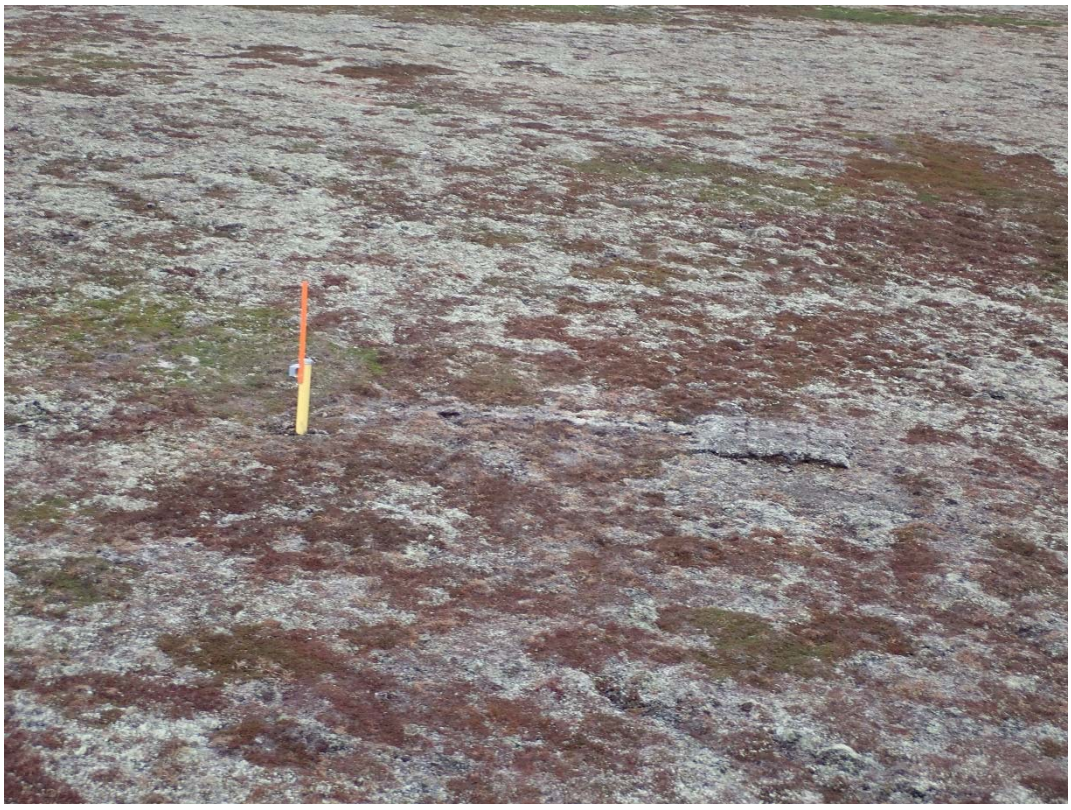
19. GH18-388S *21 October 2019*	
20. GH18-398S and GH18-396S *21 October 2019*	

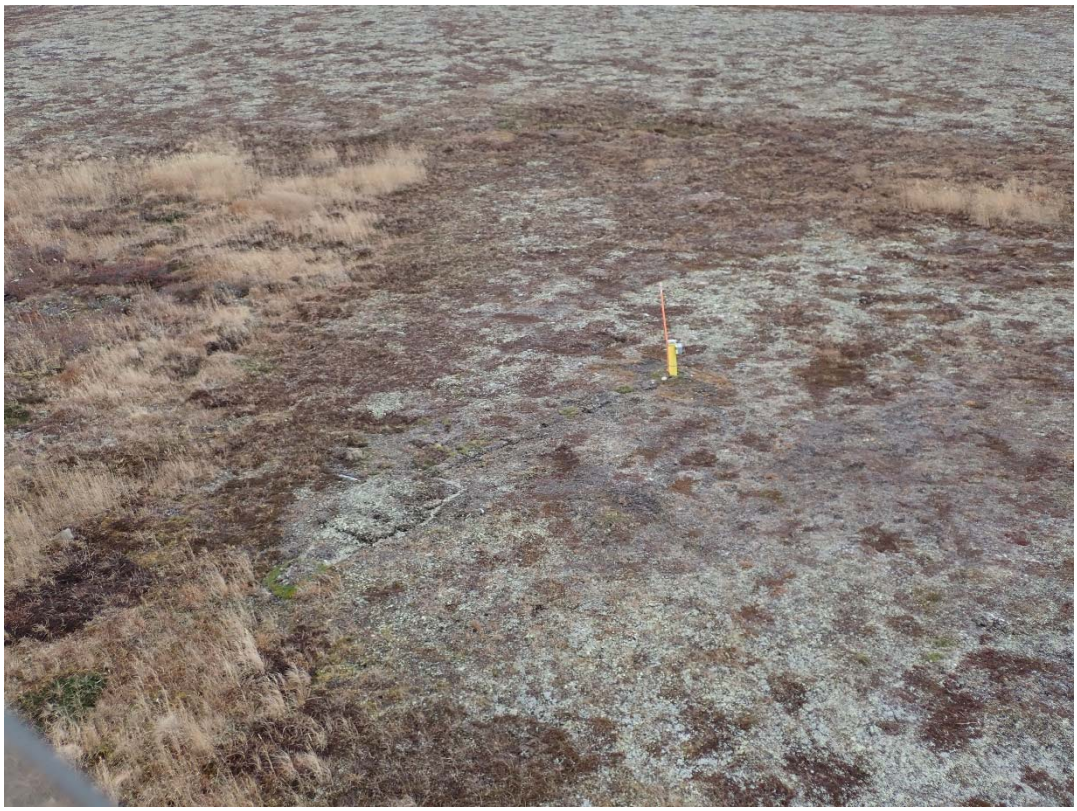
21. GH18-399S, GH18-406S, GH18-392S *21 October 2019* As viewed from upper left to lower right	
22. GH18-395S *21 October 2019*	

23. GH18-394S *21 October 2019*	
24. GH18-402 *21 October 2019*	

25. GH18-400 *21 October 2019*	
26. GH18-393 *21 October 2019*	

27. GH18-397 *21 October 2019*	
28. GH18-391 *21 October 2019*	

29. GH18-404 *21 October 2019*	
30. GH18-413S *21 October 2019*	

31. GH18-414S *21 October 2019*	
32. GH18-387S *21 October 2019*	

33. Main Supply Depot and Westbay 4 *21 October 2019*	

Appendix B

In 2015, PLP provided rating codes for each individual borehole across the project area. The coding was developed by PLP and is used as a means of communication between PLP and ADNR. ADNR conducts ongoing random sampling of locations to assess the efficiency and accuracy of the PLP rating system.

Borehole Status Codes

Code	Category	Description
1	Active	Primary designation for active monitoring wells (groundwater quality, geotechnical, etc.). Also used for some former exploration boreholes that are maintained as possible water sources. Active sites do not have material plugs (grout, cement, bentonite) but may be fitted with mechanical plugs or caps.
2	Inactive	Site is not currently used as monitoring/study location, but is preserved for potential future use (e.g., additional drilling, water source). Inactive sites maintain aboveground structures (casing, valves, caps).
3	Abandoned	Site is decommissioned and fully abandoned. Borehole has been plugged as appropriate. All surface structures removed, with possible exception of wood post indicating location and borehole ID.

Maintenance/Reclamation Status Codes

Code	Category	Description
A	Major Repairs	Site condition presents an identified environmental compliance or health & safety concern or is at risk of progressing if not addressed as soon as possible. Significant repairs necessary, typically requiring advanced planning, technical staff and additional equipment. Coordination and approval from DNR or another agency may be required.
		Examples: upwelling of discolored or voluminous water; discharge to surface water.
B	Minor repairs	Site condition requires repairs or rehabilitation but is stable and not at risk of deteriorating further. Work does not require technical staff but generally cannot be completed during routine maintenance trips or by one person. Advance approval from DNR or other agency is usually not required unless circumstances dictate. All repair activities summarized in annual report.
		Examples: Margo plug replacement/installation; large area rehabilitation or revegetation efforts requiring soil amendments and reseeding.
C	Routine Maintenance or Additional Investigation	Maintenance requirements are small or insignificant and generally the result of normal operation or exposure to elements. Repairs can be completed by staff during routine inspections and do not require specialized equipment or advance planning. Also used to identify sites where conditions cannot be confirmed, thus requiring additional inspection or involvement of higher-level staff.
		Examples: application of sealant around cap; water valve replacement; ponded surface water with unconfirmed source.
D	Stable/Monitored	Site condition is stable and has been fully reclaimed, but with past maintenance issues or known to have higher maintenance needs. All structural equipment, if any, is in good condition. Minimum monitoring is generally more frequent than Category E sites. Also applies to sites that have recently been repaired but require more frequent inspection to verify repairs and reclamation efforts.
		Examples: artesian sites; sites with recent, major repairs.
E	Stable/No Action	Site condition is stable and has been fully reclaimed. All structural equipment, if any, is in good condition. No known issues. No history of upwellings, leaks, or staining. Located in area unlikely to cause concern (e.g., wetlands, artesian zone). Inspection frequency is lower than Category D sites.

Appendix C

Inspected Borehole / [Borehole Rating]		
P-19-90 [1C]	GH18-408A [2D]	GH08-156 [1B]
P-19-91 [1C]	GH18-407S [2D]	GH18-391 [2D]
P-19-92 [1C]	GH18-390S [2D]	GH18-404 [2D]
P-19-93 [IC]	GH18-389S [2D]	GH18-413S [2D]
PW-19-11 [1C]	GH18-388S [2D]	GH18-414S [2D]
PW-19-12 [1C]	GH18-398S [2D]	GH18-387S [2D]
9475 [1B]	GH18-396S [2D]	
3127 [1B]	GH18-399S [2D]	**Structures Locations**
4286M [3E]	GH18-406S [2D]	ARD
GH18-411S [2D]	GH18-392S [2D]	Main Supply Depot/West Bay 4
GH18-412S [2D]	GH18-395S [2D]	West Bay 1
GH18-410S [2D]	GH18-394S [2D]	Koktuli Mountain Repeater
GH18-401S [2D]	GH18-402 [2D]	Watershed
GH18-403S [3E]	GH18-400 [2D]	
GH18-405S [2D]	GH18-393 [2D]	
GH18-409S [2D]	GH18-397 [2D]	