Jericho Diamond Mine

Waste Rock Management Plan
(Part 1, Waste Rock and Overburden)

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Executive Summary

General

The Jericho Diamond Mine is being developed by Tahera Diamond Corporation (Tahera) in the Canadian Shield northeast of Yellowknife. This document is Part 1 of the Waste Rock Management Plan (WRMP). It addresses the waste rock dumps that will be built to store the waste rock and overburden. All of the structures covered by the WRMP will be developed progressively and will be in place at the end of the operating life of the mine. Part 2, to be issued subsequent to this plan, will address the kimberlite stockpiles, as well as the coarse PK and recovery PK stockpiles. Detailed management plans for the fine PK will be provided in the PKCA Management Plan.

This document has been prepared as a management tool and to fulfil the requirements of the Jericho Mine Water Licence (NWB1JER0410), Part D, Item 10 and Part H, Item 3 of the Water License. The document is intended primarily for use by Tahera and its contractors to ensure that appropriate management procedures are followed during construction and operation of the mine and that appropriate information is obtained by Tahera in relation to mine closure planning.

The plan includes the following:

1. Detailed implementation for the construction of the waste rock dumps;
2. Design criteria and parameters for the waste rock dumps;
3. Design plan for the use of the haul road as the waste rock buttress for waste dump #2;
4. Operational volumes of materials for each pile based on the open pit/underground (OP/UG) mining scenario;
5. The maintenance of a 200 meter buffer zone between the waste rock dumps and Carat Lake;
6. Stability assessments based on projected volumes; and
7. Monitoring to be done during construction.

Furthermore, the waste rock management plan;

- has been developed in accordance with the DIAND “Guidelines for Acid Rock Drainage Protection in the North”, and
- describes decision criteria and operating procedures of how waste rock will be placed and managed during construction, mining, and post-closure; and,
- Includes an annual schedule for waste rock by type, tonnage and destination over the term of the project; and,

- A description of the operational procedures that will be used to segregate and manage the rock that is identified for construction purposes; and,

- A description of the sampling design and analytical methods that will be used to support the operational classification of the rock types; and,

- A description of the methods used to construct the waste rock dumps to minimize the potential for acidic drainage and/or metal leaching.

The Jericho kimberlite pipe is approximately 300 m long and 100 m wide and is hosted by granitic bedrock. Pleistocene glacial sediments (overburden) up to 20 m thick overlie the kimberlite pipe. The terrain at the Jericho site is characterized by subdued relief, numerous small lakes and many small ephemeral streams interspersed among boulder fields, eskers and bedrock outcrops.

Mine Plan

The mine plan consists of an initial open pit mining plan to mine 3.6 million tonnes of kimberlite reserves and resources, of which 2.0 million tonnes are classified as reserves and 1.6 million tonnes are classified as resources (low grade), which will require processing to determine the economics of the resource and possible reclassification into reserves. This determination will be made in the initial year of mine operations. Should this inferred resource kimberlite material be uneconomic, the low-grade kimberlite material would be stockpiled as a waste rock and the mine plan would likely convert to an underground operation for the final two years of operation to mine an additional 0.6 million tonnes the high grade reserve zone of the deposit. On the other hand, should the inferred material prove to be economic, then the mine plan is most economically beneficial to remain as an open pit operation providing additional 25% kimberlite reserve and resource material. The (OP/UG) mine plan quantities shown herein are based on the combined open pit underground mine plan.

Mine Waste Quantities and Physical and Geochemical Properties

The life-of-mine waste quantities will be influenced by the economics of the inferred resources kimberlite material, pit slopes, actual kimberlite ore body configuration, and the economic break point, if any, between open pit and underground mining. Based on the OP/UG mine plan, the volume of waste rock is estimated to be 6.8 million m^3 (exclusive of about 0.4 million m^3 that will be used for site development and construction). The waste rock (country rock) will be comprised of granite, granodiorite and some diabase. The waste rock will be extremely competent and strong. Geochemical testing indicated there are minimal concerns with respect to ARD and metal leaching from the waste rock.

The overburden, of which there will be about 1 million m^3 for the OP/UG mine plan, will be comprised mainly of frozen sand and gravel, and granite boulders with some zones of silt and glacial till.

Waste Dump Design

There will be two waste dumps zones (site 1, for waste rock and site 2 for overburden and waste rock). The layout of the two waste dumps has been optimized in order to minimize the number of catchments affected by the facilities, control seepage, provide a suitable buffer distance with the nearest large lake (Carat Lake), conform generally with the natural relief and minimize haul distances.

Foundation conditions at the waste dumps typically consist of bedrock with isolated small, thin pockets of granular colluvial soils or till with, in some locations, a thin veneer of organic soil.

The dumps will be unlined. Due to the potential that some of the overburden could thaw, the overburden waste material will be placed in dump #2 up slope of the open pit and up slope of the initial haul road which will act as a waste rock containment buttress.

The waste dumps have been designed in order to meet appropriate physical stability criteria and to facilitate access by wildlife. Slopes on the downstream side of dumps will have benches about 15 m wide at vertical increments of approximately 10 m, which will provide an overall average slope of about 2.6H:1V. At the upstream side of waste dump # 1, the dump height is lower than its overall average and the natural ground at the dump toe is rising. These factors significantly improve the stability and, as a consequence, the upstream slope will be constructed at an angle of repose (about 1.4H:1V). Waste dump #2 will be constructed first and will be the principal dump during construction and the first year of operations. The initial construction of Waste dump #1 will be restricted to an area whereby any runoff or seepage could be directed to the open pit.

Control Measures during Construction and Operation

All of the waste rock (granite) mined during the construction phase will be used in the construction of roads, pads, fills, embankments, dikes, and dams. The contact between the overburden till waste rock and the rock is easily discernable to operations personnel and samples will be taken regularly during the construction phase to verify the waste rock characteristics. Further controls are in place in order to minimize the loss of nitrogen to waste rock. The use of explosives in all aspects of the mining operation will be closely managed as per the Explosives Management Plan.

The dumps will be constructed so as to promote stability and generally encourage the aggradation of permafrost into the respective dump area. Key actions that may be included during the construction of these facilities include placement of an inspection road (which will act as a frozen berm) at the toe near dump toes and the placement of the initial lift of waste rock in winter to the extent possible

Closure and Reclamation of the Waste Dumps

The target end land use for these areas will be wildlife habitat. Therefore, the aim of the closure plan is to promote, to the extent practical, rehabilitation of the land to this use. Key elements of the plan include vegetation prescriptions based on reclamation trials, re-grading dump slopes and construction of ramps to allow safe caribou transit across the dump slopes. Further details are provided in the Closure and Reclamation Plan.

Verification and Monitoring Plans

Geochemical monitoring and seepage sampling will be carried out to confirm the geochemical properties of the waste rock, and overburden waste rock. Thermal instrumentation will be installed to monitor freezing of the dumps. Results of these programs will be reported in an annual seepage and waste rock monitoring report.

A program of regular visual inspections, including an annual inspection by a geotechnical or civil engineer registered in Nunavut, will be implemented so as to evaluate the performance and condition of each dump or stockpile.

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1 Introduction

This document presents Part 1 of the Waste Rock Management Plan (WRMP) for the Jericho Diamond Mine owned by Tahera Diamond Corporation (Tahera). All of the structures covered by the WRMP will be developed progressively and will be in place at the end of the operating life of the mine. Part 1 of the WRMP incorporates the waste rock and overburden waste rock dumps. Part 2, to be issued subsequent to this plan, will address the kimberlite stockpiles, as well as the coarse PK and recovery PK stockpiles. Detailed management plans for the fine PK will be provided in the PKCA Management Plan.

This document has been prepared both as a management tool and to fulfil the requirements of the Jericho Mine Water Licence (NWB1JER0410), Part D, Item 10 and Part H, Item 3 of the Water License. The document is intended primarily for use by Tahera and its contractors to ensure that appropriate management procedures are followed during construction and operation of the mine and that appropriate information is obtained by Tahera in relation to mine closure planning.

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Furthermore, the waste rock management plan;

a. has been developed in accordance with the DIAND “Guidelines for Acid Rock Drainage Protection in the North”, and
b. describes decision criteria and operating procedures of how waste rock will be placed and managed during construction, mining, and post-closure; and,
c. Includes an annual schedule for waste rock by type, tonnage and destination over the term of the project; and,

d. A description of the operational procedures that will be used to segregate and manage the rock that is identified for construction purposes; and,

e. A description of the sampling design and analytical methods that will be used to support the operational classification of the rock types; and,

f. A description of the methods used to construct the waste rock dumps to minimize the potential for acidic drainage and/or metal leaching.

2 Background Information

2.1 Geology

The Jericho Diamond Project is situated in the northern portion of the Slave Geological Province, within the Canadian Shield. The deposit consists of an elongate kimberlite pipe with a length of approximately 300 metres (m), a width of up to 100 m, and a depth of at least 350 m. The kimberlite is hosted by regionally extensive Archean granitic rocks, which vary locally and over very short distances from granodiorite to syenogranite, with associated pegmatite phases. The granitic rocks have been intruded by Proterozoic diabase dykes. Pleistocene glacial sediments occur sporadically throughout the region, and provide a 10 to 20 m cover over the kimberlite pipe.

The Jericho kimberlite was formed from multiple emplacement events, comprising a precursor dyke (JDF2) and three diatreme intrusive stages consisting of a northern (JDF4N), central (JDF6) and southern lobe (JDF4S). The precursor dyke is described as a hypabyssal kimberlite or kimberlite breccia with a finely crystalline, calcite and oxide-rich groundmass hosting macrocrysts of olivine as well as garnet, chrome diopside, ilmenite and mantle xenoliths. The northern and southern lobes are serpentinized, fragmental kimberlites containing olivine macrocrysts, mantle xenoliths as well as xenocrysts and macrocrysts of chrome diopside, phlogopite and ilmenite, and 5 to 10% crustal xenoliths of granodiorite, diabase and limestone. The central lobe is a clast-supported tuffisitic kimberlite, with a serpentinized groundmass hosting olivine macrocrysts, 5 to 10% crustal xenoliths of limestone and granodiorite, and mantle derived material.

The granitic country rock consists of a biotite +/- muscovite granite with associated pegmatite, which varies from weakly foliated to massive. A large diabase dyke crosses through the east side of the kimberlite, and will be encountered during mining. Minor quantities of andesite, aplitic dykes, and quartz veins are found along with the granite. The relative percentage (by length of drill core) of the rock types from the five 1999/2000 geotechnical drill holes are presented in Table 2.1.

Sulphide mineralization is extremely rare in both the granitic rocks and kimberlite, and no occurrences of Yellowknife Supergroup Metasediments have been observed in the drill core or surface outcrops in the vicinity of the Jericho deposit.

Table 2.1: Rock Types by Percentage in 1999/2000 Geotechnical Drill Holes

Rock Type	Percentage	Length of Core (m)
Granite (both massive and foliated)	47	878
Kimberlite	20	384
Pegmatite	16	292
Diabase	13	240
Other	4	84
TOTAL	100	1,878

2.2 Topography and Surficial Soils

The local relief is subdued as a result of previous glaciations, and is characterised by numerous lakes and many small ephemeral streams interspersed among boulder fields, eskers and bedrock outcrops . The water surface elevation in Carat Lake is approximately 470 m, and the topographic highs in the vicinity of the site facilities typically range from approximately 500 to a maximum of 550 m. More resistant rocks in the nearby Willingham Hills (east of the site) lead to small cliffs and elevations of up to 580 m. In the vicinity of the proposed open pit, slopes are gentle, and drainage is towards Carat Lake.

Drilling results and the surficial geological mapping indicate that the foundation conditions at waste dump sites consist of bedrock with isolated soil deposits. The soil deposits typically range in thickness from 0 to 3.2 m and consist of granular colluvial soils with, in some locations, a thin mantle of organic soil. Both sites are underlain by permafrost.

2.3 Permafrost

Regional permafrost maps, complemented by site-specific thermal data and data from the Lupin Mine, indicate the Jericho Diamond Project lies in a region of continuous permafrost. Permafrost is present everywhere except beneath large lakes. Available data suggests that the permafrost depth is about 450 m, which is consistent with published data from the Jericho area . Mining activities are not expect to extend below 300 meters from the surface.

In the surficial soils, the active layer typically ranges in thickness from less than one meter in organic soil to slightly more than three meters where well drained granular soils are present. The active layer thickness in exposed rock locally exceeds three meters.

2.4 Mine Plan

The mine plan consists of an initial open pit mining plan to mine 3.6 million tonnes of kimberlite reserves and resources of which 2.0 million tonnes are classified as reserves and 1.6 million tonnes are classified as resources (low grade). These inferred resources will require processing to determine the economics of the resource and possible reclassification into reserves. This determination will be made in the initial year of mine operations. Should this inferred resource kimberlite material be uneconomic, the low-grade kimberlite material would be stockpiled as a waste rock and the mine plan would likely convert to an underground operation for the final two years of operation to mine an additional 0.6 million tonnes the high grade reserve zone of the deposit. On the other hand, should the inferred material prove to be economic then the mine plan is most likely to remain as an open pit operation providing additional 25% kimberlite reserve and resource material. The waste rock management plan is based on the combined open pit/underground mining scenario.

The initial years of mining will be by conventional open pit methods with a combination of loaders and off-highway trucks. Loaders and hydraulic shovels with 5 to 10 m^3 buckets will be used. The open pit will ultimately be approximately 400 m wide and 500 m long, covering an area of approximately 16 hectares (ha). Mining is expected to proceed to a depth of about 270m. The depth of permafrost is estimated to be 450m and groundwater seepage into the pit will be limited, therefore, to flow from the active layer.

Should further analysis dictate that underground mining is the preferable method for later years of the mine life the open pit/underground transition would start at the level determined by the economic trade-off studies and actual mining costs experienced during the first years of operation. Under this scenario, once open pit mining is complete, an underground decline will be driven at a -15% gradient to access the high grade Center lobe kimberlite ore from elevations below the bottom of the open pit. Open benching or sub-level caving will be used to extract the ore. Operating efficiencies and economics experienced during initial open pit operations will dictate the final level for transfer to underground mining.

Two distinct waste materials will be produced during mining, including:

- Overburden Waste which is comprised of a mixture of glacial soils overlying the kimberlite and surrounding waste rock
- Waste rock, comprised of granitic country rock, associated pegmatite phases and diabase dykes.

The overburden and waste rock will be stockpiled in two designated waste dumps. .

2.5 Production Schedule

The production rates for the waste dump materials have been estimated based on the current mine plan, as summarized in Table 2.2. The “split” between waste rock and overburden soil is an estimate. The actual split between the production of waste rock and overburden soil may differ from what is indicated in Table 2.2. Likewise the actual quantities of waste rock mined will depend on final mine plan factors including the economics of inferred kimberlite resources, open pit versus underground economics for the lower reserves, pit slopes and final dump densities. The estimated quantity of kimberlite has been included for completeness of materials to be mined.

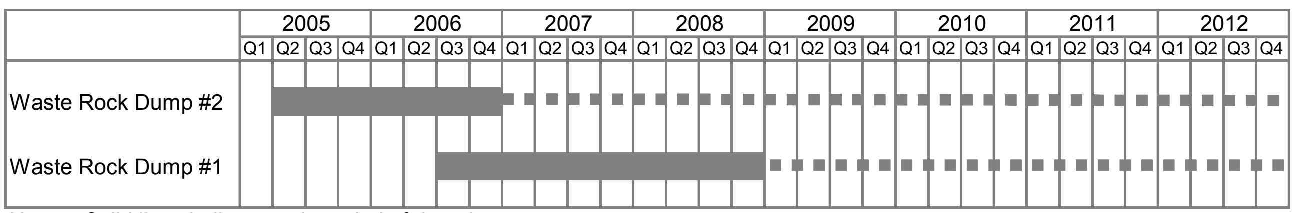
The majority of the waste rock and overburden will be used in construction or placed in Waste Rock Dump #2 during the first or two of mining operations, and then principally in Waste Rock Dump #1 for the next several years of operations. Minor quantities of rock will be placed in both dumps during the remainder of the mine life. The deposition schedule is shown in Figure 2.1.

Table 2.2: Estimated Production Rates for Waste Rock and Mined Materials

Year		Annual Production (BCM x 1,000)		
		Waste Rock	Overburden	Total Waste Material
1	2005	0.4	0.3	0.7
2	2006	2.7	0.7	3.4
3	2007	3.0	0.0	3.0
4	2008	0.9	0.0	0.9
5	2009	0.0	0.0	0.0
6	2010	0.1	0.0	0.1
7	2011	0.0	0.0	0.0
8	2012	0.0	0.0	0.0
	Totals*	7.1	1.0	8.1

Notes:
1. The information contained in this table is based on the OP/UG mine plan, which consists of a combined open pit/underground mining scenario.
2. Depending on the findings from the first year of mining, the mine plan may change.
3. BCM x 1,000 = million bank cubic metres – waste rock is calculated at proper wet bulk densities.
4. The split between overburden and waste rock is an estimate.

Production Schedule



Notes: Solid lines indicate main period of dumping
Dashed lines indicate periods of when minor quantities of waste will be placed, as necessary.

Figure 2.1: Production Schedule

3 Waste Rock and Overburden Characterization

3.1 General

The life-of-mine (LOM) quantities of waste rock and overburden waste rock for the OP/UG mining scenario are provided in Table 3.1. The density, taken as the estimated dry density following placement in a waste dump or stockpile, is the basis of the volumetric estimates for each material.

Table 3.1: Estimated Quantities of Waste Rock Materials

Material	Approximate Quantity (tonnes)			Estimated Density (t/m^3)	Approximate Volume (m^3)
	Mined	Used in Construction	Stored		
Waste rock	12,900,000	1,000,000	11,900,000	1.8	6,750,000
Overburden	1,600,000		1,600,000	1.7	940,000

Notes: 1. The information contained in this table is based on the OP/UG mine plan, which consists of a combined open pit/underground mining scenario.
2. Depending on the findings from the first year of mining, the quantities may change as a result of actual pit slopes; the waste rock/overburden split; reserve reclassification and potential mine plan changes.

The physical and geochemical properties of these materials are discussed in the following sections.

3.2 Physical Characterization

The physical characterization of waste dump materials has been based on data gathered during various drilling and laboratory programs and the construction and assessment of the decline that was completed to obtain bulk samples of the kimberlite. Incremental information will collected during the early stages of mining that will add significantly to the knowledge and understanding of the physical characteristics of the waste dump materials.

3.2.1 Waste Rock

Most of the waste rock will be comprised of granitic rocks, including granite, granodiorite and pegmatite, and, to a minor extent, diabase from dykes. Available data suggests that these “country rocks” are quite massive and extremely competent and strong.

3.2.2 Overburden

Available test pit and drilling data suggests the overburden soils comprise mainly sand and gravel, with some zones of silt and till. Cobbles and, occasionally, boulders are also present in the overburden and it assumed mixed material will be classified as overburden.

The active layer within the overburden is estimated to be less than 1m. Permafrost is present below the active layer. The total tonnage of overburden soils is estimated to be 1.6 million tonnes. The density of these soils after dumping could range from about 1.6 to 1.9 t/m^3. A small portion of the overburden soils will be used for the construction of earthen structures related to water management, i.e. berms for collector ditches and some dykes. In addition, it is anticipated that some of the overburden will be used in conjunction with mine closure reclamation activities.

3.3 Geochemical Characterization

3.3.1 Sampling and Testing Programs

Detailed geochemical characterization of the waste rock, was completed as part of the EIS. The programs included detailed core logging, examination of the development rock, mineralogical characterization, acid base accounting (ABA), solids ICP, leach extraction tests, interaction tests, and seepage sampling.

3.3.2 Waste Rock

The majority of the waste rock will be comprised of granitic rocks. Mineralogical observations on hand samples from drill core and the development rock pile indicated that sulphides are extremely rare in the granites, occurring in limited quantities (<0.2%) in only a few sections of core and isolated locations in the development rock. A thin section of granite which contained atypically elevated (but still very low) quantities of sulphide (0.07%) indicated that the sulphides were in the form of pyrite, chalcopyrite and digenite. Rare veins of chalcopyrite observed in the development pile occurred in association with slickensides. Carbonates were generally not present.

ABA testing on eighteen granite and granodiorite samples including one sample that was altered and iron stained and total sulphur tests on thirty samples indicated that these samples were non-acid generating with low neutralization potential (NP's from 2 to 21 mg $CaCO_3$/tonne) and negligible levels of sulphides (average <0.01% S).

Results of leach extraction testing on sixteen waste rock samples indicated that leachate in contact with the granitic waste rock is likely to have neutral pH's, moderate alkalinity levels, low total dissolved salts, and generally low metal concentrations.

Seepage from a small waste rock pile ("the development waste pile") associated with the exploration activities were also sampled periodically. The seepage results indicated that dissolved metal concentrations were generally low with the exception of copper which slightly exceeded CCME guidelines, and uranium, which exceeded the CCME/Health Canada guidelines for drinking water.

Further testing completed to characterize the uranium content of the solids indicated that granite and pegmatite samples near the Jericho kimberlite had uranium concentrations that were consistent with the regional data, and that there were no indications of high concentrations in a particular rock type or area of the pit. Extraction tests indicated that enhanced leaching of uranium from the granitic rocks was due to mixing of the granitic rocks with kimberlite. Therefore, any waste rock that is inadvertently mixed with kimberlite should be segregated and placed into a designated area in the center of the waste dump to promote freezing.

In summary, the testing results indicate there are relatively few concerns with respect to ARD and metal leaching from the waste rock. However, based on the observations of isolated sulphides on boulders in the development waste pile, and elevated uranium in the development pile seepage, the waste rock solids will be monitored during mining to ensure that any isolated materials that could require special handling are appropriately identified and managed during mining.

3.3.3 Overburden

Three overburden samples were collected from the development waste pile and nearby vicinity for settling tests to determine the metal content of the suspended sediments for use in estimating total metal concentrations in the discharges. The results indicated generally low dissolved metal concentrations. Total aluminum and iron concentrations were slightly elevated reflecting the aluminum and iron content of fine suspended sediments.

3.3.4 Other Waste Management Issues

In addition to the minor issues related to the geochemical properties of the rock, ammonia and nitrate from blasting and fine sediments in the waste rock and overburden may cause water quality issues in seepage and runoff from these areas. Measures to control blasting residues and minimize suspended sediments are provided in the Explosives Management Plan.

4 Design of the Waste Rock Dumps

4.1 General Layout

The layout of the waste dumps is illustrated in Drawing WRMP-P1-1 and was selected to:

- Minimize the number of catchments potentially affected by drainage from the waste dumps;
- Facilitate the design and operation of seepage control structures related to the waste dumps;
- Maintain an adequate buffer zone between the toe of waste dump #1 and Carat Lake;
- Optimize the offsetting impacts associated with the minimized project footprint and conformity with the natural relief in the immediate area; and
- Minimize haul distances.

Waste dump #1 will store primarily waste rock. The construction of the waste dump will start at contour elevations that allow any runoff to flow to the open pit and be handled by pit sumps. In the event that seepage water quality is low and quantity from waste dump site 1 is high enough, Pond A will be constructed.

Waste dump #2 will store overburden and waste rock. Any drainage from the waste dump site 2 will initially flow to a sump in the open pit and subsequently to Pond B if significant quantities are encountered.

Since the initial waste rock production will be needed for project development, access and overburden containment, waste rock disposal at waste dump #1 is scheduled to occur after overburden deposition at waste dump #2 commences. There is flexibility to increase the height and/or merge the dumps to provide additional capacity should mine plans be altered during the first year of operation.

4.2 Foundation Conditions

4.2.1 Waste Dump Site 1

The drilling results and the surficial geological mapping indicate that the foundation conditions at waste dump site 1 consist of bedrock with isolated soil deposits. The soil deposits typically range in thickness from 0 to 3.2m and consist of granular colluvial soils or till with, in some locations, a thin veneer of organic soil. The site is underlain by permafrost.

A series of ephemeral streams flow across the dump site to Carat Lake. In general, these occupy broad zones over which the water flows very slowly in the spring and early summer. Grassy vegetation is commonly associated with these streams.

4.2.2 Waste Dump Site 2

Based on site reconnaissance and surficial geological mapping, the foundation conditions at waste dump site 2 consist primarily of bedrock, with some till in the south edge of the site. This site is also underlain by permafrost.

4.3 Dump Designs

4.3.1 General

Dump designs have been developed on the basis of the properties of dump materials, the foundations conditions at the dump sites and the approximate volume of mine waste that will be produced as a result of the current mine plan. The details of these designs are provided below. Typical sections through the two waste dumps are provided in Drawing WRMP-P1-3. The corresponding dimensions and storage capacities of the proposed waste dumps based on the planned OP/UG quantities are provided in Table 4.1. The dump capacity can be increased through design modifications if required.

Table 4.1: General Dimensions and Storage Capacities of the Waste Rock Dumps

Site	Area (ha)	Approx. Crest Elev. (m)	Height (m)	Capacity (Mt)	Capacity (Mcm)
Waste Dump Site 1	37.7	520	44	13.930	7.739
Waste Dump Site 2	12.5	520	21	2.382	1.377

Notes: 1. The storage capacities quoted in Table 4.1 are based on the current dump layouts.
2. Depending on the findings from the first year of mining, the mine plan may change.
3. In the event that a change in the mine plan leads to an increased waste rock storage requirement, the storage capacity of these dumps can be increased significantly by measures such as raising the dumps and/or increasing their footprint areas in a way that preserves the objectives outlined in Section 4.1.

The thickness of each dump lift is expected to be approximately 10 m, but depending on the projected height of the structure and the number of benches, the lift thickness may be modified in order to develop relatively uniform bench heights. Overall slopes of between 2.6:1 to 1.4:1 depending on location and dump performance, as described below. During the LOM, the slopes between benches will correspond to the angle of repose of the dump material, which is expected to be about 1.4H:1V (35 degrees).

4.3.2 Waste Dump Site 1

The overall downstream slopes at this waste dump will be about 2.6H:1V (21 degrees), except for internal slopes during the course of dump development. Those slopes along the east side of the dump will be equal to the angle of repose or approximately 1.4H:1V (35 degrees). This variance is based on how the dumps will be constructed and the fact that the ground along the east side of the dump toe is rising, which is favourable to dump stability.

4.3.3 Waste Dump Site 2

Waste dump site 2 will be used primarily to store a mixture of overburden and waste rock, much of which will be frozen when it reports to the waste dump #2. Some portion of the overburden stockpile may thaw during the summer months and may require confinement at the dump perimeter. As a consequence, the design of the waste dump #2 includes a waste rock buttress for the downstream slope that will be used to provide confinement to the soils in the event they thaw and show a propensity to slump or "run." The slopes at this waste dump will be about 2.6H:1V (21 degrees), except for internal slopes during the course of dump development. The performance of the overburden will be evaluated following the first summer of operations, and if conditions warrant, the slopes on the upstream side may be optimized.

Some of the overburden at waste dump site 2 may be used in conjunction with the mine closure activities.

4.4 Stability Analysis

4.4.1 General

The stability of the waste dumps has been considered in an overall context based on the generally favourable foundation conditions, moderate slope angles and low seismic risk. Stability analyses were undertaken on waste dump #1, since it is planned to be the highest dump.

4.4.2 Stability Criteria

A typical example of minimum factors of safety for waste rock dumps is provided in Table 4.2, the source of which is the guidelines published by the BC Mine Waste Rock Pile Research Committee in 1991.

The earthquake with a 475-year return period is usually selected for use in stability analyses associated with operations. However, proposed changes to the National Building Code of Canada will recommend the 475-year earthquake be replaced by the earthquake with a 2,475-year return period. Although these changes are not scheduled to take effect until 2005, both earthquake events have been considered in the stability analyses.

It is common to select a larger but less frequent earthquake for purposes of closure. The selection is usually based on the consequences of failure. Given the size, design, failure mechanisms and setting of the proposed waste dumps at Jericho, the consequence category is likely to be low. Assuming this to be the case, the maximum design earthquake for closure is assumed to be the same as the maximum design earthquake for operations.

Table 4.2: Guidelines for Minimum Design Factor of Safety – Waste Rock Dumps

Stability Condition	Case A – more severe	Case B – less severe
Stability of Dump Surface		
Short term (active)	1.0	1.0
Long term (closure)	1.2	1.1
Overall stability (deep-seated)		
Short term (active)	1.3 - 1.5	1.1 - 1.3
Long term (closure)	1.5	1.3
Pseudo-static	1.1 - 1.3	1.0
Case A: Low level of confidence in critical analysis parameters Possibly non-conservative interpretation of conditions, assumptions Severe consequences of failure Simplified stability analysis method (charts, method of slices) Stability analysis method poorly simulates physical conditions Poor understanding of potential failure mechanism(s)		
Case B: High level of confidence in critical analysis parameters Conservative interpretation of conditions, assumptions Minimal consequences of failure Rigorous stability analysis method Stability analysis method simulates physical conditions well High level of confidence in critical failure mechanism(s)		

4.4.3 Failure Modes

Given the granular nature of the dump materials and the dominance of the bedrock in the foundations of the two dumps, the most probable failure surfaces are likely to be relatively shallow and sub-parallel to the slope face. Nevertheless, the analyses also considered a failure through the till soils (this case is analogous to the deep-seated condition noted in Table 4.2).

4.4.4 Method of Analysis

The slope stability analyses were generally performed using 2-dimensional limit equilibrium analyses and the computer program SLOPE/W, which was developed by GEO-SLOPE International. Factors of safety for these stability cases were determined using the Bishop method of analysis. The stability of the dump face was assessed on the basis of a simple infinite slope analysis (this analysis compares the friction angle of the dump material against the slope angle).

4.4.5 Geometry and Input Parameters

The dump height was taken as 40 m, which corresponds to the approximate height along the north face of waste dump #1. During operations, the dump was assumed to have an overall downstream slope of 2.6H:1V (21 degrees), with an inter-bench slope of 1.4H:1V (35 degrees). Post-closure, the analyses assumed the downstream dump slope would be 3H:1V (18.4 degrees). Other input parameters have been selected based on judgment and are believed to be at or below typical mean values for the respective material (Table 4.3).

The water table was varied in the analyses. A low water table was used as the base case (“low”) due to the expected porosity and durability of the granitic waste rock. Although it is considered unlikely, the analyses considered the possibility of short-term spikes in the water table resulting from a frozen face and the coincident spring freshet (“high”).

The earthquakes with 475 and 2,475-year return periods coincide with peak ground accelerations of 0.013g and 0.06g, respectively.

Table 4.3: Input Parameters used in the Stability Analyses

Parameter Kimberlite	Moist Unit Weight (kN/m^3)	Effective Strength Parameters		Water Table	Earthquake for Pseudo-Static Assessment
		c (kPa)	phi (degrees)		
Waste rock	20	0	39	Low in dump	
Till	22	5	32	In dump	0.013 and 0.06
Bedrock	Failure surface prevented from intersecting the bedrock				

4.4.6 Results of Analysis

The results of the stability analyses for waste dump #1 are summarized in Table 4.4. The till foundation results had slightly lower factors of safety than the results based on the bedrock foundation, so the till foundation results are what are reported in Table 4.4.

The minimum allowable factors of safety have been based on Case B in Table 4.2 for the following reasons:

- Conservative assumptions have been used in the analyses
- The consequences of failure are minimal as they do not involve loss of life or large scale environmental impacts
- The potential failure modes are relatively simple and are well suited to the analytical methods that have been used.

Table 4.4: Summary of Critical Factors of Safety for Waste Dump Site 1

Stability Condition	Suggested Minimum FOS	Calculated Factor of Safety (FOS)	Comments
Dump Surface			
Short Term	1.0	1.0	Bench face, at angle of repose
Long Term	1.1	2.4	Slope graded to ≈18° for closure
Deep Seated			During operations, overall slope 21°
Short Term	1.3	1.9/1.3	Till foundation (low/high water table)
Long Term	1.3	1.9/1.3	Till foundation (water table as above)
Pseudo-static	1.0	1.8/1.3	Till foundation, acceleration = 0.013g (low/high water table)
Pseudo-static	1.0	1.6/1.1	Till foundation, acceleration = 0.06g (low/high water table)
Deep Seated			Post-closure, overall slope ≈18°
Short Term	1.3	2.1/1.5	Till foundation (low/high water table)
Long Term	1.3	2.1/1.5	Till foundation, (water table as above)
Pseudo-static	1.0	2.0/1.5	Till foundation, acceleration = 0.013g (low/high water table)
Pseudo-static	1.0	1.7/1.3	Till foundation, acceleration = 0.06g (low/high water table)

4.4.7 Conclusions

Stability analyses were completed for waste dump #1 using conservative input parameters. The calculated factors of safety generally exceed the minimum allowable values by a significant margin. The cases where the calculated factor of safety is close to the allowable value correspond to the following two general conditions:

- The case when the water table is very high. In reality, this would correspond to a transient condition that may or may not actually occur in the field. Observations during the first year of operations should provide a better indication of what the high water table might actually be during the freshet.

- The case of the dump surface, where the slope coincides with the angle of repose. This is typical for end-dumped materials.

There is room to optimize these dump slopes as additional information is obtained early in the operational life of the dumps.

5 Control Measures - Construction and Operations

This section describes the measures that will be implemented to minimize environmental impacts associated with mining and the construction and operation of the dumps.

5.1 Mine Operations related to Ammonia Management

Use of explosives in all aspects of the mining operation will be closely managed to reduce nitrogen loss to the waste rock as per the Explosives Management Plan.

5.2 Use of Overburden and Waste Rock for Construction

Item 3, Schedule D of the Water Licence specifies the waste rock used for construction shall be non-acid generating, and shall meet the physical specifications outlined in specific design reports for each of the major facilities on site.

Geochemical testing indicates that that the waste rock is non-acid generating, with a limited potential for metal leaching. To minimize the potential for metal leaching, site staff will examine the blasted rock designated for use in construction for sulphide minerals and for material that contains a mixture of kimberlite and granitic rock. If visible sulphides or mixed kimberlite and granitic rock are observed, the rock will be placed in a designated area in the center of the waste rock pile, and will not be used for construction. Samples to confirm rock geochemistry expectations will be collected on a weekly basis during the construction period.

Visual inspection of materials will be used to segregate the overburden from waste rock in regards to potential uses of materials for construction purposes.

5.3 Construction and Operation of Waste Dumps

5.3.1 Waste Dump Site 1

The proposed procedures for the construction of waste dump 1 are illustrated schematically on Drawing WRMP-P1-5. Waste rock will be hauled to the dump using off-road mine trucks on all-weather mine access roads. At the dump, the waste rock will be end-dumped and spread with a dozer to make a flat surface for the mine trucks to drive on. Dump development will occur in several stages, with the initial stage starting at the upstream limits of the dump and the final stage ending at the downstream limit of the dump). Further information regarding the general procedures proposed for the construction of waste dump site 1 is provided below:

- To the extent possible, a frozen foundation layer will be developed at the base of each waste dump area by placing a blanket of granitic waste rock over the tundra during the winter months. Also frozen berms may be developed at the toes to promote in-freezing of water within the dump of each dump stage.

- As noted above, the initial stage of dump construction will commence at the southeast limit of the dump site. The dump will be advanced towards the north and west stage limits. Dump slopes during this and the intermediate stage(s) of construction will be angle of repose over the lift height.
- The surface of the dump will be inclined to direct runoff water off the dump toward the open pit, or collection ponds, if the latter are required.
- To minimize the potential for metal leaching, site staff will examine the blasted rock for sulphide minerals. If visible sulphides or mixed granitic rock and kimberlite are observed, the rock will be encapsulated in the center of the dump and below the active layer of the dumps where, they will remain frozen or freeze over time.
- The final dump face will be constructed during the last construction stage.

5.3.2 Waste Dump Site 2

Waste rock and overburden will be hauled to waste dump site 2 using off-road mine trucks on all-weather mine access roads during the initial two-year period.

A haul road will be constructed adjacent to the downstream toe (north side) of waste dump site 2 to act as a waste rock buttress in case there is a significant thaw problem.

6 Closure and Reclamation

The target end land use for these areas will be wildlife habitat. Therefore, the aim of the reclamation plan is to promote, to the extent practical, rehabilitation of the land to this use. Key elements of the plan include vegetation prescriptions based on reclamation trials, re-grading dump slopes and construction of ramps to allow safe caribou transit across the dump slopes.

Details on closure and reclamation of the waste rock dumps, are presented in the Closure and Reclamation Plan, Jericho Diamond Project.

7 Verification and Monitoring Plans

7.1 Solids Quantities

As specified in Part K, Item 13 of Water Licence NWB1JER0410, Tahera will record the monthly quantities of ore processed, and the monthly quantities and disposal location of any overburden, waste rock, low-grade ore, and coarse PK.

7.2 Solids Geochemistry

Geochemical monitoring will be carried out to confirm the geochemical properties of the waste rock and overburden. Characterization of the waste rock will include:

- Sample collection every week for the first year of mining, and, assuming that the testing data indicates minimal variability in the geochemistry of the waste rock, the sample frequency would be reduced for the remaining years of mining.
- Sample collection from each rock type present (i.e. granite/granodiorite, pegmatite, diabase,)
- Geological descriptions of the samples and general geological observations of the blasted rock, including observations of the presence and composition of any large xenoliths, and the occurrence of sulphide minerals will be made and recorded by appropriately trained staff.
- Testing of paste pH, reaction with dilute HCl, total sulphur, copper and uranium analyses on every sample. (Uranium analyses may be discontinued after the first year of testing if uniformity can be demonstrated). Full ABA analyses and ICP-metals would be performed on every fourth sample for the first two years of mining, and then, assuming the material is reasonably consistent, the frequency would be reduced to every 10th sample for the remainder of the mining operations.
- Testing of a duplicate sample every 10th sample.

In addition, once per year, accessible areas of the pit walls will systematically examined to identify any areas of sulphide mineralization, and to map major rock types. The results will be recorded on bench plans.

Overburden samples will be collected and submitted for full ABA and ICP analyses once every two months.

Results of the solids characterization work would be reported in an annual seepage and waste rock monitoring report.

7.3 Ground Ice

During collection of the waste rock samples, blasted rock and freshly blasted rock faces will be examined for presence of significant quantities of ground ice. If present, the quantity of ice will be estimated, and samples of the ice lenses will be collected and submitted for water quality analyses to characterize the quality of ice melt water that would report to the pit or waste rock dumps. The frequency of sampling would depend on the amount of ice encountered, and the water quality data from the first few samples. However, it is considered unlikely that significant amounts of ice will be encountered.

7.4 Monitoring of Seepage

To supplement the routine monitoring programs described in the Water Management Plan, an annual seepage survey will also be completed at the toe of each of the waste dumps. Although seepage is more likely to be detected on the down-gradient side of the piles, any areas close to the catchment boundaries will also be checked for seepage. As specified in Water Licence NWB1JER0410, the survey will be completed in July or August. Samples would be submitted for a comprehensive suite of test parameters, including pH, conductivity, ORP, temperature, major ions, acidity, alkalinity, metals and nutrients. Standard QA/QC procedures for water sampling including collection of field, travel and method blanks as well as duplicate samples will be included in the program.

The results of the monitoring programs will be reported in an annual seepage and waste rock monitoring report.

7.5 Visual Inspections

During the active development of each of the waste dumps, site staff will carry out daily inspections in relation to the performance and condition of each structure. When dump activity ceases on an interim or seasonal basis, the inspection frequency will shift to monthly. Following the completion of a dump or stockpile, inspections will continue on a semi-annual basis to closure.

Depending on the performance of each of these facilities, the inspection frequency may have to be increased and possibly supplemented by additional monitoring methods.

Tahera will develop a system for recording and analysing their visual observations, and will assign the responsibility to appropriate personnel for completing and analysing the results of these inspections, for maintaining written records and, where appropriate, for implementing corrective actions.

A geotechnical or civil engineer registered in Nunavut will make an annual inspection of these facilities each summer.

7.6 Thermal Monitoring

Thermal monitoring is not critical to the performance of the waste dumps. However, in order to provide information that will be useful for closure planning and post-closure monitoring, thermistors will be installed in the dumps. At waste dump #1, thermistors will be installed at two locations within the final stage of the dump,.

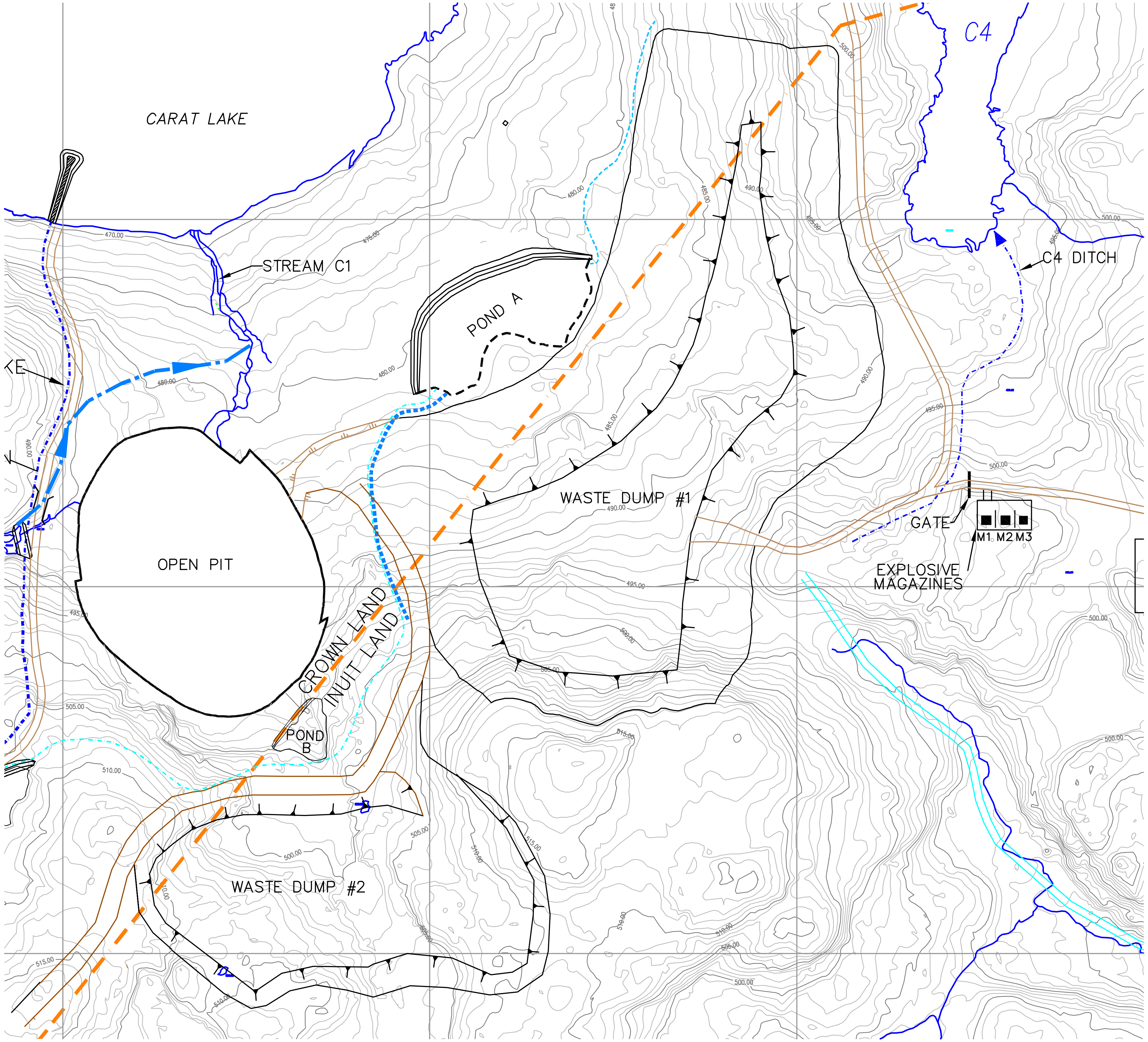
Similarly, at waste dump #2, thermistors will also be installed in two locations. The thermistor readings will be collected on a monthly basis for a period of two years or at least until a clear pattern has been established. Thereafter, the reading frequency can be reduced to quarterly.

This report **"Jericho Diamond Mine, Waste Rock Management Plan - Part 1, Waste Rock and Overburden",** has been prepared in conjunction with Tahera personnel and by SRK Consulting (Canada) Inc.

Cam Scott, P.Eng. (NWT/NT)
Principal Engineer

Kelly Sexsmith, P.Geo. (BC)
Senior Environmental Geochemist

Drawings



NOTES:

1. THE LAYOUTS OF THE WASTE DUMPS AND STOCKPILES ARE APPROXIMATE AND HAVE BEEN BASED ON EXISTING TOPOGRAPHIC DATA.
2. IN RELATIVELY FLAT AREAS WHERE THE DUMPS ARE CLOSE TO THE ASSUMED CATCHMENT LIMIT, GROUND SURVEY METHODS WILL BE USED TO ACCURATELY DEFINE THE CATCHMENT LIMIT.
3. A BUFFER ZONE WILL BE ESTABLISHED BETWEEN THE DUMP/STOCKPILE TOE AND THE ASH/KEY LAKE CATCHMENT ON A FIELD FIT BASIS IN AREAS WHERE GROUND SURVEY METHODS ARE REQUIRED (SEE NOTE 2).
4. THE NEED FOR POND B WILL BE EVALUATED DURING THE FIRST YEAR OF OPERATION.

TAHERA CORPORATION
JERICHO LAKE SOUTHWEST EXTENSION

Date of Photography: August 5, 1995.
Scale of Photography: 1:10 000
Survey control supplied by: Canamera Geological Ltd.
Survey control based on: UTM Projection, NAD 27, Zone 12
Compiled by The ORTHOSHOP, Calgary, October 1995.
WO 7423

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Engineers and Scientists

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DATE: MAY 2005
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DATE:
PROJ. MGR: CCS
DATE
PROJ. ENGR.
DATE
SRK PROJECT NUMBER: 1CT004.09

Tahera Diamond Corporation

JERICHO DIAMOND PROJECT

LAYOUT OF WASTE DUMPS

DRAWING NUMBER: WRMP – P1 – 1

REV. A

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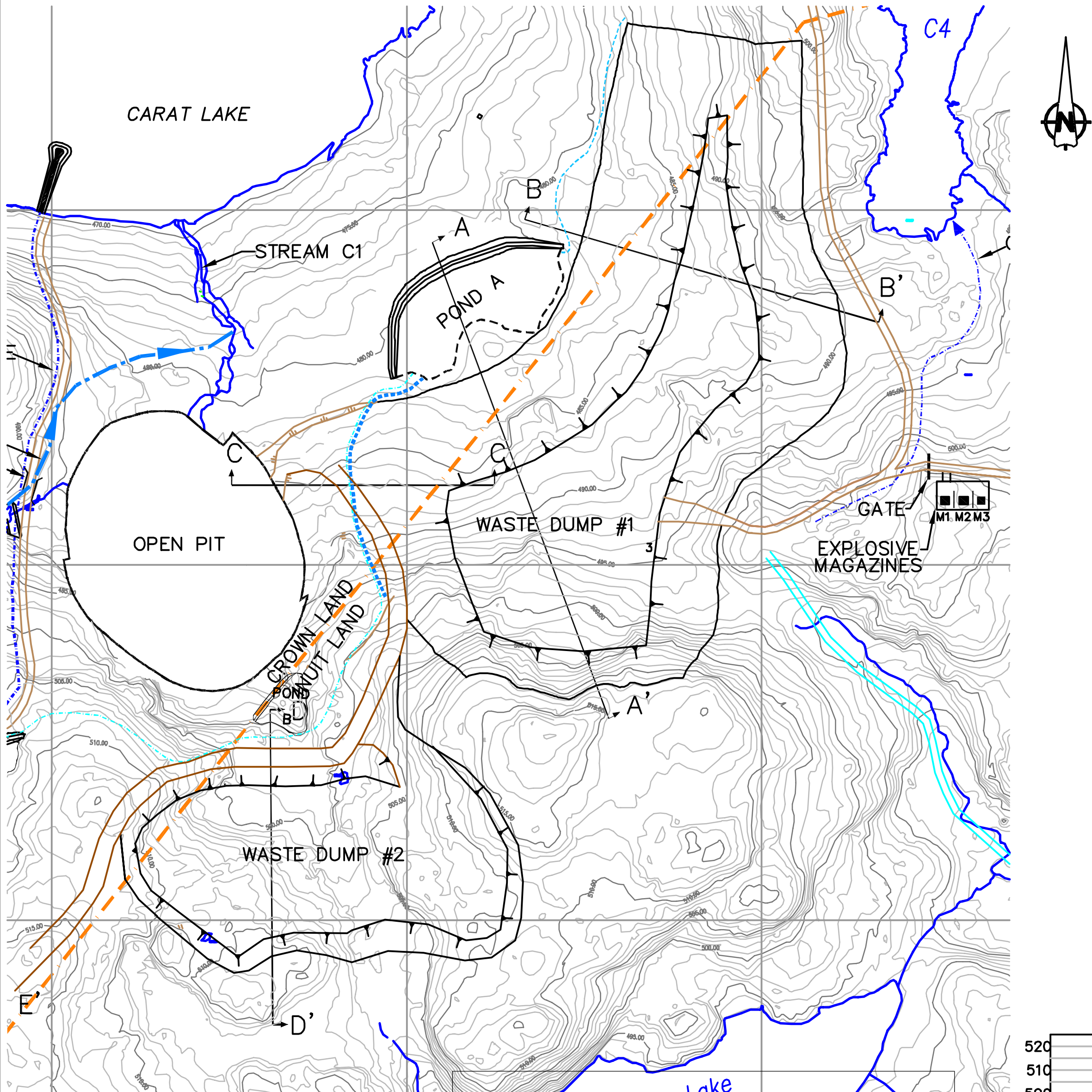

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JERICHO LAKE SOUTHWEST EXTENSION

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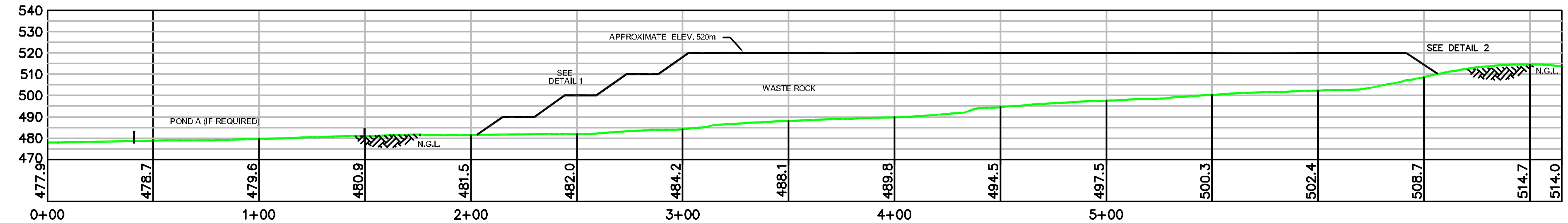

SECTION A – A' (WASTE DUMP SITE 1)
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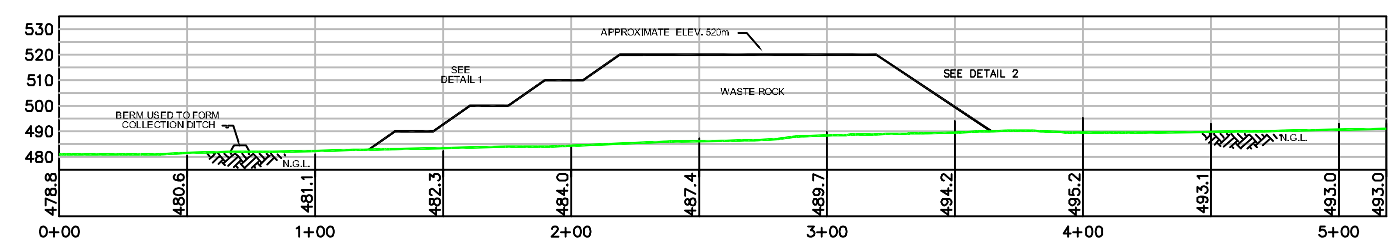

SECTION B – B' (WASTE DUMP SITE 1)
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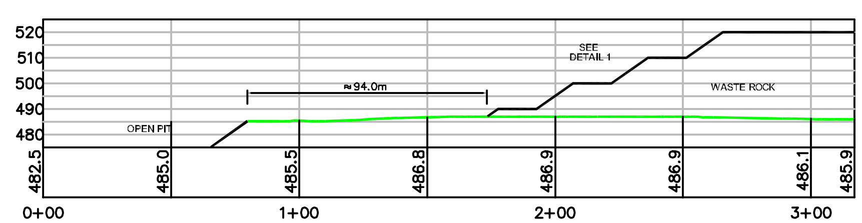

SECTION C – C' (WASTE DUMP SITE 1)
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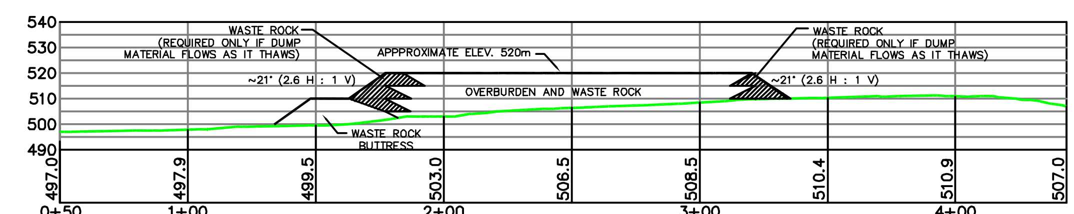

SECTION D–D' (WASTE DUMP SITE 2)
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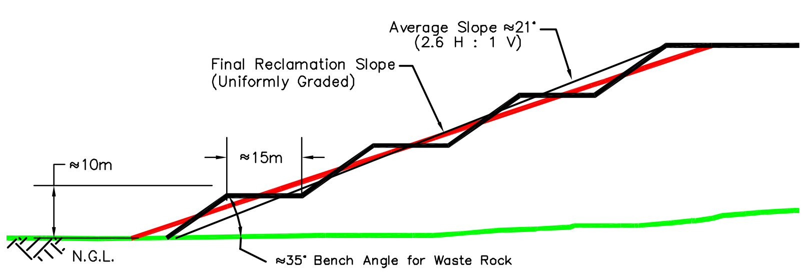
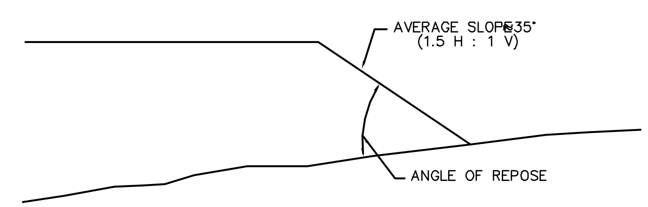


DETAIL 1 – TYPICAL DOWNSTREAM SLOPE (N.T.S.)



DETAIL 2 – TYPICAL UPSTREAM SLOPE (N.T.S.)

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SRK Consulting
Engineers and Scientists

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DATE	DATE
SRK PROJECT NUMBER: 1CT004.09	

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WASTE DUMPS 1 AND 2
SECTIONS AND DETAILS

DRAWING NUMBER
WRMP – P1 – 3

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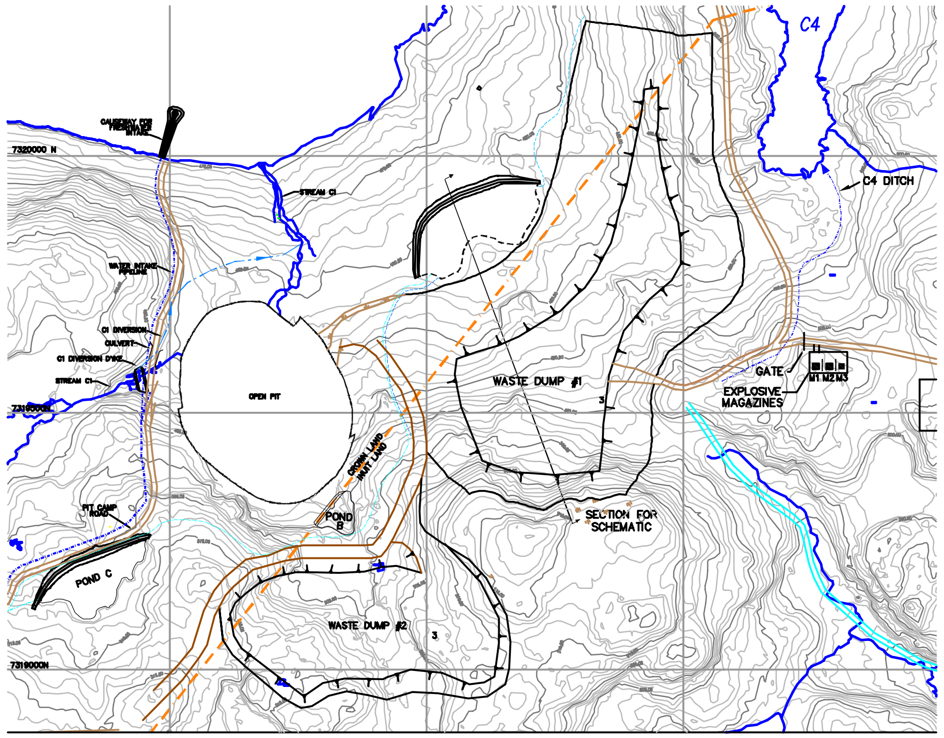

TAHERA CORPORATION
JERICHO LAKE SOUTHWEST EXTENSION

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Survey control based on: UTM Projection, NAD 27, Zone 12
Compiled by The ORTHOSHOP, Calgary, October 1995.
WO 7423

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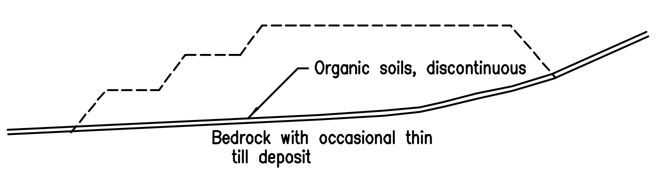
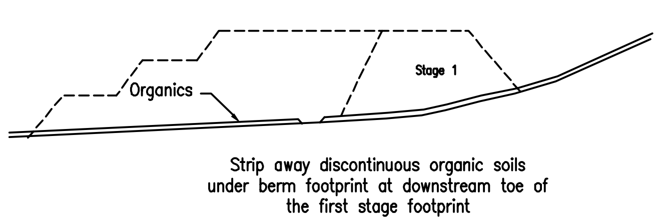
Note: The general construction procedures for the dump construction are shown below. Details may be adjusted in the field based on conditions at the time of construction.

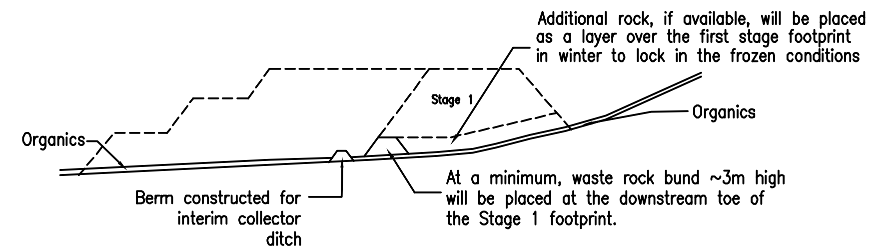
① Pre–construction



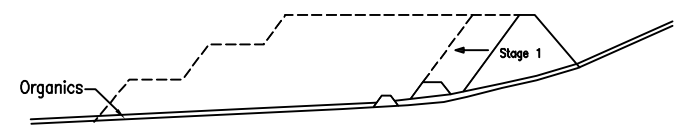
② Footprint preparation



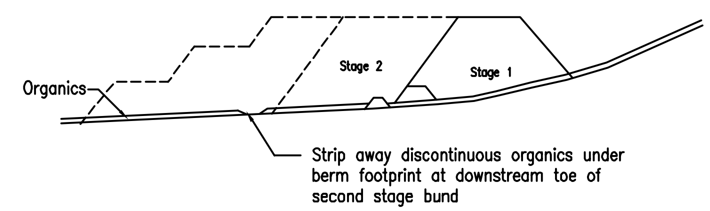
③ Waste rock placement in winter, if possible, to lock in the frozen conditions within the foundation layer



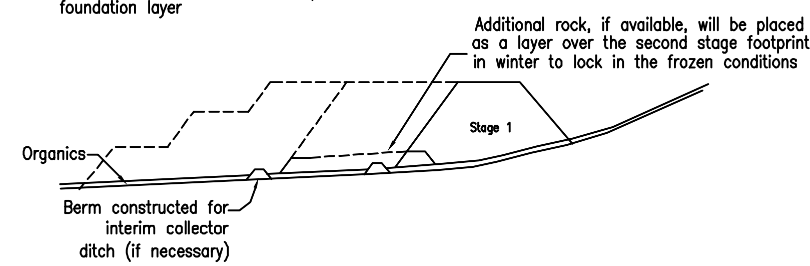
④ First stage of dump construction will consist of end dumping from dump crest towards the bund



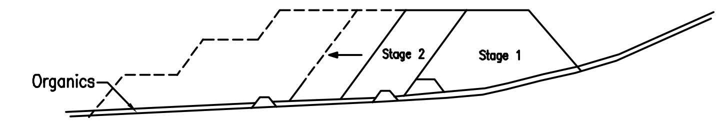
⑤ Second stage foundation preparation



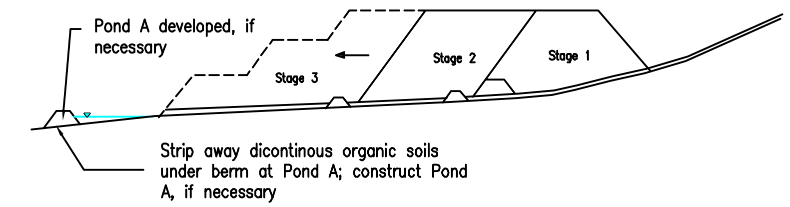
⑥ Waste rock placement in winter to lock in the frozen conditions within, if possible, the foundation layer



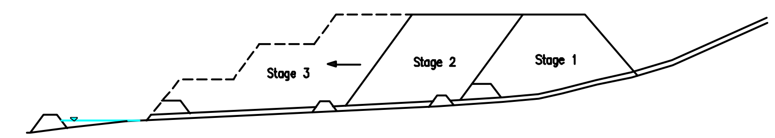
⑦ Second stage advancement at dump face by end dumping



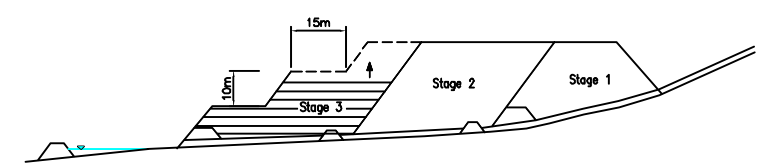
⑧ Third stage foundation preparation



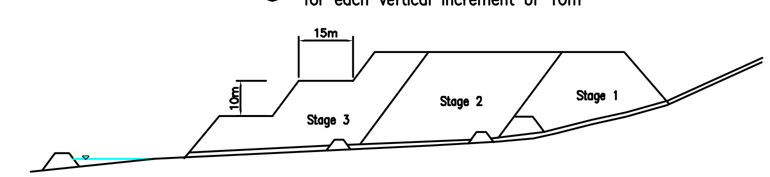
⑨ Waste rock placement in winter, if possible, to to lock the frozen conditions within the foundation layer



⑩ Third stage of dump to be constructed in horizontal lifts



⑪ Develop benches with 15m setback for each vertical increment of 10m



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SRK PROJECT NUMBER: 1CT004.09	

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SCHEMATIC OF GENERAL CONSTRUCTION SEQUENCE AT WASTE DUMP 1

DRAWING NUMBER: WRMP – P1 – 5

REV. A