CI DIVERSION CONSTRUCTION SUMMARY JERICHO DIAMOND MINE, NUNAVUT













REPORT

FEBRUARY 2011 ISSUED FOR USE EBA FILE: E14101118





LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Shear Diamonds Ltd. and their agents. EBA, A Tetra Tech Company, does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Shear Diamonds Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. EBA's General Conditions are provided in Appendix A of this report.

EXECUTIVE SUMMARY

The C1 Diversion was constructed in 2005 and 2006 to divert natural flow around open pit mining activities, from C1 Lake to Carat Lake. Detailed design of the diversion and construction monitoring was provided by EBA, A Tetra Tech Company.

The C1 Diversion consists of three reaches: Reach A, Reach B, and Reach C. Reach A collects flow from C1 Lake, routing it through a low-lying inlet area and into a rock chasm. The inlet portion of Reach A is lined with an HDPE liner to promote flow into the rock chasm. Reach B is a steep rip-rapped channel intended to transfer flows from Reach A to Reach C. Immediately upstream of Reach B is a 900 mm diameter culvert, which passes flow under Carat Lake Road. Reach C is a wide channel flanked by two granular berms with frozen sand and gravel cores to contain high flow events. Low flows meander between the granular berms.

Nuna Logistics was the general contractor responsible for the diversion construction. Specialized construction tasks, such as blasting and liner installation, were subcontracted to McCaw's Drilling and Blasting and A&A Technical Services, respectively.

The C1 Diversion was generally completed in accordance with the design. A notable exception is the omission of the low flow channel through Reach C. The design calls for the construction of a small "notch" using granular fill to provide a flow path in low flow conditions; however, construction schedule and difficulties associated with frozen ground excavation and material placement did not permit this work to be completed.

Observations since 2006 have indicated significant vegetation growth through Reach C and the development of a meandering low flow path around existing sediment control berms. Observations indicate the C1 Diversion has met the design intent as is, and no subsequent work is warranted or required.



TABLE OF CONTENTS

1.0	INTRODUCTION I			
	1.1	General	.1	
	1.2	Project Details	.1	
2.0	CONSTRUCTION MATERIALS			
	2.1	Granular Fill	.1	
	2.2	Liner System	.3	
3.0	CONSTRUCTION			
	3.1	Reach A (Station 0+000 to 0+250)	.3	
		3.1.1 Inlet Diversion Structure (Station 0+000 to 0+040)	.3	
		3.1.2 Channel Excavation (Station 0+040 to 0+250)	.5	
	3.2	Carat Lake Road Culvert (Station 0+250 to 0+277)	.5	
	3.3	Reach B (Station 0+277 to 0+332)	.5	
	3.4	Reach C (Station 0+332 to 0+520)	.6	
4.0	CONSTRUCTION CHANGES			
	4.1	Reach A	.7	
	4.2	Reach C	.7	
5.0	DIS	DISCUSSION AND RECOMMENDATIONS		
	5.1	General	.7	
	5.2	Reach A	.7	
	5.3	Reach C	.8	
	5.4	Reach C Low Flow Channel	.8	
6.0	CLOSURE		9	
REF	EREN	ICES	0	
PHC	тос	GRAPHS		
Photo		Till Fill Pad construction at Reach A inlet, facing south		
	- ·	D. I.A. I. (I. (I.		

Photo 1	III FIII Pad construction at Reach A Inlet, facing south
Photo 2	Reach A inlet key trench, looking southeast
Photo 3	Reach A inlet key trench, looking northwest
Photo 4	Bringing Reach A inlet alignment to grade, facing southwest
Photo 5	Reach A inlet alignment, facing southwest
Photo 6	Reach A inlet, facing southwest
Photo 7	Backfilling Reach A key trench, facing southeast
Photo 8	Reach A inlet structure complete, facing southwest
Photo 9	Reach A channel excavation facing south from Carat Lake Road culvert
Photo 10	Reach B excavated and shaped, facing west
Photo 11	Reach B complete, facing southwest



Photo 12 Placing north till berm in Reach C, facing northeast Photo 13 Reach C north berm complete, facing northeast Photo 14

Upper pool in Reach C completed

APPENDICES

General Conditions Appendix A

Appendix B **Construction Record Drawings**

Appendix C **Geotechnical Quality Control Testing**

Appendix D Liner Installation Summary

ACRONYMS & ABBREVIATIONS

AA Atomic Absorption Spectrophotometry

ABA Acid Base Accounting

ACM Asbestos-containing Material
AEM Aquatic Effects Monitoring
AIA Aquatic Impact Assessment

AIRS Adaptation and Impacts Research Section

ANCOVA Analysis of Covariance

ANFO Ammonium Nitrate Fuel Oil Explosives

ANOVA Analysis of Variance

APEC Areas of Potential Environmental Concern

ARD Acid Rock Drainage

BTEX Benzene, Toluene, Ethylbenzene, and Xylenes

BACI Before-after-control-impact

CALA Canadian Association for Laboratory Accreditation
CCME Canadian Council of Ministers of the Environment

CDA Canadian Dam Association
CPK Coarse Processed Kimberlite

DIAND Department of Indian Affairs and Northern Development

DFO Department of Fisheries and Oceans

DO Dissolved Oxygen

EBA, A Tetra Tech Company

EC Electric Conductivity

EIS Environmental Impact Statement
EOC Emergency Operations Centre
EPP Emergency Preparedness Plan
ERP Emergency Response Plan
ESA Environmental Site Assessment
FSCF Fuel Storage Containment Facility

FPK Fine Processed Kimberlite

GC/FID Gas Chromatograph - Flame Ionization Detector

GTC Ground Temperature Cable

Hazmat Hazardous Materials

HDPE High Density Polyethylene
HVAS High Volume Air Sampling
HAZZERIANA Wests Transfer

HWTA Hazardous Waste Transfer Area

ICP-MS Inductively Coupled Plasma – Mass Spectrometry

IDLH Immediately Dangerous to Life and Health

INAC Indian and Northern Affairs Canada

KIA Kitikmeot Inuit Association

LBP Lead-based Paint

LPRM Long-term Post-reclamation Monitoring

MANOVA Multivariate Analysis of Variance



MSDS Material Safety Data Sheets
NIRB Nunavut Impact Review Board

NP Neutralization Potential
NWB Nunavut Water Board
PHC Petroleum Hydrocarbons

PKCA Processed Kimberlite Containment Area

PPE Personal Protection Equipment

QA Quality Assurance
QC Quality Control

RBC Rotating Biological Contactor

RCM Reclamation Construction Monitoring

ROM Run of Mine

RPD Relative Percent Difference

RRPK Recovery Rejects Processed Kimberlite
SCBA Self-contained Breathing Aparatus
Shear Shear Diamonds (Nunavut) Corp.
SOP Standard Operating Procedure

SPRM Short-term Post-reclamation Monitoring

TDC Tahera Diamonds Corporation

TDGR Transportation of Dangerous Goods Act (RSNWT 1988) and Regulations

TDS Total Dissolved Solids
TKN Total Kjeldahl Nitrogen
TSS Total Suspended Solids

WSCC Workers' Safety and Compensation Commission of the Northwest Territories and Nunavut

WHMIS Workplace Hazardous Materials Information System

WWTP Wastewater Treatment Plant

2011 Water Licence Renewal Documents

AEMP Aquatic Effects Monitoring Plan
AQMP Air Quality Management Plan
CAMP Care and Maintenance Plan
CMP Contingency Management Plan

EP-RP Emergency Preparedness and Response Plan for Dam Emergencies

GMP General Monitoring Plan

ICRP Interim Closure and Reclamation Plan
LDP Preliminary Landfill Design Plan
LMP Landfill Management Plan

LFDP Preliminary Landfarm Design Plan
LFMP Landfarm Management Plan

OMS Operations, Maintenance, and Surveillance Manual

PKMP PKCA Management Plan
SWMP Site Water Management Plan
WEMP Wildlife Effects Management Plan

WMP Waste Management Plan
WRMP Waste Rock Management Plan

WTMP Wastewater Treatment Management Plan



1.0 INTRODUCTION

I.I General

The C1 Diversion was constructed at the Jericho Diamond Mine in 2005/2006 to divert stream flow around open pit mining activities. EBA, A Tetra Tech Company (EBA), was retained by the former Tahera Diamond Corporation (TDC) to provide geotechnical quality control (QC) services during construction of the C1 Diversion. This comprised part of site-wide QC services provided by EBA for several structures including the East, West and Southeast dams.

The purpose of the QC program was to observe that the construction activities were undertaken in accordance with the project drawings and specifications and that the design intent was satisfied.

This report summarizes the C1 Diversion work completed from June 2005 to May 2006.

1.2 Project Details

Mining activities have intercepted natural drainage from C1 Lake to Carat Lake. The C1 Diversion diverts flow from C1 Lake and the upstream drainage basin, around the open pit, and reconnects it with the original channel.

The diversion is approximately 500 m long and consists of three reaches: Reach A, Reach B and Reach C. The diversion design was completed by EBA and is documented in EBA 2005.

Construction activities began in June 2005 with grubbing and blasting in Reach A. This work was undertaken based on preliminary engineering completed by Steffen Robertson and Kirsten (Canada) Inc. (SRK 2004). In July 2005, EBA was retained to complete the detailed design. Design documents were issued to TDC on August 26, 2005 (EBA 2005).

EBA provided quality control services from October 2005 to May 2006. EBA's representatives monitored and documented the work. Selected construction photographs are presented in the Photographs section of this report.

Freshet flows occurred on May 11, 2006, during construction activities. Sediment and erosion control measures were installed to reduce sediment transport. This included installing silt fencing in the C1 workspace. As an added level of protection, a silt curtain was installed at the channel outflow into Carat Lake. Construction activities and the erosion and sediment control measures employed are discussed in Section 3.0.

Construction record drawings are provided in Appendix B.

2.0 CONSTRUCTION MATERIALS

2.1 Granular Fill

Granular materials used in the C1 Diversion construction are discussed below. Related geotechnical QC testing is presented in Appendix C.



Materials were coordinated with mining and crushing operations to obtain suitable materials for use in all areas of development. Construction material availability was an issue during construction. This necessitated substituting and modifying some material types to advance construction before the start of freshet.

Till (Sand and Gravel)

Till was used to construct the Reach C berms and the Reach A inlet fill pad. The till was predominantly sourced from the pit during stripping operations. Material with a large proportion of oversize was sorted at the pit and/or hauled to the waste dump. Some oversize material was observed in the fill; however, the oversize was typically enveloped in a soil matrix and was therefore considered acceptable for use.

Sand and silt content in the till varied as a function of the pit stripping location. Excess ice was also observed in some material upon thawing.

Run-of-Mine (ROM)

Run-of-mine (ROM) was used as bulk fill in the Reach A inlet and to cap the Reach C berms. The material was sourced from select granite blasts in the pit. Large boulders were sorted or removed at the pit so that the material had an approximate top size of 750 mm diameter.

Type I Rip-Rap

Type 1 rip-rap was used in areas exposed to potentially high flow velocities or shear forces, such as Reach B or the Reach A inlet. The material was select sourced from granite blasts and had an approximate top size of 500 mm.

Type 2 Granular Fill

Type 2 granular fill comprises a 150 mm material used as erosion protection in low flow regimes and for ditch stops. The material was specified to have no more than 15% sand by weight to reduce sediment transport.

Stockpiled 150 mm fill (previously produced for dam construction) was available and was used for portions of the Reach A and Reach B construction. To remove the more erodible fractions, the material was sorted prior to placement by casting the material in a pile, allowing the coarser material to fall to the bottom, and using this segregated material for erosion protection.

Production of Type 2 granular fill began on May 9. Granite feed material was crushed to 150 mm minus then split on a 20 mm screen. The 20 mm plus fraction was used as Type 2 granular fill, and the 20 mm minus portion was used as Type 4 granular fill.

Type 3 Granular Fill

Type 3 granular fill comprises a 50 mm minus crushed granite material. It was used for culvert backfill and for backfilling the Reach A inlet structure key trench. The material was also used selectively as liner bedding and cover for portions of the Reach A inlet structure due to a shortage of Type 4 granular fill.

Type 4 Granular Fill

Type 4 granular fill consists of a 20 mm minus crushed granite material. It was used as liner bedding and cover material.

Filter Material

Filter material, previously produced for Dyke A construction, was used to backfill the Reach A cutoff trench. The material comprised a 20 mm minus crush with an average fines content of 15%.

2.2 Liner System

A 60 mil textured (one-sided) HDPE liner was installed in the Reach A inlet structure. The liner was sandwiched between two layers of nonwoven geotextile to cushion and protect the liner.

A 60 oz. nonwoven geotextile was also placed in Reach B under areas to receive rip-rap, under the Type 2 granular fill in the upper Reach C sediment pond, and along the toe of the Reach C berms during rip-rap placement.

3.0 CONSTRUCTION

3.1 Reach A (Station 0+000 to 0+250)

Reach A of the diversion channel extends from Station 0+000 to 0+250. The terrain at the inlet of Reach A (0+000 to 0+040) transitions from low-lying, flat terrain with glacial fluvial and glacial tills to confining rock chasm. A diversion structure comprising a geomembrane lined berm was constructed at the transition to direct inlet flows into the diversion channel. The second portion of Reach A (0+040 to 0+250) is a cut section in bedrock controlled terrain. Carat Lake Road lies immediately downstream of Reach A.

3.1.1 Inlet Diversion Structure (Station 0+000 to 0+040)

A temporary culvert under Carat Lake Road was removed in the fall of 2005 under the direction of others.

Snow removal at the inlet diversion area began on March 14, 2006, to facilitate excavation of the cutoff trench adjacent to Carat Lake Road. Snow was excavated using a 345 excavator. Snow removal in the remaining inlet area continued intermittently into early April 2006.

The cutoff trench under the fill pad was excavated on April 16, 2006, using the 345 excavator. The trench was excavated parallel to Carat Lake Road and was approximately 2 m wide by 1 to 1.5 m deep. The trench was backfilled with 20 mm minus filter material. The material was placed in lifts and compacted with a 10 ton roller.

Construction of the fill pad began on March 17, 2006. The fill pad was constructed of till originally obtained from the pit stripping. Till was hauled with 777 haul trucks and spread with the D9 dozer (Photo 1). The material was packed during placement under wheel load and with a 10 ton roller. The material was frozen in place, and therefore, compaction testing could not be completed. Imported fill containing any frozen material was broken down during spreading and compaction. The fill pad was later capped with ROM as per design.



Drilling and blasting of the inlet began on April 4, 2006. This included blasting a key trench to anchor the geomembrane on the upstream side of the diversion structure. Blasting activities were mostly complete by April 9, 2006. A small trim blast occurred on April 21, 2006 to remove a bedrock knob. Excavation along the diversion alignment was completed by April 20, 2006. Key trench excavation continued until April 26, 2006.

The key trench was aligned in a northwest–southeast direction, perpendicular to the channel mouth. The southeast portion of the key trench ran parallel to the upstream face of the fill pad and butted into a vertical rock face (Photo 2). The northwest portion of the key trench followed the natural bedrock slope butting into a till face, well above the design high water level (Photo 3). The key trench was designed and constructed at least 1 m deep.

The channel alignment from 0+000 to approximately 0+055 was overblasted and required fill placement to bring the alignment to design grade. Fill materials included ROM, 150 mm, and Type 3 and Type 4 granular fills. ROM was placed in the channel bottom to fill in the pockets of overblast that were up to 1.2 m deep. This material was placed with the 345 excavator and compacted with the 10 ton roller. This was followed by a lift of 150 mm maximum size structural fill (Photo 4), then a combination of Type 3 and Type 4 granular fill to bring the inlet invert to design grade.

The fill pad was trimmed and shaped from April 24 to April 27, 2006, using the 345 excavator. During this time, the slope opposite the fill pad (west slope) was also grubbed, and the overburden soil removed from under the liner footprint. Type 3 granular fill was then placed over the fill pad slope and channel bottom as liner bedding. Some Type 3 granular fill was also placed on the west slope to smooth sharp contours and cover protruding bedrock. The shaped liner base is shown in Photo 5.

A shallow key trench was excavated at the crest of the west slope on April 26, 2006, to anchor the liner into the slope.

A&A Technical Services (A&A) mobilized to site on April 26, 2006, for liner installation. The nonwoven geotextile underlay was placed on April 27, 2006. The geotextile was lapped a minimum 0.3 m and heat bonded. HDPE placement proceeded from April 28 to April 29, 2006, and was completed as per the Specifications. Photo 6 shows the liner installation in progress. The second layer of geotextile was placed over the HDPE on May 2, 2006, following a brief snow storm, and completed on May 4, 2006. This geotextile was lapped. A&A's installation report is attached in Appendix C.

Granular liner cover began on May 2, 2006 and continued until May 10, 2006. Cover material was placed on the fill pad slope and channel bottom using the 345 excavator. Cover material on the west slope was spread using a D4 dozer. Some hand placement was required in areas the dozer or excavator could not readily access. Cover material was predominantly Type 4 granular fill; however, some Type 3 granular fill was placed on the upper reaches of the fill pad slope, from approximately 0.75 m above the inlet invert to the liner crest.

Some Type 2 granular fill was also placed in early May 2006 on the channel bottom from approximately Station 0+030 to 0+040.

Key trench backfill began on May 6, 2006. An initial lift of cement amended Type 4 granular fill was placed in the base of the key trench. Subsequent backfill was brought up in lifts using Type 3 granular fill and compacted using a 1000 pound plate tamper (Photo 7). Key trench backfill was completed on May 8, 2006.

Prior to capping the Type 4 granular fill with the more erosion-resistant Type 2 granular fill, a portion of the Type 4 cover material washed out on May 11, 2006, during an earlier than expected freshet event. The liner performed well, and the Type 4 granular was replaced on May 19, 2006. The entire inlet area was covered with Type 2 granular fill on May 21 and 22, 2006, using the 345 excavator. Some Type 1 rip-rap was also placed on the south face of the fill pad. Photo 8 shows the completed Reach A diversion structure.

3.1.2 Channel Excavation (Station 0+040 to 0+250)

Channel excavation in Reach A began in June 2005 and proceeded into July 2005. Drilling and blasting operations were completed by McCaw's Drilling and Blasting Ltd. (McCaw's). Grubbing occurred before blasting and proceeded from the southern portion of the channel northward. Spoil piles from grubbing were hauled to the till dump.

Most of the drill and blast work was completed in the summer of 2005; however, some smaller trim blasts were also completed in April 2006 to remove high spots and bring the channel to design grade. Channel excavation was started in 2005 but was suspended over winter. Excavation work resumed in early April 2006. Drill and blast and excavation work within the Reach A channel was substantially complete by April 19, 2006.

The channel floor is excavated entirely in bedrock. Some localized depressions are present; however, the overall grade slopes down to the north, from the inlet structure to the culvert under Carat Lake Road. The localized depressions will result in some small seasonal pools; however, this is not expected to significantly affect flows at the channel outlet.

The completed channel excavation is shown in Photo 9.

3.2 Carat Lake Road Culvert (Station 0+250 to 0+277)

A 900 mm diameter culvert under Carat Lake Road, between Reach B and C, was installed in late August/early September 2005 with on-site direction from others.

During construction, EBA reviewed the culvert hydraulics and provided some recommendations for installation. The hydraulic review concluded that the 900 mm diameter culvert would adequately accommodate the design flow of $0.7~\rm m^3/s$. Recommendations included installing the culvert at a 1% grade, backfilling the culvert with a $50~\rm mm$ minus crush, and constructing a concrete cutoff wall to impede piping along the culvert. These recommendations were ultimately incorporated into the design drawings.

3.3 Reach B (Station 0+277 to 0+332)

Reach B is a rip-rapped channel designed to transfer flow from the culvert outlet to the headwaters of Reach C. This section of the channel has an 8% slope. Construction began in late March 2006. The area was drilled and blasted on March 23, 2006, and excavated and shaped on March 26, 2006 (Photo 10). A layer of nonwoven geotextile was placed over the shaped surface, prior to rip-rap placement.

Snowfall near the end of March delayed rip-rap placement until April 13, 2006. Rip-rap placement, including installation the upper three ditch stops, was completed on April 15, 2006. The bottom ditch stop was completed concurrent with the pool at the top of Reach C on May 5, 2006.



The Type 2 shoulders, adjacent to the Reach B channel, were constructed on April 13, 2006. Material was placed and spread with the D4 dozer. The completed reach is shown in Photo 11.

3.4 Reach C (Station 0+332 to 0+520)

Reach C comprises a wide channel flanked by two granular berms with frozen sand and gravel cores (north and south) to contain high flow events. The berm design is intended to aggrade permafrost into the berms making them low permeable. A low flow channel, consisting of a small "notch", was designed to provide low flow capacity and fish habitat. The south berm forms part of the pit perimeter road.

Pit perimeter road construction began in November 2005. EBA personnel were on site at the start of construction, but completion of the road was carried under direction of others. Initial lifts were constructed using till material. The composition of later lifts is unknown.

The south berm (perimeter road) was overbuilt from the lines shown on the drawings. As a result, the channel width at the neck of Reach C, near Station 0+350, is narrower than designed.

Work on the north till berm began on February 8, 2006. Snow was removed with the D9 dozer and the berm footprint grubbed, removing thin topsoil and pockets of peat up to 150 mm thick. Till was placed intermittently over the next several months as material and equipment became available. The till was hauled with 777 haul trucks and spread with the D9 dozer (Photo 12). The material was placed in lifts approximately 0.5 m thick and compacted with a 10 ton roller.

Till placement on the north berm continued until the start of spring thaw on May 4, 2006. Berm construction thereafter continued using ROM material. ROM placement began on May 14 and was completed on May 16.

ROM was placed on the berm top and outside slope, and Type 2 granular fill was placed over the till on the inside slope. Berm shaping and Type 2 granular fill placement started on May 10, 2006, and continued to May 18, 2006. A layer of nonwoven geotextile was placed at the toe of the slope between the till and Type 2 granular fill. Photo 13 shows the completed berm shaping and Type 2 granular fill placement. A typical cross-section is shown in Appendix B, Drawing 2.

The south berm was shaped on May 28, 2006, covered with geotextile, and rip-rapped with Type 2 granular fill.

Construction of the upstream pool began on April 10, 2006. A ripper attachment on the excavator was required to penetrate the frozen ground. Excavation and shaping of the pool was completed by May 1, 2006, and Type 2 granular fill was placed on May 3, 2006. This was underlain by a layer of nonwoven geotextile. Photo 14 shows the completed pool.

During freshet, rockfill spurs were constructed in the channel to reduce flow velocities, develop a meandering flow path, and filter any suspended sediment. The spurs were constructed with Type 2 material and extended from the north berm, approximately half way into the channel. Other sediment and erosion control measures included installation of silt fencing at the upper pool discharge, along the outside toe of the north berm, and at locations between Reach C and the Carat Lake inflow. Sand bag check dams were also temporarily constructed in Reach C, and a floating silt curtain was installed at the channel discharge into Carat Lake.

4.0 CONSTRUCTION CHANGES

4.1 Reach A

The cutoff trench under the fill pad was backfilled with filter material instead of till. The filter material was available and considered equivalent or better than the till for a cutoff because it contained a significant proportion of fines and was more workable than the till available at the time. Its use in the trench cutoff provided a homogenous material with lower permeability.

A textured HDPE liner (one-sided) with heavy nonwoven geotextile was used for the Reach A diversion as opposed to the specified polypropylene liner. One of the primary advantages was that TDC's contractors were more experienced at installing HDPE than the chosen liner. This substitution was reviewed by EBA prior to installation and was accepted as a suitable alternative.

Type 3 granular fill was used for the liner base as opposed to Type 4 because of limited Type 4 quantity. This was considered acceptable for the liner base after it was demonstrated that roller compaction of this material could pack the material flat, preventing any potential sharp edges from coming in contact with the liner.

A portion of the liner on the till pad was also covered with Type 3 granular fill because of limited material availability. The use of this material was reviewed, and it was determined that the liner would perform adequately given the lack of traffic over the area and the underlying geotextile cushion.

4.2 Reach C

The north berm design was modified to construct the berm with till and then cap it with ROM. ROM was also placed on the outside berm slope for erosion protection and thermal cover. The design modification provided sufficient till thickness to provide a positive cutoff and force runoff through the design channel.

Geotextile was placed in the pool at the top of Reach C. This was not indicated on the drawings but will not have an adverse effect on pool performance.

The low flow channel as detailed on the drawings was not constructed due to time constraints and difficulties associated with excavating frozen ground. Sediment control berms were also constructed as detailed in Section 3.4.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

The C1 Diversion has been monitored by EBA regularly since it was constructed. Observations indicated the channel was performing well.

5.2 Reach A

The till fill pad in the Reach A inlet was constructed in frozen conditions. The material was placed and compacted in accordance with good construction practices; however, some settlement may be observed as



the till material thaws. This is not expected to adversely affect performance of the inlet diversion, but additional fill or levelling of the pad may be required periodically.

Portions of Reach A have been excavated in bedrock overlain by till. Based on our observations, the till has remained stable; however, localized instability of the till may develop over time. Periodic maintenance may therefore be required to remove any sloughed material from the channel. Channel inspections should be completed regularly to monitor performance.

5.3 Reach C

The berms were constructed in frozen conditions. The material was placed in accordance with good construction practices; however, some ice-rich material was observed during placement, and settlement may occur. The ROM cap will provide thermal protection and stability; however, seasonal thaw may still penetrate the underlying fill. This is not expected to adversely affect the berm performance, but periodic shaping or levelling may be required.

Temporary seepage was observed through the ring road during freshet in 2006. The seepage originated from the low lands on the pit side of the road. The ultimate pit limits will encompass this area, thereby removing any northward flow toward the respective berm; however, until the pit is developed to its full size, seepage should be monitored. Sediment control measures should also be installed at discharge points to protect against downstream sediment transport.

5.4 Reach C Low Flow Channel

The low flow channel and downstream fish pool were not constructed as shown on the design drawings. However, subsequent inspections have indicated significant vegetation growth through Reach C. Furthermore, the spurs constructed for erosion protection have forced the flow into a partially meandering pattern.

The intent of the low flow channel was to accommodate low flow velocities along a varied flow path. Recent observations through Reach C suggest this is occurring and that the design intent through this area has been achieved. Additional work to amend the existing flow path is not considered warranted and would disrupt the existing vegetation growth which has been established.

The ring road was overbuilt and encroaches on the Reach C channel. As a result, the channel is narrower than designed in the upper portion of the reach (approximately Station 0+330 to 0+400). This is not expected to affect channel performance.

6.0 CLOSURE

EBA, A Tetra Tech Company



Gary Koop, P.Eng. Senior Project Engineer

Direct Line: 780.451.2130 x519

gkoop@eba.ca



Reviewed by W.T. Horne, M.Sc., P.Eng. Principal Consultant, Arctic Regions Direct Line: 780.451.2130 x276

bhorne@eba.ca

Reviewed by Shear Diamonds Ltd.

Michelle Tanguay Environment Manager

Shear Diamonds Ltd.

PERMIT TO PRACTICE
EBA ENGINEERING CONSULTANTS LTD.

Signature Cally

Date Feb 28, 2011

PERMIT NUMBER: P018

NWT/NU Association of Professional
Engineers and Geoscientists

Allison Rippin Armstrong Director of Environment and Permitting Shear Diamonds Ltd.

2011 WATER LICENCE RENEWAL DOCUMENTS

Management Plans

- EBA, A Tetra Tech Company (EBA), 2011a. Aquatic Effects Monitoring Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011b. Care and Maintenance Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011c. Contingency Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011d. General Monitoring Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011e. Interim Closure and Reclamation Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011f. Landfarm Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011g. Landfill Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011h. Processed Kimberlite Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011i. Site Water Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011j. Waste Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011k. Waste Rock Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011l. Wastewater Treatment Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

Design Reports

- EBA, A Tetra Tech Company (EBA), 2011m. C1 Diversion Construction Summary, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011n. Fuel Storage Containment Facility Design Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011o. Preliminary Landfarm Design Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011p. Preliminary Landfill Design Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

Additional Plans

- EBA, A Tetra Tech Company (EBA), 2011q. Operations, Surveillance, and Maintenance Manual, PCKA Dams, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.
- EBA, A Tetra Tech Company (EBA), 2011r. Emergency Preparedness and Emergency Response Plan for Dam Emergencies at the Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

REFERENCES

- EBA Engineering Consultants Ltd., 2005. C1 Diversion Geotechnical Design, Jericho Diamond Project, NU. Report submitted to Tahera Diamond Corporation, August 2005. EBA File No.: 1100060.006.
- SRK Consulting, 2004. Technical Memorandum West Site Water Management, Jericho Diamond Project, NU. Report submitted to Tahera Diamond Corporation, August 2004.

