Photo: 3.8-1
Quarry #1
Overburden Dump;
area of subsidence

Direction:
n/a

Photo: 3.8-2
Quarry #1
Overburden Dump;
surrounding
sediment control
berm

Direction:
South / East

Photo: 3.8-3
Entrance to Quarry #1 Overburden Dump

Direction:
North / East

Photo: 3.8-4
Quarry #1 Overburden Dump; area of subsidence

Direction:
n/a

3.9 Airstrip

General Description

The all-weather airstrip is 900 m long and 23 m wide, and includes an apron at each end of the runway, measuring approximately 80 m x 50 m. The north portion of the airstrip was constructed in 2007, and was completed in 2008. An airstrip expansion was partially completed in 2011 that will see the airstrip length increase to 1,900 m and its width to 45 m. An extension to the north airstrip apron extension was also completed in 2011. (Photos 3.9-1 to 3.9-8)

The airstrip construction consists of a 2 m thick thermal rock fill pad, consisting of ROQ material constructed directly on the tundra. On top of the ROQ thermal pad is a layer of 2-inch crushed stone, and a topping layer of ¾-inch gravel.

This airstrip doubles as the main access road between Roberts Bay and the Doris North Camp (Primary Road). Infrastructure related to the airstrip includes traffic barriers, an air traffic control tower, runway lights, a portable wash station and power supply, portable secondary containment berms to store generator fuel and drummed jet fuel.

During construction work, temporary rock fill access pads were pushed out onto the tundra. Although the material has been carefully removed, some sand and gravel remains. This material may affect vegetation have an effect on the thermal response of the active layer.

There are two ephemeral drainage channels passing under the airstrip. Rock drains were installed at each of these locations to facilitate the flow of water under the airstrip.

Previously there has been some settlement across the airstrip that is due to it being only partially completed in one season (the thermal pad only constructed to half-height in 2008). The level of required maintenance is reportedly decreasing, suggesting the pad is approaching a steady state condition

Observations

Generally, no standing water was observed against the toe of the airstrip thermal pad. There were some significant tension cracks observed along the crest of the pad, particularly along the apron areas and near the control tower. This may be due to some thermal settlement along the edges or just due to the step angle of the pad slopes. There are also some areas where finer surface material have fallen into the void spaces in the underlying coarser material.

Minor tension cracks were observed along the main airstrip. Occasional small erosion gullies were noted on the pad slopes. There was no standing water at the location of the two rock drains, and flow appears to be unimpeded.

There were equipment tracks indicating that grading operations had recently taken place.

Recommendations

Areas where rock has been removed from the tundra should be monitored visually for deterioration. Even if the rock was carefully removed a thin layer of sand and gravel generally remains that will affect the vegetation and underlying thermal properties. This could depress the active layer and result in thawing and settlement.

Although no standing water was observed at the time of the inspection, it is understood that there a maintenance protocol in place whereby standing water is pumped out, and should be implemented whenever necessary.

The tension cracks observed near the control tower and other nearby structures should be repaired. Generally, these structures lie close to the edge of the pad and, if the cracks widen, there may be some movement or damage to the pad.

Photo: 3.9-1
West edge of airstrip and north apron

Direction:
South

Photo: 3.9-2
East edge airstrip extension

Direction:
South

Photo: 3.9-3
North end of airstrip; east edge

Direction:
North / East

Photo: 3.9-4
West edge of airstrip; south of north apron

Direction:
South

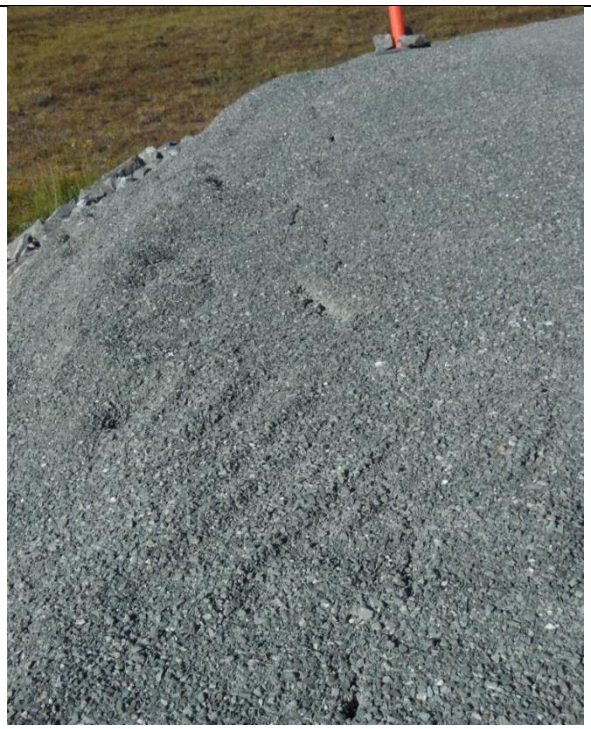

Photo: 3.9-5
Airstrip; edge of pad at north apron

Direction:
n/a

Photo: 3.9-6
Airstrip; north edge of north apron

Direction:
East

Photo: 3.9-7
Airstrip; north edge of south apron

Direction:
East

Photo: 3.9-8
Airstrip; east edge of south apron

Direction:
North

3.10 Former Wash Bay/Explosives Mixing Plant

General Description

The wash bay pad is a thermal rock fill pad constructed from ROQ material that is approximately 1 m thick. The pad is estimated to measure 60m x 30m. It houses a large modular building with a smaller adjoining modular building. The buildings are no longer in use. (Photos 3.10-1 to 3-10-3)

Observations

No standing water was observed against the toe of the perimeter of the rock fill pad or along the driveway, and there were no signs of thermal settlement. There was no standing water on top of the pad or areas of significant settlement. Significant tension cracks were noted on the north, east, and south sides of the pad.

Recommendations

If it is proposed to repurpose the building in the future, the tension cracks should be repaired. There is some potential for the cracking to propagate back into the pad and undermine the concrete building pad.

Photo: 3.10-1
Former Wash Bay/Explosives Mixing Plant; east edge of pad

Direction:
North

Photo: 3.10-2
Former Wash Bay/Explosives Mixing Plant; access road and turning pad

Direction:
East

Photo: 3.10-3
Former Wash Bay/Explosives Mixing Plant

Direction:
East

3.11 Upper and Lower Reagent Pads

General Description

Two large laydown areas are located on the west side of the Primary Road, south of the airstrip. Each pad is approximately 350 m in length, and varies from 70 to 150 m wide (estimated). The upper (north) reagent pad is roughly 2 m higher than the lower (south) reagent pad. The pads range between 1 and 3 m thick. (Photos 3.11-1 to 3.11-4)

Observations

In general, there were no signs of standing water on the surfaces of the upper and lower reagent pads, tension cracks along the crest, or areas of significant settlement. There was no standing water noted along the toe of the pads, or signs of thermal settlement.

Recommendations

None.

Photo: 3.11-1
Upper Reagent Pad; north edge of pad

Direction:
East

Photo: 3.11-2
Upper Reagent Pad; east edge

Direction:
South

Photo: 3.11-3
Slope between upper reagent and lower reagent pads

Direction:
East

Photo: 3.11-4
Lower reagent pad; east edge

Direction:
South

3.12 Upper Reagent Pad Ammonium Nitrate Storage

General Description

A lined bulk ammonium nitrate (AN) secondary storage area was constructed at the south end of the Upper Reagent Pad. It is a shallow (less than 0.5 m high) bunded area lined with HDPE and covered with gravel. (Photos 3.12-1 to 3.12-2)

Observations

Nothing is presently stored inside the secondary containment area. The HDPE liner is exposed in a few areas.

Recommendations

If it is proposed to use this area for secondary containment, the liner should be exposed to confirm that it is undamaged.

Photo: 3.12-1
Upper reagent pad AN secondary containment bund

Direction:
n/a

Photo: 3.12-2
Upper reagent pad AN secondary containment bund; exposed HDPE liner

Direction:
n/a

3.13 Batch Plant Pad

General Description

A thermal pad is located on the west side of the Primary Road between the Quarry #2 access road and Lower Reagent Pad. It is approximately 1m thick and measures roughly 125 m x 125 m. It originally housed crushed material processed from Quarry #2 but has been repurposed as a concrete batch mixing plant and associated supply storage. Fuel is stored in a tank inside a secondary containment bund.

Observations

In general, there were no signs of standing water on the surfaces of the pad, tension cracks along the crest, or areas of significant settlement. There was no standing water noted along the toe of the pads, or signs of thermal settlement.

Recommendations

None.

3.14 Sewage Treatment Plant Outfall

General Description

The sewage treatment plant outfall pipe is southwest of the Batch Plant Pad. It used to discharge treated effluent directly onto the tundra, but now only does so during the winter months (with a diffuser) as some thermal settlement and reduction in vegetation was noted in 2010 and 2011. The pipeline is extended and outflows onto a bedrock outcrop during the summer months. The extended pipeline is not used during winter months because of difficulties with keeping the pipeline unfrozen. (Photos 3.14-1 to 3.14-2)

Recommendations

The original pipeline outlet should be monitored in the spring for thermal settlement. The outlet should be switched to the bedrock outcrop as soon as possible in the spring.

Photo: 3.14-1
Winter sewage treatment plant outfall

Direction:
North / West

Photo: 3.14-2
Summer sewage treatment plant outfall on bedrock outcrop

Direction:
South / West

3.15 Landfarm / Rock Core Storage

General Description

A landfarm has been constructed immediately south of the Quarry #2 access road. Facility consists of three raised cells that are fully lined and have sumps. The cells consist of a clean water pond which only contains water that is suitable for discharge to the tundra; a snow pond which contains contaminated snow in winter, effluent consolidated from smaller fuel storage secondary containment berms around site, or treated water from the soil pond prior to being discharged onto the tundra once it meets discharge criteria; and one for remediating lighter hydrocarbon fraction contaminated soils. This facility is managed in accordance with the Landfarm Management Plan.

The landfarm was constructed on a levelled pad consisting of mixed overburden, organics, snow and ice, and oversize material from early Quarry #2 development. To minimize the risk of differential settlement the landfarm foundation was designed to include a layer of woven geotextile. This pad extends south of the landfarm cells. This Pad is used as a core storage area, and a burn pit for approved combustible construction materials. (Photos 3.15-1 to 3.15-8)

Observations

At the time of inspection, the clean water cell was about ½ full.

The snow pond was dry, and the base of the pond was covered with silt / sediment from the snowmelt and there were some larger rock pieces. There is a large pothole at the bottom of the access ramp from water discharge into the pond. There are also scuffmarks in the gravel from tires on the on the access ramp.

The soil cell was dry except in the corner by the sump. Some larger pieces of rock lay along the base of the pond with the soil.

The inner slopes had good stone coverage over the HDPE liner. The outer slopes were generally good except for some scuffmarks in the granular along the west limit, from equipment (e.g. Bobcat or similar equipment placing pipelines into the ponds).

There was water ponded between the south end of the rock core storage and the Quarry #2 Overburden Dump.

Recommendations

Large pieces of stone / rock should be removed from the cells to avoid damage to the HDPE liner. Areas where stone has been (partly) scuffed off the liner should be replaced to provide a full cover thickness. The pothole at the base of the snow pond ramp should be repaired and a diffuser should be used to reduce the impact of the inflow into the pond.

The area between the rock core storage and the Quarry #2 Overburden Dump should be kept free of standing water.

Photo: 3.15-1
Landfarm; south containment bund

Direction:
East

Photo: 3.15-2
Landfarm; soil cell **-**

Direction:
North / East