APPENDIX D

APPENDIX D SET 3 DESKTOP GEOTECHNICAL ASSESSMENT

February 11, 2005

EBA File: 1100060.002

Tahera Diamond Corporation
Suite 803 – 121 Richmond Street West
Toronto, Ontario
M5H 2K1

Attention: Dan Johnson
Executive Vice President, Operations

Subject: **Fuel Storage Facilities**
Desktop Geotechnical Assessment
Jericho Diamonds Project

1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) has carried out a desktop geotechnical review of the layout of the proposed Tank Farm (Figure 1). Authorization to carry out this work was provided by Mr. Ron Hildebrand of Hatch Associates Ltd. (Hatch) on behalf of Tahera Diamond Corporation. This letter outlines the information that EBA has reviewed and provides recommendations based on the available information. Recommendations for further work are provided in Section 6.0.

2.0 AVAILABLE INFORMATION

Available information reviewed included:

- Technical Memorandum A, Supplemental Geotechnical Data, Jericho Project, Nunavut, dated October 2003. Prepared by SRK Consulting Engineers and Scientists (SRK).
- Footprint of Proposed Tanks Development prepared by Hatch (provided by Mr. Len McHale of Nuna Logistics).
- 1:20,000 Scale Aerial Photographs provided by Mike Johnson
- Black and White aerial Photographs provided by Mike Johnson
- Telephone conversation with Len McHale (December 15th, 2004)

14940 - 123 Avenue, Edmonton, Alberta T5V 1B4 - Tel: (780) 451-2121 - Fax: (780) 454-5688
Email: edmonton@eba.ca - Web Site: www.eba.ca

The SRK Report (2003) is a compilation of geotechnical factual information collected by SRK and others since 1996. Although none of the subsurface investigation borehole information pertains directly to the area of the Tank Farm, the report provides 1:20,000 scale surficial geology mapping prepared by Thurber Engineering Ltd. (TEL) in September 2003 and draft results of a 1996 borrow investigation by Bruce Geotechnical Consultants Inc (BGC).

3.0 DESCRIPTION OF TANK FARM

The proposed tank farm layout prepared by Hatch is shown in Figure 1. Figures 2 and 3 prepared by EBA overlay the Hatch layout on the available topography (Figure 2) and aerial photo (Figure 3). Based on this information, it appears the tank farm footprint crosses a topographic transition of sloping terrain to relatively flat-lying poorly drained terrain. The south end of the tank farm is located on the toe of a 7 percent north facing slope (approximate). Available surficial geology mapping suggests that bedrock may be near surface but is not definitive. The most recent surficial geology by TEL describes the area to be "undifferentiated metamorphic and volcanic bedrock. Several columnar jointed dykes strike across the eastern map area. Very complex areas of bedrock and colluvium occur on north facing slopes located directly south of Carat Lake." TEL go on to say in their terrain assessment that bouldery colluvium, organic deposits and possible alluvium can interfere with differentiation between till and bedrock from aerial photographs.

Figure 4 shows a cross-section through the tank farm prepared using the available topographic information. EBA's assessment is based strictly on a review of the aerial photographs. Based on our review of the aerial photographs and EBA's experience on other mine sites in similar terrain, it is EBA's assessment that the tank farm footprint may have surface organics underlain by thick deposits of ice-rich glacial till.

4.0 BORROW SOURCES

A borrow investigation was carried out by Bruce Geotechnical Consultants Inc. (BGC) in 1996 in an area referenced as the esker and glacial outwash delta complex, located immediately northeast of Carat Lake. Areas of dry materials were noted as well as deposits with sand and gravel that contain excess ice. The reports do not provide volumes of the respective materials.

BGC Figure 2 in Appendix A shows the borehole and test pit locations.

Based on BGC investigation results some dry sand to sand and gravel borrow material was found in Testpits (96-BGC-J01 to 96-BGC-J04) at shallow depths between 0.3 to 0.6 m below grade and in Borehole 96-BGC-07 at 0.76 m below grade. This is based on results from washed sieve particle size analysis results and moisture content analyses of the BGC samples that were forwarded to EBA's Yellowknife Laboratory.

Testpits (96-BGC-J01 to 96-BGC-J04) and Borehole 96-BGC-07 logs, particle size distributions, and moisture contents are also included in Appendix A.

Best practices for resourcing granular materials for winter construction will require careful selection of materials and sorting to extract sand or sand and gravel that are very weakly bonded at freezing temperatures and free of any excess ice.

5.0 EVALUATION AND RECOMMENDATIONS

5.1 General

The proposed design described herein is based on assumptions made by EBA on the subsurface conditions at the proposed tank farm site. Subsurface investigation for the tank farm would provide EBA the ability to make better predictions of long term performance and might result in a different design. It is recommended that subsurface investigation be carried out at the first opportunity.

5.2 Site Preparation

The tank farm will comprise a lined, bermed spill containment area, a set of eight- 8.15 m diameter by approximately 9.75 m high diesel fuel storage tanks (Set 1) and a second set of 14.63 m diameter by 9.75 high tanks (Set 2). The Set 1 tank farm will be constructed and the tanks filled for the first time during the winter of 2005. The facility is expected to be in use for about 10 years.

No subsurface investigation information exists for the tanks farm. It is possible that thick deposits of ice rich glacial till materials exist discontinuously over bedrock in the tank farm footprint. If allowed to thaw under the weight of the proposed fills and tanks, these materials would be susceptible to differential thaw strain. Assuming that ice-rich soil exists, the design objective is to construct fills that will preserve the native soils in a frozen condition. This can be accomplished by constructing a uniformly thick non-frost susceptible granular fill pad.

Seasonal freeze thaw depths in well drained fills are estimated to be about 3.5 m and therefore a minimum fill thickness of 3.5 m is recommended.

It is understood that a crusher will be mobilized to site to facilitate the production of aggregates but will not be in operation for the winter 2004/2005 construction of the Set 1 Tank Farm.

Observations of the native undisturbed ground conditions in the tank farm should made on site by EBA prior to the placement of fills. Disturbance of the ground conditions should be minimized for winter construction except for leveling purposes. It is strongly recommended that the site preparation commence by benching into the toe so that the tank farm is keyed into the sloping terrain. Blasting operations should leave near-flat lying benches from which winter fill construction can be carried out. Any steps in the bench should be located so that the thickness of fill beneath each tank is uniform in thickness.

Recommended Fill Construction

The recommended design cross-section incorporates a combined minimum thickness of 3.5 m of granular fill placed above a level grade to the elevation of the bottom of the liner, as shown in Figure 4. The “Granite Stockpile” Run of Mine (ROM) material would be adequate for constructing the first 3.0 m of granular fill provided it is placed using best construction practices. A controlled rockfill constructed using best practices ordinarily implies some maximum rock size (ideally about 600 mm diameter), a consistent distribution of particles sizes and consistent methodology for placing the fill.

It is recommended that at least a 500 mm thick layer of 150 mm minus crushed material be placed over the surface of the ROM to reduce the possibility of any loss of liner bedding materials into the voids of the rockfill. Bedding material used below the liner may be either manufactured crushed materials or imported sand. Typical either 20 mm maximum size crushed materials or 50 mm maximum size granular materials with rounded particles may be used. Sharp aggregates in the crushed sand gravels that are greater than 20 mm diameter can cut liner materials. A thin layer of sand and/or a heavy weight (12ounce) non woven fabric can be used to provide protection to the liner from aggregates of 20 to 50 mm diameter in size. Crushed granular fills with 50 mm maximum size should also be used to construct the interior and perimeter berms. Use of a 50 mm material for the berms makes excavation of an anchor trench for the liner installation more practical.

It is expected that some “sand and gravel ” bedding material will be available from local borrow sources. Weakly bonded frozen material with no excess ice and as dry as possible should be used during the winter.

Winter 2004/2005 Construction at Set Tank Farm

It is understood that crushing operations will not be in place in time for the winter 2004/2005 construction. The structure described above should be followed as close as possible using materials sorted from either ROM or from the available natural granular borrow. All materials placed should be observed and recorded by qualified geotechnical personnel.

Winter 2004/2005 Construction at Set 2 Tank Farm

Unless subsurface investigation is undertaken which clearly shows summer construction is feasible at the Set 2 Tank farm, it is recommended that the ROM fill be placed and compacted this winter to a finished thickness of at least 3.5 m over the footprint of the Set 2 Tank Farm to preserve the subgrade in a frozen condition. Summer construction would include subexcavating and reconstructing the upper fills once the crushed granular materials are available.

5.3 Fill Material Placement

It is imperative that all fill materials be compacted as they are placed. Research and past experience has shown that winter compaction of dry coarse granular fill materials can significantly increase the in situ density even though it is impractical to moisture condition these materials to the optimum moisture content. It is also imperative that all snow be carefully cleared from the ground surface before any fill materials are placed such that it does not become part of the embankment and then lead to settlement during the summer following construction. Any snow that accumulates during fill placement or during periodic storms must be removed as well. Fill materials with snow in them should be rejected. Certainly, winter placement of the fill materials will lead to lower densities than could be achieved in the summer.

Past experience has shown that compaction of coarse rockfill is not feasible with normal compaction equipment because it is very hard on the equipment. EBA have observed construction of fills constructed using 600 mm maximum size material. The most effective technique employed with this material has been compaction with a large dozer and loaded haul trucks. All remaining granular materials materials should be compacted with large smooth drum vibratory compactors.

All aspects of fill placement should be monitored. A spotter should be positioned beside the dozer to monitor the placement and thickness of the backfill. Close monitoring of the fill placement is critical to reduce the risk of puncturing the liner. Hand excavation of small test pits to check backfill depths and liner integrity may be necessary.

6.0 RECOMMENDATIONS FOR ADDITIONAL WORK

Settlement performance of the tanks should be monitored until such time as the tanks settlement performance has been established. In spite of the application of best practices, settlements may occur. Settlements related to the thaw of isolated pocket of frozen fills with excess ice are most likely to occur in the first year.

Installation of a thermistor cable to monitor ground temperatures would provide a means of assessing the performance of the fill in preserving the subgrade soils in a frozen conditions and are strongly recommended.

7.0 LIMITATIONS

The recommendations provided herein are based on our review of the information described in Section 2.0. EBA should also be given the opportunity to review the final construction drawings and specifications well in advance of construction. It is recommended that site preparation and observation of the fill placement for the tank farms be monitored by qualified personnel under the direction of a geotechnical engineer. Quality control of the liner materials and installation should undertaken by liner specialists.

Although the recommendations in this report are intended to provide the guidance necessary to complete design and reduce the likelihood of changes at the time of construction, changes may be required.

This letter report has been prepared in accordance with generally accepted foundation engineering practices. No other warranty is made, either express or implied. Reference should be made to EBA's Geotechnical General Conditions, attached to this letter report, for further limitations.

8.0 CLOSURE

EBA trusts that this report satisfies your present requirements. If you require any additional information please contact us.

Respectfully submitted,
EBA Engineering Consultants Ltd.

Mark Watson, P. Eng
Senior Geotechnical Engineer
Arctic Practice
(Direct Line: (780) 451-2130, ext. 277)
(E-mail: mwatson@eba.ca)

Reviewed by:

Bill Horne, P. Eng.
Senior Project Engineer
Circumpolar Region
(Direct Line: (780) 451-2130, ext. 276
(e-mail: bhorne@eba.ca)

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This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

2.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

3.0 LOGS OF TEST HOLES

The test hole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

4.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

5.0 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

6.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

7.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

8.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

9.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

10.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

11.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

12.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the client's expense upon written request, otherwise samples will be discarded.

13.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practising under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

14.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

15.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

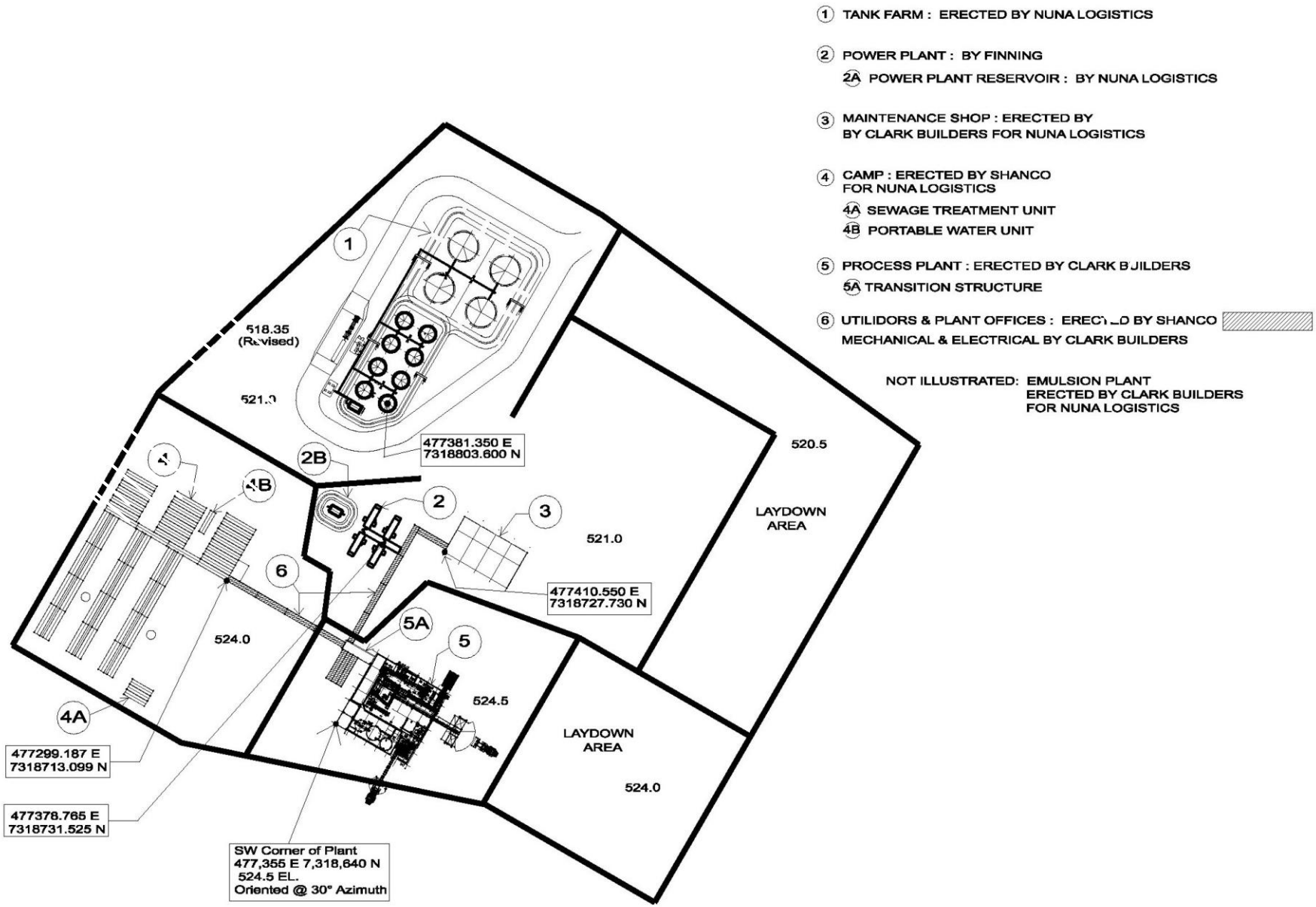


Figure 1

Jericho Plant Site Layout

1100060K01b.cdr

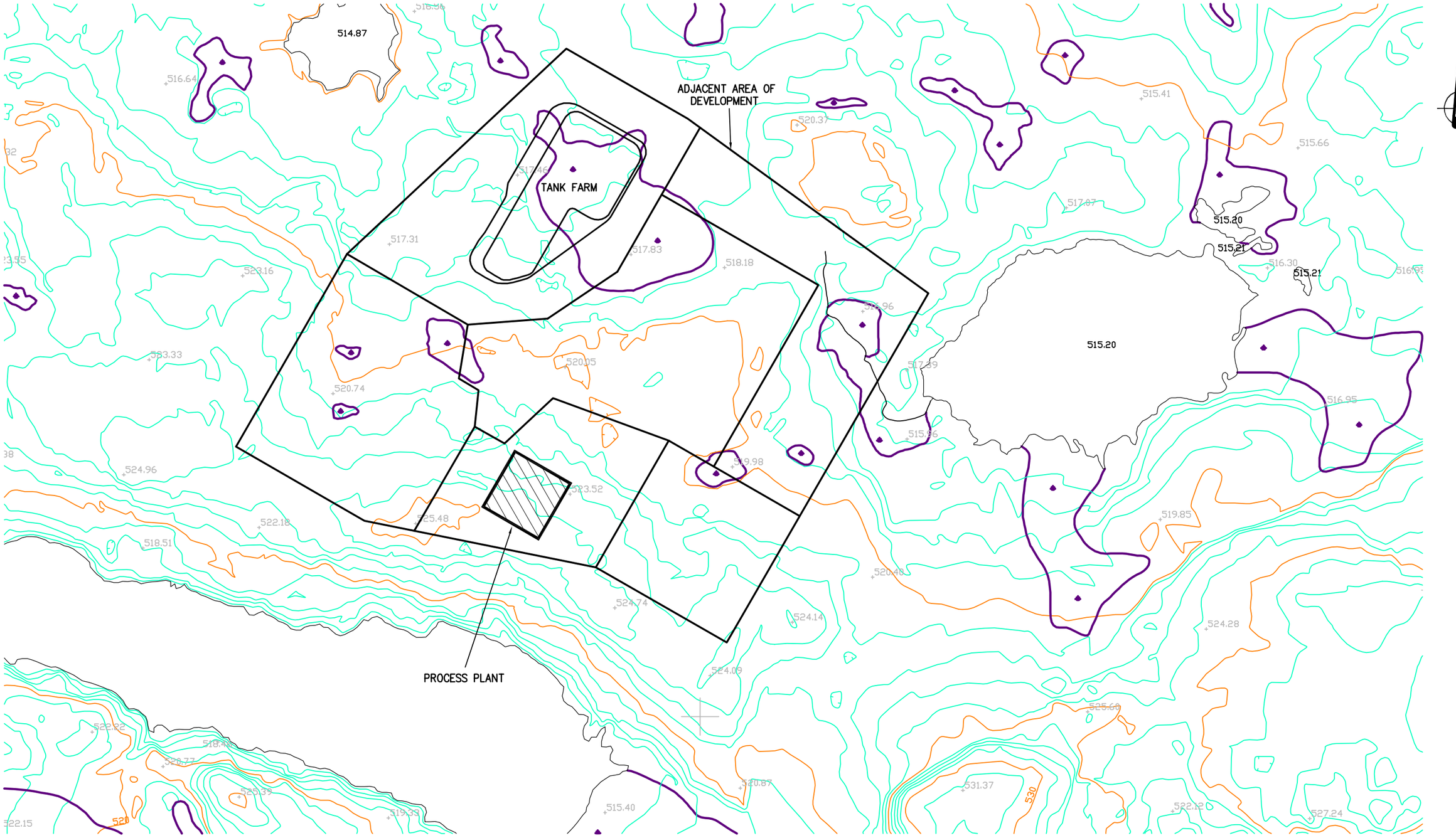


Figure 2

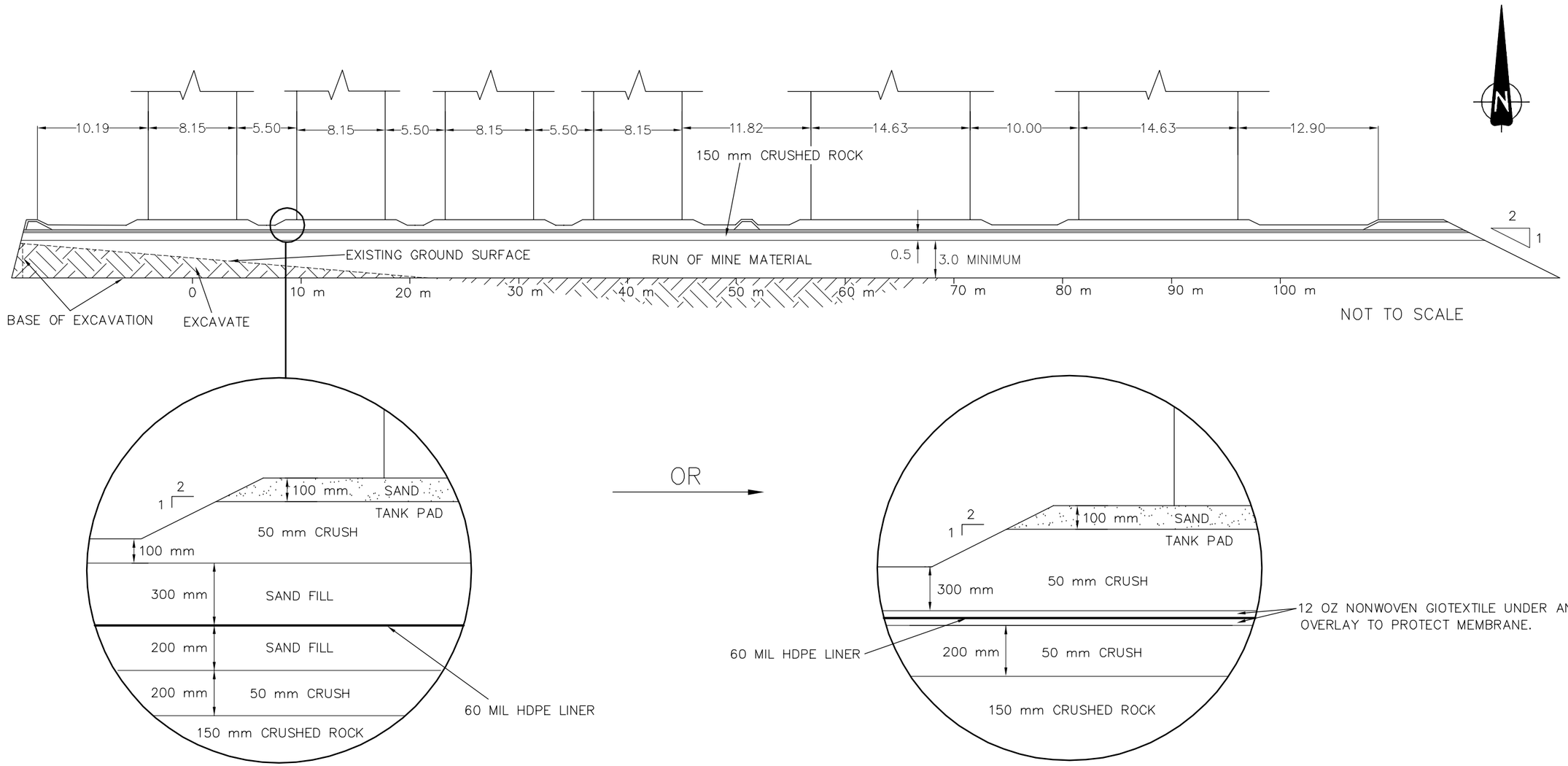
Proposed Tank Farm Location

1100060Q03b.dwg

Figure 3

Proposed Tank Farm Location

1100060Q04a.dwg



ALTERNATE 1

NOT TO SCALE

ALTERNATE 2

NOT TO SCALE

Figure 4
Proposed Fill Configuration
Tank Farm Liner Design

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