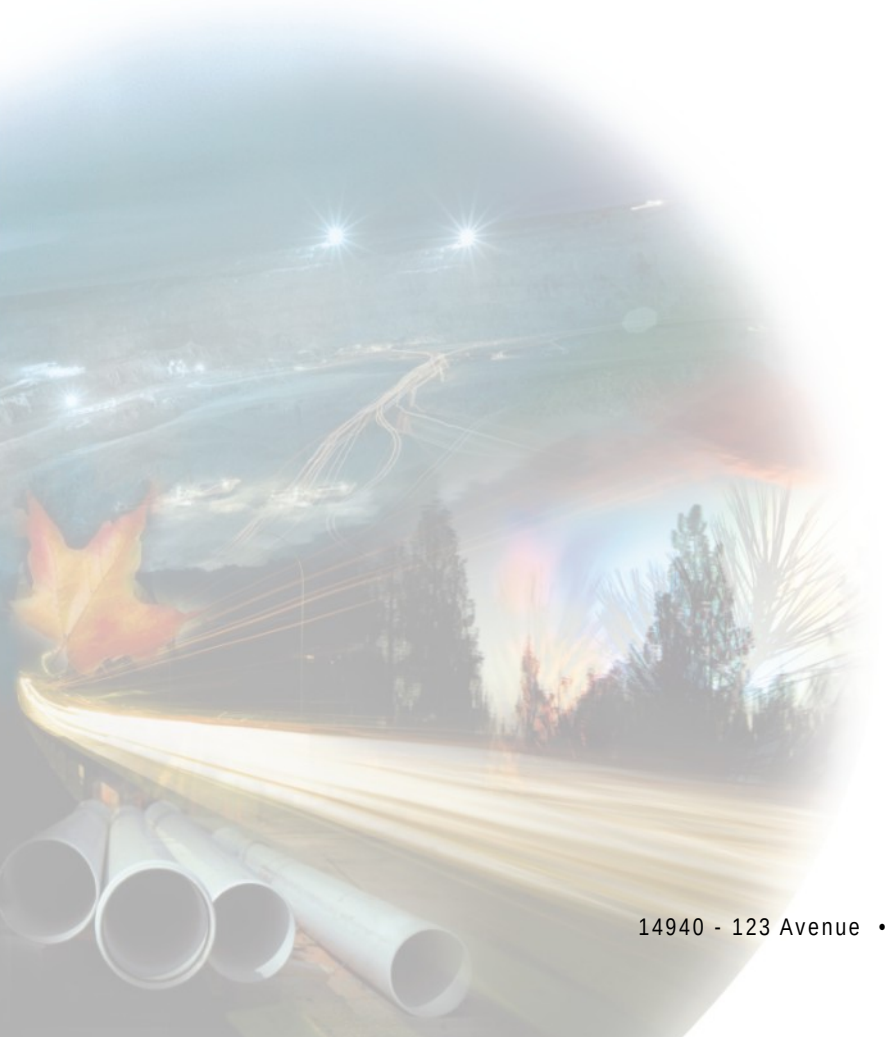
Tahera Diamond Corporation

LANDFARM AND CONTAMINATED SNOW CONTAINMENT FACILITY DESIGN SUMMARY REPORT

1100060.008

December 2005



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EXECUTIVE SUMMARY

A landfarm and contaminated snow containment facility (LCSCF) is required at the Jericho mine site as part of the Water Board licensing requirements. The purpose of the facility is to contain and remediate hydrocarbon-contaminated snow and soil resulting from accidental spills occurring during mining operations. A design for these facilities was completed by EBA Engineering Consultants Ltd. on behalf of Tahera Diamond Corporation (TDC).

The proposed design combines the landfarm and contaminated snow areas into a single-bermed enclosure, lined with a geomembrane liner. Contaminated soil is landfarmed in the upgradient portion of the facility, while contaminated snow and runoff is contained in a down gradient sump area.

The upgradient landfarm portion of the facility is designed to accommodate up to 900 m^3 of hydrocarbon contaminated soil. The sump area is designed to contain 750 m^3 of water derived from a combination of freshet runoff and hydrocarbon contaminated snow placement. To prevent flooding of the landfarm area, the sump must be pumped out after storm events and freshet.

In 2004, AMEC Earth & Environmental (AMEC), recommended locating the landfarm on the waste rock pile, based on site logistics, anticipated foundation conditions, and surface drainage patterns. This location was approved by TDC during TDC's 2004 Water Licence Application and has been adopted for this design.

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1.0 INTRODUCTION

1.1 GENERAL

EBA Engineering Consultants Ltd. (EBA) was retained by Tahera Diamond Corporation (Tahera) to provide engineering services for the design of a landfarm and contaminated snow containment facility (LCSCF) at the Jericho Diamond Mine. This facility is required to contain hydrocarbon-contaminated snow and soil resulting from minor spills occurring during mine operation.

This report summarizes the LCSCF design. Issued for Construction (IFC) drawings and Construction Specifications have been submitted to Tahera under separate cover.

The LCSCF was designed based on a review of existing geotechnical data and air photo examination.

1.2 SCOPE OF WORK

The scope of work was outlined in an email submitted to Tahera on October 17, 2005 and is briefly summarized in the following:

- Review preliminary/conceptual design completed by AMEC Earth & Environmental and submitted to Tahera in August 2004;
- Complete detailed design of landfarm, incorporating AMEC design where applicable;
- Prepare issued for construction (IFC) drawing for the landfarm;
- Prepare technical specifications for construction; and
- Complete a letter report documenting the design.

2.0 DESIGN INTENT

2.1 DESIGN CONCEPT

AMEC Earth & Environmental (AMEC) completed a Landfarm Management Plan in 2004 (AMEC, 2004). The plan provided concept level designs for landfarm and contaminated snow containment facilities. Each were designed as separate facilities and located as shown in Figure 1.

At Tahera's request, EBA looked at combining the landfarm and contaminated snow containment facilities into a single facility, thus reducing material construction volumes and space requirements on site. The resulting design is shown on Drawing 1100060-01.

The combined design comprises a bermed enclosure lined with a geomembrane liner. The upgradient portion of the facility, comprising the landfarm, is designed for the placement and remediation of hydrocarbon-contaminated soil. The down gradient portion is designed

as a sump area to contain hydrocarbon contaminated snow and collect runoff from the landfarm area. The sump area has been designed with sufficient capacity to contain the design runoff volume without flooding the upgradient contaminated soil.

The design allows for satisfactory remediation of hydrocarbon-contaminated soil provided that runoff from freshet and summer storm events is pumped out of the facility after each event. The accumulation of successive runoff events can result in flooding of contaminated soil, impeding the remediation process, or overtopping of the liner crest.

2.2 FACILITY LOCATION

AMEC (2004) located the landfarm and contaminated snow facility on top of the proposed waste rock pile and coarse processed kimberlite stockpile areas, respectively. At present, both stockpiles have not been constructed to design elevation.

After reviewing anticipated foundation conditions, site logistics and surface drainage patterns, it is recommended that the LCSCF be located on the waste rock pad as recommended by AMEC. At this location, the LCSCF will be located on a substantial thickness of waste rock, reducing potential foundation related issues associated with permafrost degradation. Furthermore, surface drainage is towards the pit, away from Lake C1 and potential environmental receptors.

2.3 DESIGN PARAMETERS

2.3.1 Hydrocarbon Contaminated Soil

It is desirable that the LCSCF have capacity to accommodate hydrocarbon-contaminated soil excavated over the anticipated mine life (approximately 10 years). Tahera requested that the landfarm be sized to have an internal footprint of 1,500 m^2. For a placement depth of 0.3 m, this would be equivalent to a contaminated soil volume of 450 m^3.

For design purposes, given the 10-year design life, the landfarm liner elevation was set 0.7 m above the base. This allows for placement of two contaminated soil lifts, increasing the overall contaminated soil capacity to approximately 900 m^3.

Options to accommodate additional contaminated soil volume in excess of 900 m^3 include the following:

1. Expand the LCSCF;
2. Construct a second landfarm facility; or
3. Stockpile material in the LCSCF and remediate in stages.

2.3.2 Water Containment

Water within the LCSCF will be derived from two sources:

- Hydrocarbon contaminated snow – contaminated snow placed in the facility over winter will generate melt water which will pond in the down gradient portion of LCSCF.

- Seasonal precipitation – runoff occurring from freshet or summer storm events will accumulate in the down gradient portion of the LCSCF. Analysis completed by SRK (SRK, 2003b) indicates that accumulated snowfall represents greater precipitation amount than summer storm events; therefore, water volumes generated during freshet were considered as the basis for design.

The annual contaminated snow volume was estimated to be 400 m^3 (snow water equivalent of 250 m^3). This quantity is loosely based on EBA's experience with other mines. It assumes an annual contaminated snow area of 1,200 m^2 excavated to a depth of 0.3 m.

Water from seasonal precipitation was estimated from the average annual snowfall (SWE 183 mm) applied to the LCSCF area, accounting for drifting within the facility perimeter. This resulted in a runoff volume of 500 m^3.

Combining the water volumes yields a design water containment volume for the sump area of 750 m^3.

3.0 DESIGN DETAILS

3.1 GENERAL

The planned layout and cross sections for the LCSCF are shown on Drawing 1100060-01. Estimated design quantities for the LCSCF are summarized in Table 1.

TABLE 1: LCSCF MATERIAL QUANTITIES

Geomembrane (m^2)	Geotextile (m^2)	Fill Material Type		
		Waste Rock Material (m^3)	200 mm Material (m^3)	20 mm Material (m^3)
3,250	6,500	2,000	4,700	2,100

Note: Waste rock material quantity does not include foundation waste rock pad volume

The berms have been designed with a 4 m top width; however, adjustments to the top of berm width may be made by the Engineer to accommodate site-specific foundation conditions. The top of berm width should not be less than 1.5 m, measured from the inside crest of the LCSCF and as shown on Drawing 1100060-01. The berms underlying the liner system are constructed of 200 mm minus material. The outside portion of the berms is designed using waste rock material to reduce processed material quantities. If desired, the waste rock material can be replaced with processed 200 mm minus material.

The LCSCF has been designed as a generic structure with relative layout points to allow flexibility with respect to facility location.

3.2 FOUNDATION DESIGN

In the absence of site-specific data, a conservative approach was taken for the foundation design, assuming a "worst case" scenario for ground conditions.

The LCSCF should be constructed on a waste rock pad a minimum 3.0 m thick. The foundation pad should comprise waste rock no greater than 0.7 m in diameter, placed and compacted in lifts.

3.3 LINER SYSTEM

The liner system consists of a 60 mil textured HDPE liner sandwiched between a 540 g/m^2 nonwoven geotextile. The liner system is supported on 20 mm granular fill material, which is underlain by a layer of 200 mm material. The liner is terminated in a key trench around the berm perimeter.

Liner cover comprises 20 mm material. Cover thickness in all areas subject to vehicle traffic (maximum tire pressure of 350 kPa) should be a minimum 600 mm. On berm slopes where vehicles will not travel, the cover thickness can be reduced to 300 mm. During construction minimum fill thicknesses over the liner should be adhered to in accordance with Table 2.

TABLE 2: MINIMUM LIFT THICKNESS

Backfill Thickness	Placement Equipment
No backfill	Foot traffic or 4 tire ATV vehicle only
150 mm or less	Hand placement
200 - 300 mm	D3 - D4 LGP Cat
300 mm	Bobcat (Skid-Steer)
300 mm	D4 - D6 Style Cat
600 mm	D300 haul truck with 350 kPa tire pressure

3.4 SUMP CAPACITY

The sump design at relative elevation 99.25 m (top of sump) provides an actual containment volume of 740 m^3 with 0.7 m of freeboard.

The freeboard provides an additional emergency water storage capacity in the amount of 1,100 m^3 if required. Under normal operating conditions, it is expected to not be necessary to utilize this additional storage capacity; however, the capacity is available if precipitation events or contaminated snow placement exceed design estimates. In the event that the freeboard storage is mobilized, a portion of the landfarm area would be temporarily flooded.

4.0 OPERATIONAL CONSIDERATIONS

Containment within the facility is contingent upon liner integrity. As such, care should be taken during construction and operation to not damage the liner.

Tire pressures within the LCSCF should not exceed 350 kPa. Furthermore, turning within the facility should be limited to long radius turns to avoid inducing shear stresses in the underlying liner. If this cannot be accomplished with existing haul trucks, then contaminated material should be dumped near the facility entrance and a smaller piece of equipment used inside the LCSCF to move contaminated material to its final destination.

Contaminated soil placement should be offset a minimum 2 m from the toe of the berm. An access path through the landfarm area should also be maintained to access the contaminated snow area.

The LCSCF has been designed to accommodate the annual melt water volume during freshet. The facility should be pumped out following freshet to allow for accumulation of summer storm events. At the end of summer, the LCSCF should be pumped dry to provide maximum storage capacity for snowfall and contaminated snow placement.

Further details pertaining to the operation of the LCSCF and monitoring of contaminated soils will be submitted in a separate report.

5.0 CLOSURE

We trust this report satisfied you current requirements. If you have any inquiries or require additional information please contact our Edmonton office.

Yours truly,
EBA Engineering Consultants Ltd.

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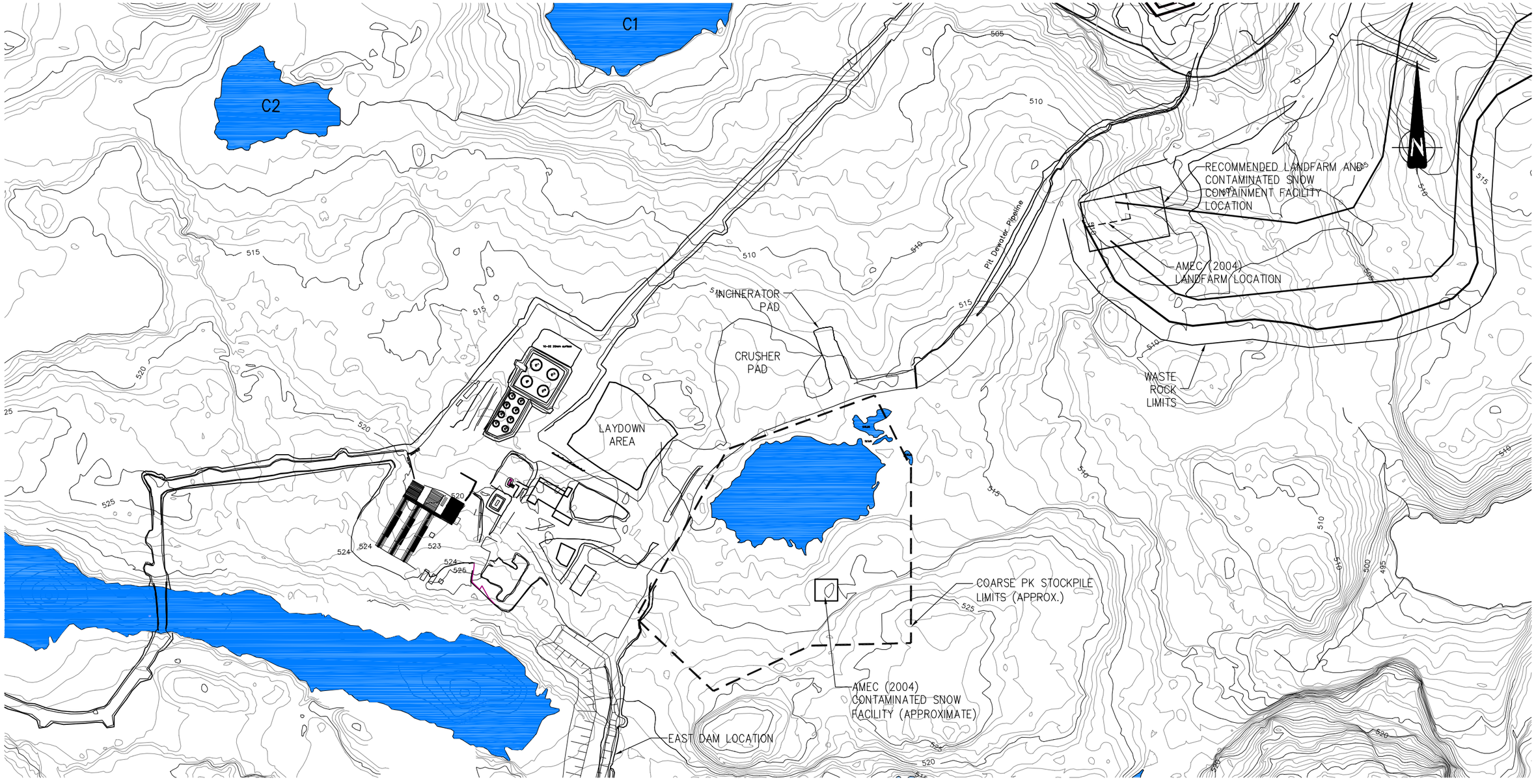
REFERENCES

AMEC Earth and Environmental, 2004. Landfarm Management Plan, Jericho Diamond Mine, Nunavut. Report submitted to Tahera Diamond Corporation, August 2004.

SRK Consulting, 2003a. Technical Memorandum A, Supplemental Geotechnical Data, Jericho Project, Nunavut. Report submitted to Tahera Diamond Corporation, October 2003.

SRK Consulting, 2003b. Technical Memorandum C, Supplemental Climate and Hydrology, Jericho Project, Nunavut. Report submitted to Tahera Diamond Corporation, October 2003.

FIGURE



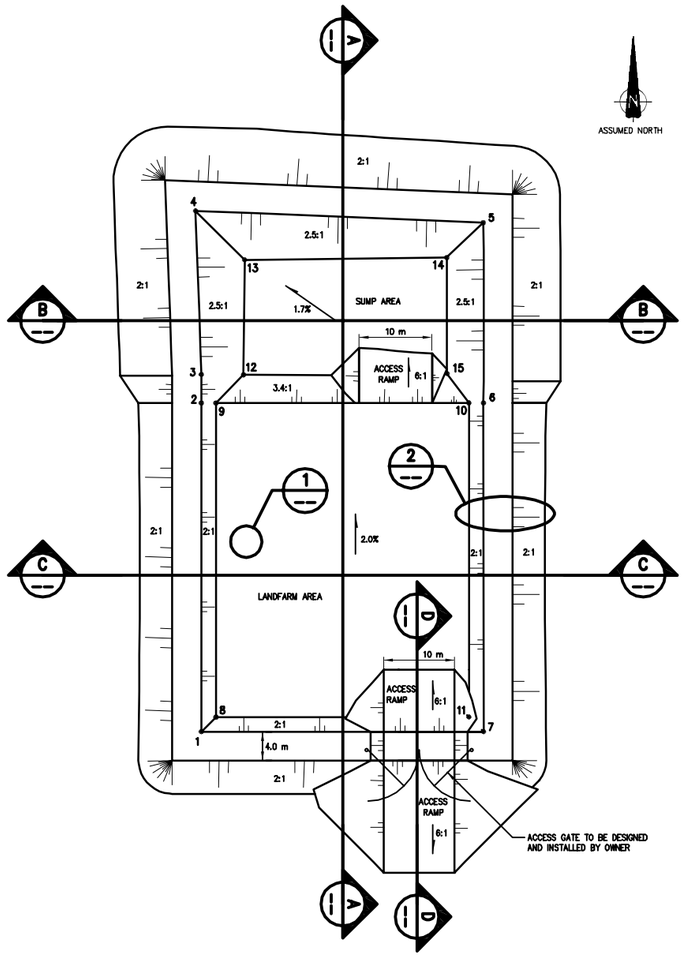
NOTE: FIGURE BASED ON AS-BUILT DRAWING PROVIDED BY TAHERA OCTOBER 30, 2005

0 250
metres
SCALE: 1:5000

Figure 1
Site Locations
1100060008K01B.dwg

APPENDIX

APPENDIX A DRAWING 1100060-01



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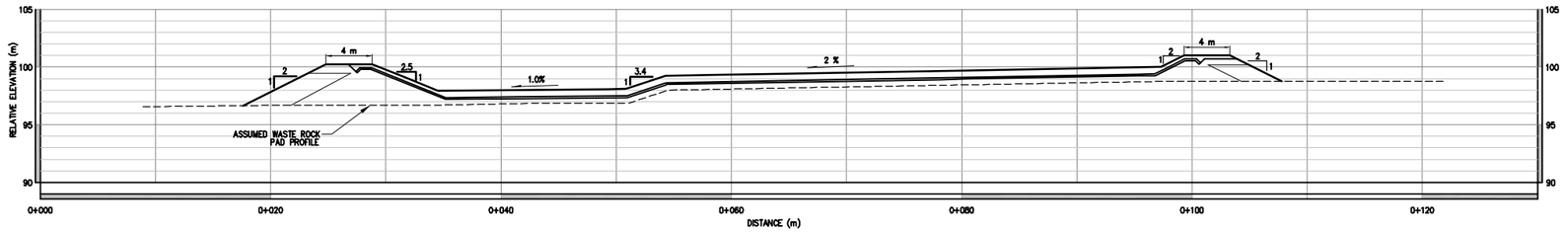
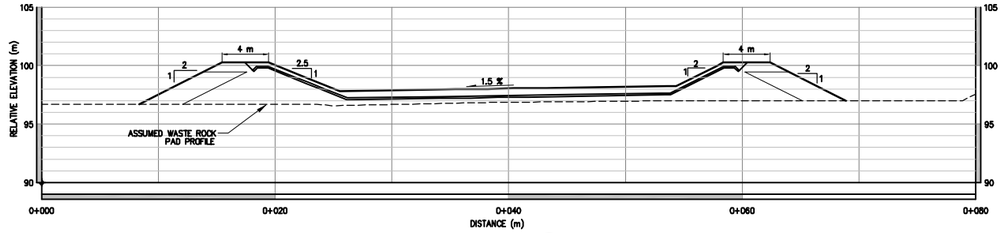


SECTION A
SCALE: 1: 250

RELATIVE LAYOUT COORDINATES			
POINT	X (m)	Y (m)	ELEVATION (m)
1	0	0	101.00
2	0	45.00	100.25
3	0	48.90	100.25
4	−0.879	71.31	100.25
5	38.65	69.74	100.25
6	38.65	45.00	100.25
7	38.65	0.00	101.00
8	2.00	2.00	100.00
9	2.00	45.00	99.25
10	36.65	45.00	99.25
11	36.65	2.00	100.00
12	5.79	48.87	97.95
13	5.93	64.60	97.65
14	33.63	64.90	98.25
15	33.66	49.03	98.25



SECTION B
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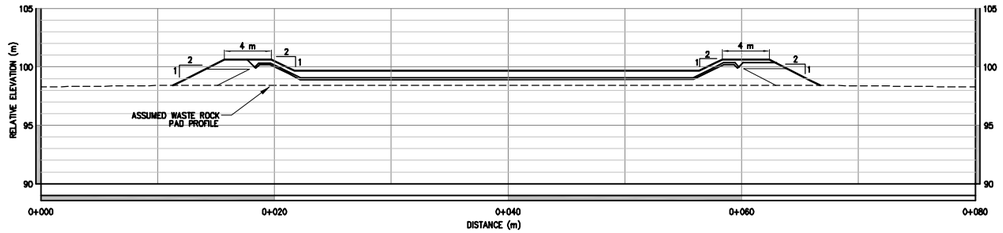

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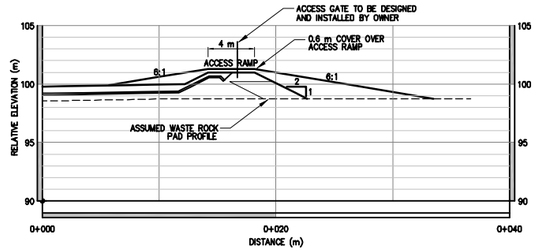

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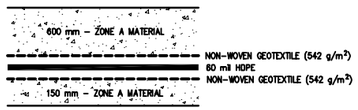
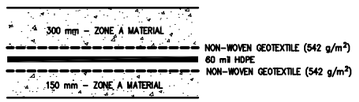
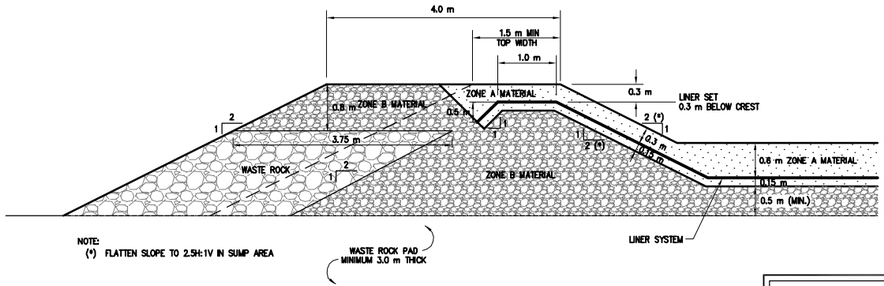


DETAIL – LINER SYSTEM (BASE) 1
N.T.S.



DETAIL – LINER SYSTEM (BERMS) 2
N.T.S.



SECTION – (TYPICAL)
N.T.S.

REDUCED COPY
- Do Not Scale -

NOTES:

1. FOUNDATION CONDITIONS TO BE INSPECTED BY ENGINEER PRIOR TO STARTING CONSTRUCTION.
2. LANDFARM AND CONTAMINATED SNOW CONTAINMENT FACILITY TO BE CONSTRUCTED ON WASTE ROCK PAD, MINIMUM 3.0 m THICK, UNLESS SITE INVESTIGATION INDICATES A THINNER PAD THICKNESS MAY BE USED. REDUCTION IN PAD THICKNESS SHALL BE DETERMINED BY THE ENGINEER.
3. MAINTAIN THE FOLLOWING MINIMUM COVER THICKNESS OVER LINER TO SUPPORT LISTED EQUIPMENT. CONSULT ENGINEER IF DESIRED EQUIPMENT IS NOT LISTED.

COVER OVER LINER (mm)	ALLOWABLE EQUIPMENT
0	FOOT TRAFFIC, 4 TIRE ATV
300	D4–D6 STYLE CAT, BOBCAT
600	D300 HAUL TRUCK WITH 350 kPa TIRE PRESSURE

4. COVER THICKNESS OVER ACCESS RAMP TO BE INCREASED TO 0.6 m.
5. FACILITY LAYOUT BASED ON ASSUMED BENCHMARK LOCATION AND ELEVATION. CONSTRUCTION ELEVATIONS TO BE ADJUSTED TO MATCH EXISTING TOPOGRAPHY.
6. LAYOUT POINTS 11 AND 15 LOCATED UNDER ACCESS RAMPS.
7. BERM TOP WIDTH MAY BE ADJUSTED BY ENGINEER IN ACCORDANCE WITH SITE SPECIFIC CONDITIONS. MINIMUM BERM TOP WIDTH MEASURED FROM THE INSIDE CREST SHALL BE 1.5 m.

REFERENCE DRAWINGS				REVISION			
–	–	DD/MM/YY		A	ISSUED FOR CLIENT REVIEW	DEC/05	KJ
DRAWING No.	DRAWING TITLE	DATE	REV	No.	DESCRIPTION	DATE	APPROVED

EBA ENGINEERING CONSULTANTS LTD.

DESIGNED BY:	GK
DRAWN BY:	GK/DRG
DATE:	09/11/05
SCALE:	AS SHOWN
PROJECT No.:	1100060.008
ACAD FILENAME:	1100060008D01e.dwg

ORIGINAL
SIGNED AND SEALED
Seal: G.D. Koop, P.Eng. Date: December 9, 2005
Permit: Kevin W. Jones, P.Eng. Date: December 9, 2005
The signed Professional Seal and Permit to Practice stamps reside on the executed drawing which is held and controlled by EBA Engineering Consultants Ltd.

Tahera Diamond Corporation

TAHERA DIAMOND CORPORATION

LANDFARM AND CONTAMINATED SNOW CONTAINMENT FACILITY

LANDFARM AND CONTAMINATED SNOW CONTAINMENT FACILITY DESIGN PLAN, SECTIONS AND DETAILS

REVISION ISSUE: A

DRAWING No.: 1100060–01