

design to develop a wetland model to estimate the performance in the context of the discharge for an engineered lagoon system. A discussion of the anticipated performance is provided in Section 8 of this report.

6.6 Snowdrift Assessment

A wind and snow assessment was completed by Novus Environmental for the new site. The conclusions and recommendations of this study include the following:

- Drifting snow will tend to accumulate along the southeast side of the lagoon. Thus, during spring thaw, the water will drain into the existing ponds
- The new site location will minimize snow drifting issues with the existing and proposed access road;
- The preferred location for the truck discharge point is at the midpoint of the northeast berm face.

6.7 Phase 1 environmental site assessments (ESA)

Based on the findings of the Phase I ESA completed at the new site, EXP did not identify any areas of potential environmental concern. No further environmental assessment work is recommended.

6.8 Aggregate and clay sources assessment

An aggregate and clay sources field assessment was completed in 2020. Visual observations from seven sites were provided together with a cursory estimation of an area available for extraction at each site. The findings were photo documented and summarized in a brief report (Appendix C). Sampling and testing were not a part of the review and were not conducted. The aggregate sources review is summarized below for the seven sites.



Figure 6-1 – Aggregate sources assessment sites

Aggregate Site 1 – Kudlik Rock Quarry – The site is a well-established quarry about 4.8 km from the existing lagoon with considerable amount of granular materials and a possibility for expansion. It has a good roadway access and a water source nearby. The quarry measures about 300 m by 300 m and has a rock face about 6 m high. The heavy equipment consists of a crusher that appears in good condition last used three years ago and trucks and loaders owned by Kudlik stored at the airport. The existing stockpiles consist of a small stockpile of 19 mm sized stone and a small stockpile of medium sized blasted bedrock. The quarry is located east of the airport on Middle Lake Road.

Aggregate Site 2 – Airport Stockpile – The site is a 30 m by 30 m and a couple of meters high stockpile of 19 mm sized crushed granular material that is for the airport use only and is not to be used by the Municipality. The stockpile is on the east side of the runway located 2.6 kilometers from the existing lagoon.

Aggregate Site 3 – Middle Lake Road - Old Abandonment Pit - The site is an abandoned pit with a possible one season left of screening and crushing of sand and gravel. The pit measures about 100 m by 1000 m and has been abandoned for almost 20 years. The equipment consists of old crushing plant and screens that seem non-functioning. The existing stockpiles include many small 1 m to 3 m high stockpiles of sand and gravel that can be screened and crushed. The site is located about 3 km from the existing lagoon. Possibly 1 season of sand and gravel available for use.

Aggregate Site 4 – Lagoon Road between Dump and Sewage Lagoon – The site has been occasionally used by the Municipality. The pit measures about 100 m by 400 m and is located between the dump and the sewage lagoon on the west side of the airport about 550 m east from the existing lagoon. Possibly one season of sand and gravel available for use.

Aggregate Site 5 – Municipality Borrow Pit – Water Plant Road – The site has been used since 1980s for sourcing granular materials for housing pads and road subgrades with a possibility to be used for another 20 years. The native material mostly consists of silty sand till with some gravel and boulders and trace of clay. The pit has 8 m to 10 m vertical banks which are being cut and the granular materials used directly around the Municipality. A screener is present on site which appears to be in use by the Municipality. The pit is southeast of the airport and west of the water reservoir about 3.1 km from the existing lagoon. Estimated 20 year plus of materials can be available for use in the eastern direction of the pit.

Aggregate Site 6 – Clay Pit – Water Plant Road – Clay has been sourced from this site for many years with clay being stripped and used yearly. Presently, large boulders have been scraped back to 20 m from the edge of the borrow pit to approximately 2 m below grade. The pit measures about 20 m by 100 m and is located east of the Municipality borrow pit on Water Plant Road about 3 km from the existing lagoon. Estimated available quantity for this site is unknown.

Aggregate Site 7 – Clay Pit – Near Water Plant Road – This site has been used for years as a clay source and has very limited resources left. The pit measures about 50 square metres and is located on the south side of the roadway before Plant Road about 3.2 km from the existing lagoon.

Recommendation

Sites 1 and 5 from the Material Aggregate Assessment report contain considerable granular resources and are the preferred sites for resource extraction. Sites 3 and 4 contain limited amounts of granular quantities but may also be used to supplement construction activities as required.

6.9 Bird Hazard Study

A bird hazard study associated with the bird attraction and the potential for bird collisions with aircraft was completed. The airport zoning regulations do not include a wildlife hazard clause. Overall, the lagoon project is expected to result in a moderately low to low bird hazard risk for aircraft using the Taloyoak Airport, with no mitigations. The potential for bird strikes in the area is reduced due to:

- Relative infrequency of aircraft flights;
- Seasonal activity of birds reducing bird activity in the area from November to May;
- Existing WWL within the Taloyoak AZR was low use based on interview data;
- Limited collisions to date suggesting that use is low and current deterrence is effective.

These factors suggest there is a moderate to low risk for bird strike events to occur near the Taloyoak Airport. Mitigation measures such as audio or visual deterrents may further limit birds from landing in, or being attracted to,

Appendix C - Material (Granular) Assessments



December 3, 2020

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**Re: OTT-000254843-A0 Review of Existing Aggregate Resources
Hamlet of Taloyoak, Nunavut - SOA 2018-77**

Dear David,

Attached please find a summary of our field review of the available aggregate and clay sources in the Hamlet of Taloyoak, Nunavut. This work was completed under our SOA agreement Number 2018-77 with the Government of Nunavut.

EXP terms of reference for this project were outlined in our proposal number: 200816 dated August 16, 2020 and listed below:

- Review of background documentation provided by CGS;
- Visual inspection of each of the six (6) available granular resource sites;
- Photo documentation of each of the sites;
- Cursory estimation of the area available at each site for granular resource extraction; and
- Documentation of the findings in a brief geotechnical assessment report.

Sampling and testing of any of the reviewed sites and resources did not form part of EXP terms of reference for this project.

Methodology

The review was completed by a senior geotechnician from EXP Services Inc. (EXP) who was accompanied by a representative from the hamlet. A total of six (6) sites were reviewed at the locations shown in Figure 1 and in each section of this letter type report. The photographs of each site are also shown in Appendix A.

A summary of each site reviewed along with documentation is provided in the following sections of this report.

Site 1- Kudlik Rock Quarry- Photos 1 to 4

This quarry is located east of the airport on Middle Lake Road. The following observations were made during the field review:

- The existing quarry measures approximately 300 m by 300 m in size and has a rock face with a height of +/- 6 m. There are good access roadways to the quarry and a water source near the quarry;
- Rock has been blasted already between UTM 15W0478590 and 15W478684 and 7716738 and 7716514;
- There was a small stockpile of 19 mm sized stone on-site (20 m in diameter, 4 m in height) along with a small stockpile of medium sized blasted bedrock (20 m in diameter and 4 m in height);
- There is an existing crusher on-site which was last used 3 years ago. The crusher appears to be in good condition. The trucks and loaders owned by Kudlik and previously used at this quarry are stored at the airport. The stockpiles and crusher coordinates are at UTM 047868 and 7716834;
- This existing rock quarry is of unlimited quantity and the rock appears to be of good quality. This quarry can be expanded in the north-south as well as in the east-west directions; and
- The site is located 4.8 kilometres approximately east from the existing lagoon.



Site 1 Location

In summary, this is a well-established quarry with considerable amount of resources and has roadway access to allow for blasting operation and the production of aggregates.

Site 2- Airport Stockpile- Photo 5

The following observations were made during the field review:

- This stockpile is 30 m by 30 m in size by 3 m in height and consists of 19 mm sized crushed granular located on the east side of the runway at UTM 15W0477645 AND 7715347. This stockpile is not to be used by the hamlet and is for airport use only; and
- The site is located 2.6 kilometres approximately east from the existing lagoon.

Site 3- Middle Lake Road – Old Abandonment Pit-Photos 6 to 9

This pit is located on the north side Middle Lake Road. The following observations were made during the field review:

- This pit has been abandoned for almost 20 years; UTM location between 15W0477790 and 15W0477589 and 7715847 and 7715603;
- Approximately a 100 m to 150 m in wide and 1.0 kilometre (1,000 m) long area have been scraped to remove sand and gravel for screening and crushing purposes;
- Old crushing plant and screens are on-site and appeared to be in a non-working condition;
- Crushable sand and gravel remain available on-site for one (1) season of screening and crushing;
- There are many small 1 m to 3 m high stockpiles of sand and gravel over the site that can be screened and crushed, if needed; and
- The site is located 3.0 kilometres east approximately from the existing lagoon.



Site 2, Site 3, & Site 4 Locations

In summary, this is an abandoned pit with a possible one (1) season of sand and gravel that may be scraped, crushed and screened.

Site 4- Lagoon Road between Dump and Sewage Lagoon- Photos 10 to 12

This site is located between the dump and the sewage lagoon on the west side of airport. The following observations were made during the field review:

- This pit is approximately 100 m by 400 m in size and at UTM 15W0477589 and 15W477220 and 7715606 and 7715337;
- This pit is mainly sand with gravel and has been used occasionally by the hamlet for screening of sand product;
- Some pit material may still be available from this source to scrape and screen; potential of half ($\frac{1}{2}$) season of use; and
- The site is located 550 m east approximately from the existing lagoon.

Site 5- Hamlet Borrow Pit- Water Plant Road- Photos 13 to 15

This pit is located southeast of the airport and west of the water reservoir at UTM 15W0477237 and 15W0479100 and 7715227 and 7714987. The following observations were made during the field review:

- This pit has been in use since the 1980s mainly for the production of granular required for construction of housing pads and roadway subgrades;
- This pit has 8 m to 10 m high vertical banks which are being cut and loaded on trucks directly for use around the hamlet. Boulders are present and have been stockpiled on-site. The native source consists mostly of silty sand till with some gravel and boulders and trace of clay;
- There is a screener on site which appears to be in use by the hamlet;
- Another 20 year plus can be available for use in the eastern direction within the pit;
- The area is dry and has stable banks to allow for easy access and removal; and
- The site is located 3.1 kilometres east approximately from the existing lagoon.

In summary, this pit has potential for additional granular material that can be screened and used around the hamlet.

Site 6- Clay Pit – Water Plant Road – Photos 16 to 17

The following observations were made during the field review:

- This pit is located east of the hamlet borrow pit on Water Plant Road, on top of the bank of the borrow pit at UTM 15W0479080 and 7715000;
- This pit is about 20 m by 100 m in size and has been in use for many years. Presently, large boulders have been scraped back to 20 m from the edge of the borrow pit to approximately 2 m below grade. Each year, clay is stripped and used from this source, as needed; and
- The site is located 3.0 kilometres east approximately from the existing lagoon.

Site 7- Clay Pit – Near Water Plant Road – Photos 18 to 19

The following observations were made during the field review:



Sites 5, 6 and 7 Locations

This pit is located on the south side of the roadway before Plant Road and is approximately 50 square metre in area and has been used for years. The pit is located at UTM 15W04479360 and 7715133. This pit has very limited resources left; and

The site is located 3.2 kilometres approximately from the existing lagoon.

Closure

We trust that the information contained in this report will be satisfactory for your purposes at this time. Please do not hesitate to contact this office should you have any question or should you require any additional information

Sampling and laboratory testing would be required to confirm the observations and conclusions made in this report regarding aggregate/clay availability, suitability and procurement.

Sincerely,

EXP Services Inc.

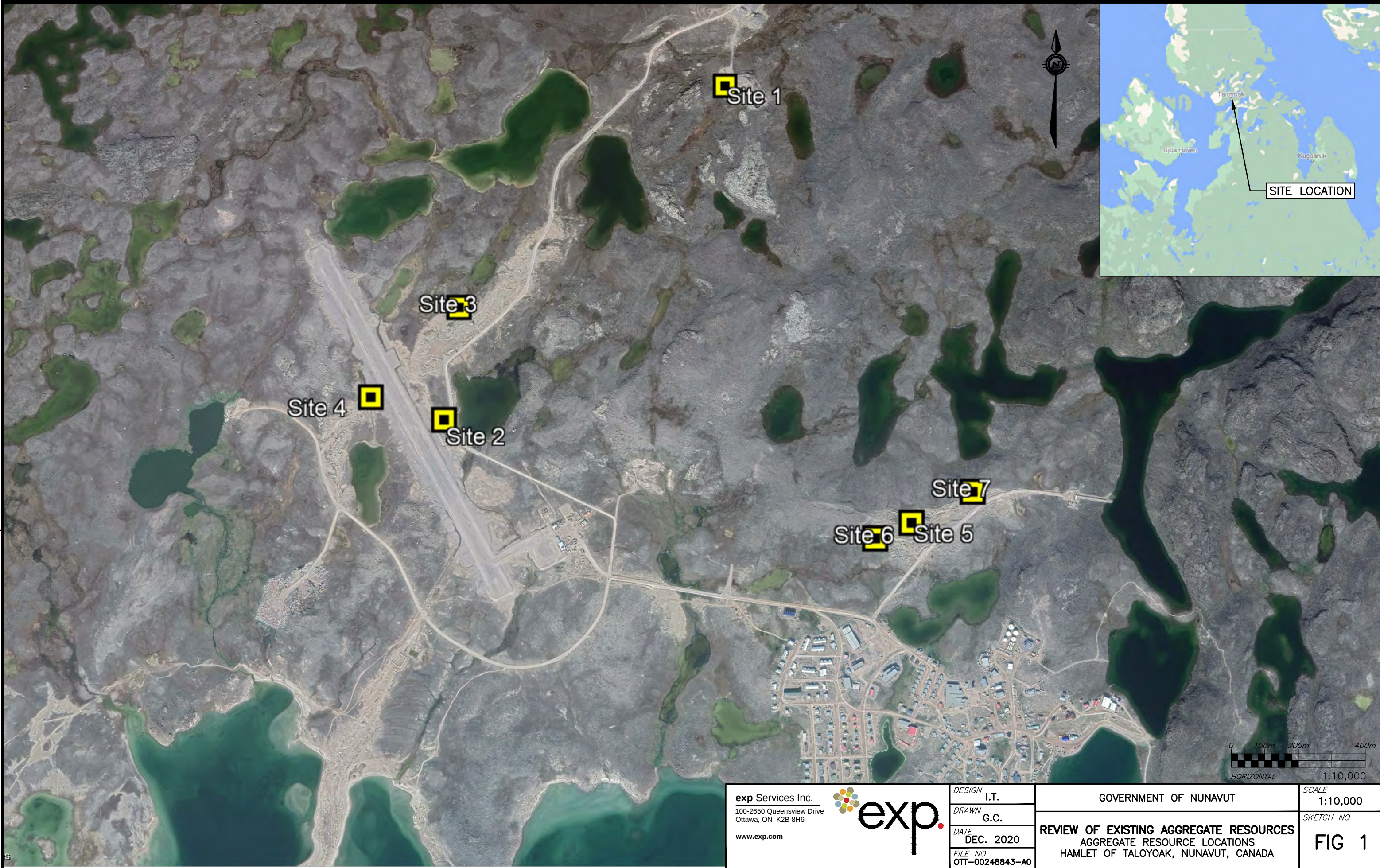
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*Government of Nunavut
Review of Existing Aggregate Resources
Taloyoak Sewage Lagoon, Hamlet of Taloyoak, Nunavut
Project: OTT-00254843-A0
December 7, 2020*

Figures



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DATE	DEC. 2020
FILE NO	OTT-00248843-A0

GOVERNMENT OF NUNAVUT	
REVIEW OF EXISTING AGGREGATE RESOURCES AGGREGATE RESOURCE LOCATIONS HAMLET OF TALOYOAK, NUNAVUT, CANADA	

SCALE	1:10,000
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EXP Services Inc.

*Government of Nunavut
Review of Existing Aggregate Resources
Taloyoak Sewage Lagoon, Hamlet of Taloyoak, Nunavut
Project: OTT-00254843-A0
December 7, 2020*

Appendix A: Photographs



Photo 1: Site 1- Kudlik Quarry - Blasted rock stockpiled Ready for Crushing



Photo 2: Site 1- Kudlik Quarry – Additional Blasted Rock Stockpiles for Crushing



Photo 3: Site 1- Kudlik Quarry - View of quarry from top of Rock outcrop looking from East limit westward



Photo 4: Site 1- Kudlik Quarry – East Limit view Looking West



Photo 5: Site 2- Airport Stockpile (30m by 30m y 2m high). For Airport use only



Photo 6: Site 3 – Old Abandoned Pit -Middle Lake Road



Photo 7: Site 3- Abandoned Pit -Middle Lake Road- Old and Abandoned Crusher



Photo 8: Site 3- Abandoned Pit -Middle Lake Road- Close View of Abandoned Crusher



Photo 9: Site 3- Abandoned Pit -Middle Lake Road- Old Vehicles and Metal Debris Throughout



Photo 10: Site 4- Lagoon Road Sand Pit- Looking North along West side of Lagoon Road



Photo 11: Site 4- Lagoon Road Sand Pit- Looking South on West side of Lagoon Road



Photo 12: Site 4- Lagoon Road Sand Pit- Looking East from West side of Lagoon Road



Photo 13: Site 5 Hamlet Borrow Pit- Water Plant Road
Screening plant only with loader and truck- 6m Banks- in operation



Photo 14: Site 5 Hamlet Borrow Pit- Water Plant Road -Screening Plant and Loader



Photo 15: Site 5 Hamlet Borrow Pit – Water Plant Road- Rock and Boulder Stockpiles



Photo 16: Site 6 Clay Pit – East of Hamlet Borrow Pit – Just Before the Pump Station stripped to Surface of Clay



Photo 17: Site 6 Clay Pit – East of Hamlet Borrow Pit – Area on top of Borrow Pit Stripped to Surface of Clay



Photo 18: Site 7 , Clay Source North side of Water Plant Road



Photo 19: Site 7 – Clay Source - South side Waterfront Road

