VICTOR MINE EXTENSION PROJECT

PROJECT DESCRIPTION

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FORWARD LOOKING INFORMATION

This document contains "forward-looking information" as defined in applicable securities laws (referred to herein as "forward-looking statements"). Forward looking statements include, but are not limited to, statements with respect to the cost and timing of the development of the Victor Mine Extension Project, including the exercise of the economic parameters of the project; the success and continuation of exploration activities; estimates of diamond resources; acquisitions of additional diamond properties; the future price of diamonds; government regulations and permitting timelines; estimates of reclamation obligations that may be assumed in connection with the exercise of the economic parameters of the project; requirements for additional capital; environmental risks; and general business and economic conditions. Often, but not always, forward-looking statements can be identified by the use of words such as "plans", "expects", "is expected", "budget", "scheduled", "estimates", "suggests", "continues", "forecasts", "projects", "predicts", "intends", "anticipates" or "believes", or variations of, or the negatives of, such words and phrases, or statements that certain actions, events or results "may", "could", "would", "should", "might" or "will" be taken, occur or be achieved. Inherent in forward-looking statements are risks, uncertainties and other factors beyond the Company's ability to predict or control. These risks, uncertainties and other factors include, but are not limited to, the assumptions underlying the document not being realized, future diamond prices, changes in cost of labour, supplies, fuel and equipment, changes in equity markets, actual results of current exploration, changes in project parameters, exchange rate fluctuations, title risks, regulatory risks and uncertainties with respect to obtaining necessary surface rights and permits or delays in obtaining same, and other risks involved in the diamond exploration and development industry. Forward-looking statements are based on a number of assumptions which may prove to be incorrect, including, but not limited to, the availability of financing for the Company's exploration and development activities; the timelines for the Company's exploration and development activities on the Victor Mine Extension Property; the availability of certain consumables and services; assumptions made in diamond resource estimates, including geological interpretation, recovery rates, and operational costs; and general business and economic conditions. Forward looking statements involve known and unknown risks, uncertainties and other factors which may cause the Company's actual results, performance or achievements to be materially different from any of its future results, performance or achievements expressed or implied by forward-looking statements. All forward-looking statements herein are qualified by this cautionary statement. Accordingly, readers should not place undue reliance on forward-looking statements. The Company undertakes no obligation to update publicly or otherwise revise any forward-looking statements whether as a result of new information or future events or otherwise, except as may be required by law.

DE BEERS CANADA

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GLOSSARY

µg/m^3	micrograms (one-millionth of a gram) per cubic metre
AMEC	AMEC Environment & Infrastructure
AttFN	Attawapiskat First Nation
CEA Agency	Canadian Environmental Assessment Agency
CEAA, 2012	Canadian Environmental Assessment Act, 2012
cm	centimetres
De Beers	De Beers Canada Inc.
EA	environmental assessment
ESA	*Endangered Species Act*
FAFN	Fort Albany First Nation
FPK	fine processed kimberlite
FPKC	fine processed kimberlite containment
ha	hectare
IBA	Impact Benefit Agreement
KFN	Kashechewan First Nation
km	kilometre
km^2	square kilometre
kV	kilovolt
L	litres
m	metre
m^2	square metres
m^3	cubic metres
m^3/a	cubic metres per year
m^3/d	cubic metres per day
Ma	million years
MCFN	Moose Cree First Nation
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
mm	millimetre
MNDM	Ontario Ministry of Northern Development and Mines
MNR	Ontario Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
Mt/a	million tonnes per year
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
^oC	degrees Celsius
PK	processed kimberlite
PSQG	Provincial Sediment Quality Guidelines
PWQO	Provincial Water Quality Objectives for the protection of aquatic life

SAR	Species at Risk
SARA	*Species at Risk Act*
SO_2	sulphur dioxide
TDS	total dissolved solids
TK	Traditional Knowledge
TLU	Traditional Land Use
UTM	Universal Transverse Mercator
VMEP	Victor Mine Extension Project

EXECUTIVE SUMMARY

GENERAL INFORMATION AND CONTACTS

De Beers Canada Inc. (De Beers) has been exploring the Victor Mine Extension Project (VMEP or the Project) property since 1987, with the objective of developing a satellite open pit diamond mine on the site to extend the life of the adjacent Victor Mine. De Beers proposes to construct, operate and eventually reclaim a new open pit, the VMEP, at the Project site (Figure ES-1).

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De Beers is an active member of the community with an office in Timmins that offers residents easily accessible locations to learn about the VMEP. De Beers has engaged First Nation community members. Through meetings and regular communications, De Beers strives to ensure engagement with all members of the local communities. Key stakeholders and Aboriginal groups who are expected to have an interest in the VMEP going forward were identified during the early consultation efforts and can be considered in the following categories:

- Business, organizations and non-governmental organizations.
- First Nations and aboriginal groups;
- General public;
- Provincial (Ontario) Government; and
- Federal Government.

The VMEP is anticipated to require completion of a Federal Environmental Assessment (EA), pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012). If the Canadian Environmental Assessment Agency (CEA Agency) determines that a Federal EA is required, the Project Description will be used to develop Environmental Impact Statement Guidelines, which defines the scope of the Federal EA required for the project.

In addition to needing to meet Federal EA requirements pursuant to the CEAA, 2012, aspects of the VMEP are anticipated to potentially require completion of Provincial EA process(es) to meet the requirements of the Ontario *Environmental Assessment Act*. Should it be determined that a Provincial EA is required, It is fully expected that the same body of information will be use to inform both the Provincial and Federal EA processes, culminating in a single EA report that meets both the federal Environmental Impact Statement Guidelines and the provincial requirements. Where possible, consultation activities for both processes will be coordinated, but nonetheless, the comments gathered during all consultation activities will be used to inform both EA processes. After the EA processes are completed, environmental approvals will be required to construct, operate and close the VMEP.

PROJECT INFORMATION

The majority shareholder of De Beers is Anglo American PLC, and De Beers proposes to develop and operate the VMEP in order to extend the life of the Victor Mine and produce diamonds for sale. There is a local and regional need in northern Ontario for economic development. The VMEP will have a significant economic influence on the region providing construction and permanent employment opportunities.

The federal *Regulation Designating Physical Activities* identifies the physical activities that constitute the designated projects that could require completion of a Federal EA. The following section may apply to the VMEP:

- Section 8: "The construction, operation, decommissioning and abandonment of a facility for the extraction of 200,000 m^3/a or more of ground water,...."

By this definition, according to CEAA 2012, this Project Description should only relate to the extraction of the water. However, as the dewatering in excess of 200,000 cubic metres per year (m^3/a) is a required component of the VMEP, the VMEP cannot not proceed without it.

Therefore, to provide more complete environmental context, this Project Description discusses the VMEP and all related activities, and not solely the dewatering aspect (which is the designated project).

There will be of necessity, some new infrastructure and facilities constructed specifically for the VMEP (Figure ES-2). Should the Project proceed as planned, the VMEP will however, preferentially use of much of the existing infrastructure and facilities at the Victor Mine (Figure ES-3), and the existing regional infrastructure.

The main, existing Victor Mine facilities that will be part of the VMEP are:

- Processing plant;
- Maintenance shop, warehouse and administration complex;
- Accommodations complexes;
- Explosives manufacturing and storage facilities (with potential for relocation or development of a spur road for new access);
- Local access roads and pipelines, power infrastructure and fuel storage facilities;
- Fine processed kimberlite storage in the Victor open pit or at existing fine processed kimberlite containment facility (as currently approved or expanded);
- Coarse processed kimberlite storage;
- Domestic and industrial waste handling;
- Water treatment and management facilities;
- Winter road between Attawapiskat and Victor Mine
- Regional transmission line; and
- All-season airstrip.

All of the Victor Mine components were approved through a previous Federal EA process and have been operating in compliance with the federal requirements. These listed components are currently, and are planned to continue to be, under the care and control of De Beers, with the exception of existing regional infrastructure.

New physical works that will be part of the VMEP are:

- Open pit: approximately 36 hectare (ha) surface area and 200 metres (m) in depth. Mining is proposed to occur at a rate increasing to approximately 3 million tonnes per year of ore extracted, with a mine life of up to approximately 7 years.

- Mineral waste stockpile(s): approximately 8,400,000 cubic metres (m^3) of overburden and peat, and 9,100,000 m^3 of mine rock will potentially be stored in surface stockpiles. The mine rock may also be placed in the existing Victor open pit, in combination with the

fine processed kimberlite (crushed rock slurry, no reagents), in order to minimize in the groundwater inflow that is higher in salinity, and ameliorating the final closure scenario.

- Crusher, conveyor and existing processing plant: ore will be processed onsite to produce raw diamonds for sale.

- Storage of approximately 9,100,000 m^3 of coarse and fine processed kimberlite at the Victor Mine, in the existing open pit, or storage in a proposed expansion of the existing Victor Mine Fine Processed Kimberlite Containment facility and/or coarse processed kimberlite stockpile.

- Local distribution line: power for later construction and operations phases of the VMEP is proposed to be supplied by a 13.8 kilovolt (kV) distribution line connected to the existing electrical grid structure of the Victor Mine, which is connected to the regional transmission line system.

- Associated buildings, facilities and infrastructure: additional permanent facilities currently planned for the VMEP are expected to include a small maintenance garage, warehouse and administration complex, access roads, infrastructure corridor (pipeline, conveyor) and twinning (and eventual replacement) of a 13.8 kV distribution line (on lease).

- Detailed design studies may require the relocation of some or all of the explosives manufacturing and storage facilities to the east side of the road to the water intake, or potentially the development of a short spur access road parallel to the existing road to maintain access.

The new facilities listed above, will all be under the care and control of De Beers.

The VMEP and existing Victor Mine facilities are located within mineral leases P1052190, P1246006, CLM435,CLM436, CLM437 CLM445, CLM446 CLM455, and mining claims 1241227,1241228, 1241229, 1241231, and 4212583 (Figure ES-2); with the exception of the winter road / transmission line right-of-way from Attawapiskat to Victor Mine which are located primarily on Crown land.

Primary construction phase activities will include:

- Completion of engineering studies and environmental approvals processes;

- Procurement and movement of construction materials to identified laydown areas;

- Initiation of open pit mine development;

- Preparation of onsite mineral waste handling facilities, including FPKC management area dams if applicable;

- Establishment of water management works;

- Construction / assembly of associated buildings and facilities;

- Construction and energizing of a 13.8 kV distribution line.

Activities that will be carried out during the operations phase are anticipated to include:

- Peat, overburden, ore and mine rock extraction and management;
- Ore processing at the Victor Mine processing plant;
- Mineral waste management (stockpiling or FPK management area)
- Ongoing environmental management; and
- Progressive site reclamation where practical.

Decommissioning phase activities will consist of the closure and reclamation of the various project components. Ongoing environmental monitoring and site management will occur as needed after decommissioning activities are completed.

KEY ENVIRONMENTAL ASPECTS

Air emissions will derive from point source and fugitive sources, with fugitive sources (dust) likely to contribute the majority of the air emissions. The primary point source air emissions are expected to be particulate (dust) from the conveyors and crusher(s). Measures will be taken to minimize dust creation at the plant site and to utilize dust collection / suppression devices where practical. Greenhouse gas emissions will derive principally from diesel fuel combustion in heavy equipment operation. Onsite greenhouse gas emissions will be minimized by utilizing the regional transmission line and a new local distribution line as the primary power supply source.

The principal anthropogenic noise sources at the Project site are expected to derive from open air, heavy equipment operation. Plant site operations including crushing and grinding operations will be enclosed and associated noise emissions are expected to be minor in comparison to open air noise sources. Noise source modelling will be carried out to ensure that noise and noise-related effects are fully considered during engineering design such that regulatory requirements are met.

The dewatering of the proposed open pit will occur through means of a dewatering wellfield. Runoff and precipitation, in addition to the pit wellfield water will report to a pond, or series of ponds on surface, for settling of solids, prior to discharge to the Attawapiskat River.

Fine processed kimberlite will be the end product of the processing of diamond bearing rock at the existing Victor Mine processing plant. The processing of kimberlite does not require chemicals, and no material changes to the Victor processing plant are expected. The resultant kimberlite waste slurry will be deposited in to the existing Victor open pit, or the Victor Fine Processed Kimberlite Containment facility (potentially requiring expansion) This facility will provide retention and holding capacity to ensure that effluent quality meets applicable regulations prior to discharge. Coarse processed kimberlite also arising from the processing will be re-used as aggregate or stored on the Victor Mine site.

Other solid and liquid wastes produced during the construction and operations phase will be handled and treated on the Victor Mine site as appropriate (such as sewage treatment plant), or transported offsite (such as for the limited quantities of hazardous wastes) for handling, treatment and/or storage according to applicable regulatory requirements.

A preliminary schedule for the development of the VMEP has the construction phase commencing after completion the Federal (and potential Provincial) EA process(es), which is currently planned for as early as 2016. The operation and production phase are planned to start in 2018 and continue for a seven year mine life. Closure and decommissioning is therefore anticipated to begin in 2025 at the earliest.

A significant amount of work will be required over a relatively short period of time to complete Project feasibility and engineering studies, and to obtain the necessary environmental approvals, in order to commence mine construction as early as 2016 and initiate mine production in 2018 (assuming all Project approvals are obtained). The construction phase will commence with the stripping of peat and overburden from the open pit footprint. This can only be effectively be undertaken during the colder months, which is a significant factor for the project schedule.

PROJECT LOCATION INFORMATION

The VMEP is located in Unorganized Township, District of Kenora, approximately 100 kilometres (km) west of Attawapiskat, Ontario (Figure ES-1). The Universal Transverse Mercator coordinates for the centroid of the proposed open pit are 300934E, 5861863N (NAD 83 Zone 17). The latitude / longitude (degrees - minutes - seconds) for the Project are 83° 57' 27.7" W, 52° 52' 10.6" N (decimal degrees: -83.9577, 52.8696). The VMEP site and surrounding lands are dominantly held by De Beers which holds a very large land package.

The VMEP site is located in an undeveloped area, with the exception of Victor Mine facilities. Figure ES-2 shows the VMEP in relation to the existing site features. The area exhibits flat, pervasive muskeg terrain, and is drained principally by the Attawapiskat River and its associated tributaries. Adjacent areas show mainly fen and bog wetlands.

FEDERAL INVOLVEMENT

There is no proposed or anticipated federal funding associated with the Project and no facilities or activities are proposed on federal lands, including First Nation Reserves.

It is believed that the VMEP will require completion of an EA pursuant to the CEAA, 2012. Federal approval expected to be required for the construction, operation and decommissioning of the VMEP may include Authorization(s) under the *Fisheries Act* depending upon impending legislative changes.

ENVIRONMENTAL EFFECTS

Lands in the immediate and regional area of the Project site are flat, with pervasive muskeg terrain. Local drainage systems are characterized by numerous ribbed fens, shallow ponds, bogs and domed bogs, draining to the Attawapiskat River. Area creeks are small and frequently intermittent in nature. Surface water quality in the area is generally quite good, typically meeting Provincial Water Quality Objectives and Canadian Environmental Quality Guidelines for the protection of aquatic life with the exception of iron, phosphorus and pH.

Studies of fisheries and aquatic resources included habitat assessments and fishing efforts in September 2012, and focused on the unnamed tributary system and surrounding muskeg ponds. One small adult Pike and three adult Brook Trout were found in the unnamed tributary north of the Project site. Brook Stickleback were found in seventeen of the 25 ponds in the project vicinity. No game fish or sustenance fish were found.

Some aquatic species may be affected by Project activities due to overprinting of minor waterbodies by proposed site facilities, reductions in flow or diversion to avoid site facilities. Watercourses in the vicinity of the open pit may have the potential to have reduced flows as a result of pit dewatering during operations.

Only one aquatic Species at Risk has been identified in the VMEP region to date. Lake Sturgeon were captured during the late summer/early fall of 2011 using gill net and trap nets set in the lower Nayshkootayaow River confluence of the Attawapiskat River. This is quite distant from the VMEP site, and neither the Nayshkootayaow River nor Attawapiskat River are expected to be significantly affected by the project.

As a result of VMEP open pit dewatering discharge to the Attawapiskat River, there may be impacts to the Attawapiskat River water quality and flow. However, these impacts, after implementation of mitigation methods such as those used for the Victor Mine, are anticipated to be minor.

The mine site and related infrastructure development will displace existing terrestrial habitat, stunted forests and wetlands. Limited effects on large predators and furbearers are expected. Disturbance to migratory birds including Species at Risk, may be mitigated by the fact that there is abundant existing suitable habitat nearby.

A total of 13 Species at Risk are known to occur in the regional area. Of these, three species are listed provincially as Threatened, resulting in a potential requirement for a provincial Species at Risk Permit pursuant to requirements of the *Endangered Species Act*, if the proposed Project activities are likely to harm the species in question or its habitat. There are no federal lands within the Project footprint and therefore, federal Species at Risk Permits will not be required.

No provincially listed avian Species at Risk were observed at VMEP during recent field investigations (2012). The only federally listed SAR observed was Rusty Blackbird (the habitat for which is common throughout the VMEP area), considered as Special Concern on Schedule 1 of the *Species At Risk Act*.

Caribou have been observed in the region. The development of the VMEP will not displace sufficient undeveloped lands to negatively impact this species according to the Recovery Strategy for Woodland Caribou (MNR 2008).

As a result of carrying out the project, there are no anticipated changes to the environment which may occur on federal lands, in a province other than Ontario, or outside of Canada. The site does not overlap with any First Nation reserve lands or lands under land claim.

Impacts to aboriginal communities that will be assessed are anticipated to include: potential effects to traditional pursuits and land use; potential effects on health; and potential effect on cultural heritage resources. These impacts (if any) are anticipated to be largely mitigated through: strategic placement of facilities to minimize the VMEP footprint and avoid areas that typically host cultural resources; enforcement of winter road rules to minimize incidents; and provision of harvester compensation due to disturbance / displacement of lands, and associated wildlife and vegetation.

ENGAGEMENT WITH ABORIGINAL GROUPS

De Beers has been actively consulting and engaging with the Attawapiskat First Nation and James Bay First Nations for over a decade. They are actively involving local Aboriginal groups in the project planning and through consultation related to the Victor Mine. De Beers has signed Impact Benefit Agreements (IBA) with a number of the local First Nations to set protocols and commitments for ongoing involvement for the life of the Victor Mine and any future developments, such as the VMEP. Community benefits would, in part, help mitigate any potential effects to Aboriginal or Treaty rights.

Key issues and interests raised by Aboriginal groups to date are related to: general project understanding, employment, trapping, IBA aspects, Project components and mining.

The VMEP is located on traditional lands of the Attawapiskat First Nation, and is endeavouring to engage its partner First Nations in the collection and documentation of Traditional Knowledge and Traditional Land Use, to supplement the data that was obtained in support of the development and approval of the adjacent Victor Mine. The company feels that it is important to ensure that any Traditional Land Use be properly documented and used respectfully to avoid, or limit potential effects.

CONSULTATION WITH THE PUBLIC AND OTHER PARTIES

De Beers believes that in order to be successful it needs to effectively engage the local communities. Parties involved to date in the VMEP include those with a direct interest in the Project, or those who were or will be able to provide data for baseline environmental reports. As a result of the very remote nature of the VMEP the list of parties involved are primarily First Nations and government agencies as follows:

Federal Government:

- Aboriginal Affairs and Northern Development Canada;
- Canadian Environmental Assessment Agency;
- Environment Canada;
- Fisheries and Oceans Canada;
- Health Canada;
- Natural Resources Canada; and
- Transport Canada;

Provincial (Ontario) Government:

- Ministry of Tourism, Culture and Sports;
- Ministry of Aboriginal Affairs;
- Ministry of Economic Development and Trade;
- Ministry of Energy;
- Ministry of Labour;
- Ministry of Natural Resources;
- Ministry of Northern Development and Mines;
- Ministry of the Environment;
- Ministry of Transportation;
- Ministry of Training, Colleges and Universities
- Hydro One Networks Inc.; and
- Ontario Provincial Police;

Municipal Government:

- City of Timmins;
- Town of Cochrane; and
- Town of Moosonee;

First Nations and Aboriginal groups:

- Attawapiskat First Nation;
- Kashechewan First Nation;
- Fort Albany First Nation;
- Moose Cree First Nation;
- Weenusk First Nation (Peawanuk);
- Taykwa Tagamou First Nation (New Post);
- Marten Falls First Nation (Ogoki Post);
- Neskantanga FN (Lansdowne House);
- Webequie First Nation;
- Nishnawbe Aski Nation;
- Mushkegowuk Council of the James Bay Cree;

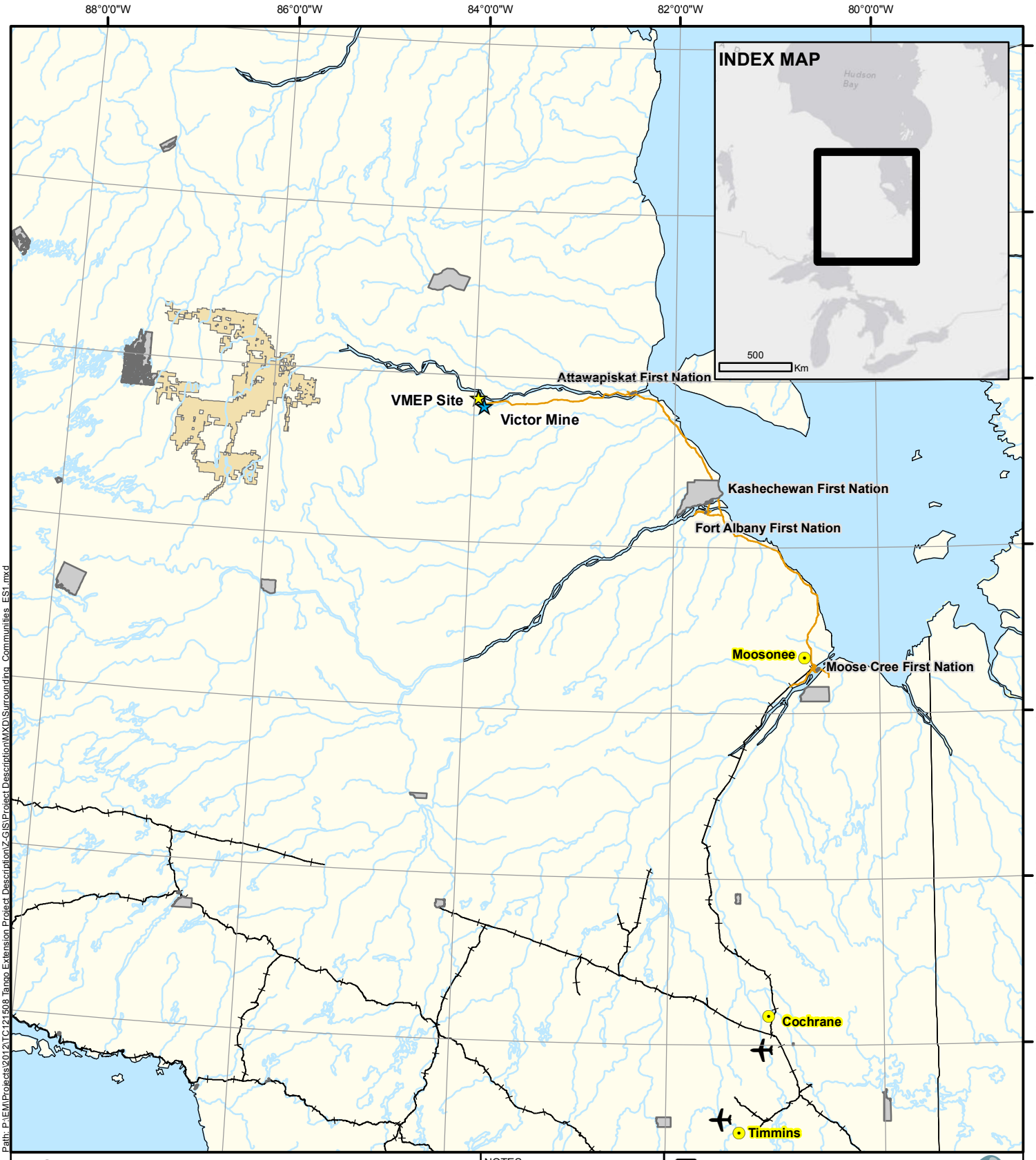
Business, organizations and non-governmental organizations:

- Ontario Federation of Anglers and Hunters;
- Attawapiskat Resources Inc.;
- Keewaytinok Askee Enterprises (Attawapiskat);
- Bradley Young Consulting (Attawapiskat);
- Roger Nakogee Rentals & Construction (Attawapiskat);
- Kattawapiskak Development Co. Inc. (Attawapiskat);
- Koostachin Group (Attawapiskat);
- K A Joint Venture (Attawapiskat);
- Shu-Pae Stayo Enterprises (Attawapiskat);
- Joseph Fireman Ontario 190552620 (Attawapiskat);
- Masowatch Partnership Ontario 1779522 (Attawapiskat);
- Koostachin-Cecconli Joint Venture (Attawapiskat);
- ASWM Contracting Inc. (Attawapiskat);
- Meenish Enterprises (Attawapiskat);
- Tundra Hawk Rentals (Attawapiskat);
- Neegan Naynowan Jacques Whitford LP (Attawapiskat);
- ORTECH Consulting Inc. (Attawapiskat);
- Northern College;
- Timmins and District Chamber of Commerce;
- Mining Watch Canada;
- Northwatch;

- Wildlife Conservation Society; and
- Other local small business owners;

and the general public.

De Beers has and will inform and involved the public and stakeholders in a variety of ways. The focus consultation will be to inform citizens of the status of the exploration and mining-related activities and to provide information regarding future consultation opportunities. Consultation activities are now focused on gathering input for the Provincial and Federal EAs, and engaging stakeholders in the baseline data collection as appropriate.



LEGEND

- Tango Extension Kimberlite
- Victor Mine
- Town
- Airports
- Road
- Winter Road
- Railway
- First Nation Reserve (Federal Land)
- Ring of Fire
- Watercourse

NOTES:
- Background data provide by the Ontario Ministry of Natural Resources
- Location and name of First Nation Communities provided by Aboriginal Affairs and Northern Development Canada

Datum: NAD83
Projection: UTM Zone 17N

0 25 50 100 150 200 250 Kilometres

N W E S

De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

Site Location

PROJECT N°: TC121508

FIGURE: ES-1

SCALE: 1:3,500,000

DATE: April 2013

300000 302000 304000 306000 308000

5864000 5862000 5860000 5858000 5856000 5854000 5852000 5850000

VMEP
Unnamed Tributary
Peat Stockpile
Overburden Stockpile
VMEP Open Pit
Mine Rock Stockpile
Water Intake/ Discharge Pumphouse
4212583
1241228
1241229
1241227
CLM436
Distribution Line Connector
Contingency Stockpile
1241231
P1052190
Mine Services
Contingency Stockpile
Infrastructure Corridor
CLM455
CLM446
Attawapiskat River
Attawapiskat River Intake Road
North Granny Creek
CLM445
CLM435
Potential Fine PK Storage
1246006
South Granny Creek
Nayshkootayaow River
CLM437

Attawapiskat River
James Bay
Attawapiskat
VMEP Site
Victor Mine
10 Km

Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z_GIS\Project Description\MXD\Site Plan_ES2.mxd

LEGEND

- Tango Extension Kimberlite
- Victor Mine
- Town
- Existing Access Trail
- Existing Winter Road Corridor
- Existing Transmission Line Corridor
- Disposition (De Beers)
- Claim (De Beers)
- Waterbody/Large River
- Watercourse

Proposed VMEP Feature

- Infastructure Corridor (Road, Conveyor, and Dewatering Pipeline)
- Mine Services
- Mine Rock
- Contingency Stockpile
- Overburden Stockpile
- Peat Stockpile
- Open Pit
- Distribution Line

0 0.5 1 2 3 4 Kilometres

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers, background image was collected in October 2010 and provided by De Beers
- Imagery in inset extracted from ESRI online
- Watercourse data provided by the Ontario Ministry of Natural Resources and amended by AMEC

Coordinate System
NAD 1983 UTM Zone 17N

N W E S

De Beers Canada

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VICTOR MINE EXTENSION PROJECT

VMEP Conceptual Layout

PROJECT N°: TC121508	**FIGURE: ES-2**
SCALE: 1:40,000	DATE: April 2013

300000 302000 304000 306000 308000

5864000 5862000 5860000 5858000 5856000 5854000 5852000 5850000

Unnamed Tributary
Attawapiskat River
North Granny Creek
South Granny Creek
NayshKootayaow River
VICTOR MINE
James Bay
Attawapiskat

1241227 1241228 1241229 1241231
4212583
CLM436 CLM445 CLM455 CLM435 CLM446 CLM437
P1052190
1246006

1 Airstrip
2 Central Quarry
3 South Quarry
4 Open Pit (Fine PK Cell)
5 Accommodation Complex
6 Milling Building
7 Crusher
8 Fuel Tank Storage
9 Services (Potable Water, Sewage Treatment Plant, Incinerator)
10 Landfill
11 Muskeg/Peat Stockpile
12 Overburden Stockpile
13 Coarse Processed Kimberlite Stockpile
14 Attawapiskat River Pumphouse
15 Attawapiskat River Intake Road
16 South Winter Road
17 115 kV Transmission Line
18 Nayshootayaow River Flow Supplementation Pipeline
19 Explosives Blending Plant (Location May Change)
20 Mine Rock Stockpile
21 Fine PK Cell 1
22 Approved Fine PK Cell (Not Yet Built)
23 North Granny Creek Supplementation Pipeline
24 South Granny Creek Supplementation Pipeline

VMEP Site
Victor Mine
10 Km

Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Existing_Features_ES2.mxd

LEGEND

- Tango Extension Kimberlite
- Victor Mine
- Town
- Winter Road Corridor
- Transmission Line Corridor
- Waterbody/Large River
- Watercourse
- Approved Fine PK Cell (Not Yet Built)
- Disposition (De Beers)
- Claim (De Beers)

Existing Victor Mine Features*

1 - Airstrip
2 - Central Quarry
3 - South Quarry
4 - Open Pit (Fine PK Cell)
5 - Accommodation Complex
6 - Milling Building
7 - Crusher
8 - Fuel Tank Storage
9 - Services (Potable Water, Sewage Treatment Plant, Incinerator)
10 - Landfill
11 - Muskeg/Peat Stockpile
12 - Overburden Stockpile
13 - Coarse Processed Kimberlite Stockpile
14 - Attawapiskat River Pumphouse
15 - Attawapiskat River Intake Road
16 - South Winter Road
17 - 115 kV Transmission Line
18 - Nayshootayaow River Flow Supplementation Pipeline
19 - Explosives Blending Plant (Location May Change)
20 - Mine Rock Stockpile
21 - Fine PK Cell 1
22 - Approved Fine PK Cell (Not Yet Built)
23 - North Granny Creek Supplementation Pipeline
24 - South Granny Creek Supplementation Pipeline

*Yellow highlighted numbers indicates existing Victor MIne facilities to be reused to support VMEP.

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers
- Watercourse data provided by the Ontario Ministry of Natural Resources and amended by AMEC
- Mine features extracted from 2011 FUPA Report

Coordinate System
NAD 1983 UTM Zone 17N

0 0.5 1 2 3 4 Kilometres

N W E S

De Beers Canada

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VICTOR MINE EXTENSION PROJECT

Victor Mine Existing Features

PROJECT Nº: TC121508 | FIGURE: ES-3

SCALE: 1:40,000 | DATE: April 2013

SOMMAIRE

RENSEIGNEMENTS GÉNÉRAUX ET CONTACTS

De Beers Canada Inc. (De Beers) étudie la zone du projet d'extension de la mine Victor (PEMV ou le projet) depuis 1987 dans le but d'aménager une mine de diamants à ciel ouvert satellite afin de prolonger la durée de vie de la mine Victor adjacente. De Beers se propose de construire, d'exploiter et finalement de remettre en état une nouvelle mine à ciel ouvert, le PEMV, sur le site du projet (figure ES-1).

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De Beers est un membre actif de la collectivité locale et possède des bureaux à Timmins qui permettent aux résidents d'accéder facilement à des lieux où ils peuvent se renseigner sur le PEMV. De Beers a sensibilisé les membres des Premières nations. Grâce à des réunions et des communications régulières, De Beers vise à assurer la participation de tous les membres des collectivités locales. Les principaux intervenants et groupes autochtones qui seront susceptibles

d'avoir un intérêt dans le PEMV ont été identifiés au cours des premières consultations et appartiennent aux catégories suivantes :

- Entreprises, organisations et organisations non gouvernementales.
- Premières nations et groupes autochtones;
- Le grand public;
- Le gouvernement provincial (Ontario);
- Le gouvernement fédéral.

Le PEMV devrait faire l'objet d'une évaluation environnementale fédérale (EE), conformément à la *Loi canadienne sur l'évaluation environnementale, 2012 (*ACEE, 2012). Si l'Agence canadienne d'évaluation environnementale décide qu'une évaluation environnementale fédérale est nécessaire, on utilisera la description du projet pour élaborer les lignes directrices relatives à l'étude d'impact environnemental, qui définissent la portée de l'EE fédérale requise pour le projet.

En plus de devoir satisfaire aux exigences fédérales en matière d'EE en vertu de la LCEE 2012, certains aspects du PEMV devraient éventuellement exiger un ou plusieurs processus d'EE provinciaux pour répondre aux exigences de la *Loi sur l'évaluation environnementale* de l'Ontario. S'il est établi qu'une EE provinciale est nécessaire, on s'attend à utiliser les mêmes renseignements pour les processus provincial et fédéral d'évaluation environnementale, qui aboutiront à un seul rapport d'EE répondant à la fois aux *Lignes directrices relatives à l'étude d'impact environnemental* du fédéral et aux exigences provinciales. Dans la mesure du possible, les consultations relatives aux deux processus seront coordonnées, mais les commentaires recueillis lors de ces consultations seront utilisés pour les deux processus d'EE. Une fois les processus d'EE terminés, il faudra obtenir des autorisations environnementales pour construire, exploiter et fermer le PEMV.

RENSEIGNEMENTS SUR LE PROJET

L'actionnaire majoritaire de De Beers est la société anglo-américaine, PLC, et De Beers se propose de développer et d'exploiter le PEMV afin de prolonger la durée de vie de la mine Victor et de produire des diamants destinés à la vente. Il existe un besoin local et régional de développement économique dans le nord de l'Ontario. Le PEMV aura une influence économique importante sur la région en offrant des possibilités d'emplois permanents et en construction.

.

Le *Règlement désignant les activités concrètes* du fédéral indique les activités concrètes qui constituent les projets désignés pouvant exiger une EE fédérale. L'article suivant pourrait s'appliquer au PEMV :

- Article 8 : « La construction, l'exploitation, la désaffectation et la fermeture, d'une installation destinée à extraire 200 000 m^3/an ou plus d'eau souterraine.... »

Selon cette définition, conformément à la LCEE 2012, cette description du projet ne devrait concerner que l'extraction de l'eau. Cependant, comme l'évacuation de plus de 200 000 mètres cubes par an (m^3/a) est une composante nécessaire du PEMV, le PEMV ne peut aller de l'avant sans cela. Par conséquent, pour fournir un contexte environnemental plus complet, cette description du projet porte sur le PEMV et toutes les activités connexes et non uniquement sur l'assèchement (ce qui est le projet désigné).

De nouvelles infrastructures et installations devront être construites spécialement pour le PEMV (Figure ES-2). Si le projet se déroule comme prévu, le PEMV utilisera toutefois de préférence la plupart des infrastructures et des installations existantes de la mine Victor (Figure ES-3) et les infrastructures régionales existantes.

Les principales installations de la mine Victor existantes qui feront partie du PEMV sont les suivantes :

- Usine de traitement;
- Atelier d'entretien, entrepôt et complexe administratif;
- Complexe de logements;
- Usine de fabrication d'explosifs et installations de stockage (avec possibilité de déplacement ou de création d'une voie de raccordement pour assurer un nouvel accès);
- Voies d'accès locales et pipelines, infrastructure d'alimentation électrique et réservoirs de carburant;
- Stockage de kimberlite traitée à grains fins dans la mine Victor à ciel ouvert ou installation de confinement de kimberlite traitée à grains fins (celle qui est actuellement approuvée ou qui sera agrandie);
- Stockage de kimberlite traitée à grains grossiers;
- Traitement des déchets ménagers et industriels;
- Installations de traitement et de gestion de l'eau;
- Route d'hiver entre Attawapiskat et la mine Victor
- Ligne de transport d'électricité régionale;
- Piste d'atterrissage toute saison.

Toutes les composantes de la mine Victor ont été approuvées dans le cadre d'un processus fédéral d'EE précédent et sont utilisées conformément aux exigences fédérales. Ces composantes sont sous la garde et le contrôle de De Beers et continueront de l'être, à l'exception des infrastructures régionales existantes.

Voici les ouvrages concrets qui feront partie du PEMV :

- Mine à ciel ouvert : environ 36 hectares (ha) de superficie et 200 mètres (m) de profondeur. Le rythme de l'exploitation minière devrait augmenter à environ 3 millions de tonnes par an de minerai extrait, avec une durée de vie allant jusqu'à environ 7 ans.

- Piles de stockage des résidus miniers : environ 8 400 000 de mètres cubes (m^3) de morts-terrains et de tourbe et 9 100 000 m^3 de roches de mine seront éventuellement stockés dans des piles de stockage de surface. Les roches de mine pourraient également être placées dans la mine Victor à ciel ouvert actuelle, conjointement avec la kimberlite traitée fine (boues de minerai concassées, sans réactifs), afin de réduire l'afflux d'eau souterraine, dont le taux de salinité est plus élevé, et améliorer le scénario de fermeture définitive.

- Broyeur, convoyeur et usine de traitement : le minerai sera traité sur place afin de produire des diamants bruts destinés à la vente.

- Stockage d'environ 9 100 000 m^3 de kimberlite traitée à grains grossiers et fins à la mine Victor, dans la mine à ciel ouvert actuelle, ou stockage dans une extension proposée de l'installation de confinement de la kimberlite traitée fine de la mine Victor existante et/ou une pile de stockage de kimberlite traitée à grains grossiers.

- Ligne locale de distribution : l'alimentation électrique nécessaire aux phases de construction et d'exploitation ultérieures du PEMV serait assurée par une ligne de distribution de 13,8 kilovolts (kV) reliée au réseau électrique actuel de la mine Victor, lui-même relié au réseau de lignes de transport régional.

- Bâtiments, équipements et infrastructures connexes : les installations permanentes supplémentaires actuellement prévues pour le PEMV devraient comprendre un petit garage d'entretien, un entrepôt et un complexe administratif, des voies d'accès, un corridor d'infrastructures (pipeline, convoyeur) et le doublement (et remplacement éventuel) de la ligne de distribution de 13,8 kV (en location).

- Selon les études techniques détaillées, il pourrait être nécessaire de déplacer la totalité ou une partie de l'usine de fabrication des explosifs et des installations de stockage sur le côté est de la route vers la prise d'eau ou, éventuellement, de construire une courte voie parallèle à la route existante pour assurer l'accès.

De Beers assurera le contrôle et l'entretien de ces nouvelles installations.

Le PEMV et les installations de la mine Victor existantes sont situés sur les concessions minières P1052190, P1246006, CLM435, CLM436, CLM437 CLM445, CLM446 CLM455 et les

concessions minières 1241227,1241228, 1241229, 1241231 et 4212583 (Figure ES-2); à l'exception de la route d'hiver et de l'emprise de la ligne de transport d'électricité de Attawapiskat à la mine Victor qui sont principalement situées sur des terres domaniales.

Voici les principales phases de la construction :

- Études techniques et processus d'approbations environnementales;
- Achat et déplacement des matériaux de construction vers les aires de dépôt désignées;
- Début de l'aménagement de la mine à ciel ouvert;
- Préparation des installations de manutention des résidus miniers sur place, y compris les barrages pour la gestion de la kimberlite traitée à grains fins, le cas échéant;
- Construction d'ouvrages de gestion de l'eau;
- Construction/assemblage des bâtiments et installations connexes;
- Construction et alimentation d'une ligne de distribution de 13,8 kV.

Activités prévues pendant la phase d'exploitation :

- Extraction et gestion de la tourbe, des morts-terrains, du minerai et des roches de mine;
- Traitement du minerai à l'usine de traitement de la mine Victor;
- Gestion des résidus miniers (piles de stockage ou aire de gestion de la KT à grains fins)
- Gestion environnementale permanente;
- Remise en état progressive du site dans la mesure du possible.

Les activités de la phase de déclassement consisteront à fermer et remettre en état les différents éléments du projet. Une fois que les activités de déclassement seront terminées, le suivi environnemental et la gestion du site seront assurés selon les besoins.

PRINCIPAUX ASPECTS ENVIRONNEMENTAUX

Les principales sources ponctuelles des émissions atmosphériques devraient être les particules (poussière) des convoyeurs et des concasseurs. Des mesures seront prises pour réduire au maximum la création de poussière sur le site de l'usine et pour utiliser des appareils d'aspiration et de suppression de la poussière, dans la mesure du possible. Les émissions de gaz à effet de serre (GES) proviennent principalement de la combustion du carburant diesel utilisé pour l'équipement lourd. Les émissions de GES sur place seront réduites en utilisant la ligne de

transport régionale et une nouvelle ligne de distribution locale comme principale source d'alimentation.

Les principales sources de bruit d'origine anthropique sur le site du projet devraient provenir de l'utilisation à ciel ouvert de l'équipement lourd. Les activités de l'usine, y compris le concassage et le broyage, se dérouleront à l'intérieur et les émissions sonores en découlant devraient être faibles par rapport aux sources de bruit en espace ouvert. Une modélisation des sources de bruit sera effectuée afin que le bruit et ses effets soient pleinement pris en compte lors de la conception technique de manière à respecter les exigences réglementaires.

Pour le dénoyage de la mine à ciel ouvert proposée, on utilisera un champ de captage. Les eaux de ruissellement et les précipitations, en plus de l'eau du champ de captage, seront acheminées vers un étang ou une série d'étangs de surface, pour que les matières solides se déposent, avant leur rejet dans la rivière Attawapiskat.

La kimberlite traitée à grains fins sera le produit final du traitement de la roche diamantifère à l'usine de traitement actuelle de la mine Victor. Le traitement de la kimberlite ne nécessitant pas de produits chimiques, il n'est pas prévu d'apporter des changements importants à cette usine. Les boues de résidus de kimberlite seront déposées dans la fosse à ciel ouvert de la mine Victor ou dans l'installation de confinement de la kimberlite traitée (qui devra être éventuellement agrandie). Cette installation permettra la rétention des résidus de manière à ce que la qualité des effluents respecte la réglementation en vigueur avant le rejet. La kimberlite traitée à grains grossiers également produite lors du traitement sera réutilisée comme agrégat ou stockée sur le site de la mine Victor.

Les autres déchets solides et liquides produits pendant la construction et l'exploitation seront manipulés et traités sur le site de la mine Victor, selon le cas (p. ex., l'usine de traitement des eaux usées) ou transportés à l'extérieur (p. ex., les petites quantités de déchets dangereux) en vue de leur manipulation, traitement et/ou stockage, conformément aux exigences réglementaires applicables.

Selon le calendrier préliminaire du développement du PEMV, la construction devrait commencer une fois que le ou les processus d'évaluation environnementale du fédéral (et provincial éventuellement) seront terminés, ce qui est actuellement prévu pour 2016. Les phases d'exploitation et de production devraient débuter en 2018 et se poursuivre pendant la durée de vie de sept ans de la mine. La fermeture et le déclassement devraient donc commencer en 2025 au plus tôt.

Il faudra effectuer beaucoup de travail sur une période relativement courte pour réaliser les études de faisabilité et les études techniques et pour obtenir les autorisations environnementales nécessaires afin de commencer la construction de la mine dès 2016 et lancer la production minière en 2018 (en supposant que toutes les approbations soient

obtenues). La phase de construction commencera par le décapage de la tourbe et des morts-terrains à partir de l'empreinte de la mine à ciel ouvert. Ces travaux ne peuvent pas être entrepris pendant les mois les plus froids et représentent un facteur important dans l'établissement du calendrier du projet.

EMPLACEMENT DU PROJET

Le PEMV est situé dans un canton non organisé du district de Kenora, à environ 100 kilomètres (km) à l'ouest d'Attawapiskat, en Ontario (figure ES-1). Les coordonnées Universal Transverse Mercator pour le centre de gravité de la mine à ciel ouvert proposée sont 300934E, 5861863N (NAD 83 Zone 17). La latitude / longitude (degrés - minutes - secondes) pour le projet sont 83° 57 '27.7 "W, 52° 52' 10.6" N (degrés décimaux : -83,9577, 52,8696). Le site du PEMV et les terres environnantes appartiennent en majorité à De Beers qui possède un vaste ensemble de terres.

Le site du PEMV est situé dans une zone non développée, à l'exception des installations de la mine Victor. La figure ES-2 montre le PEMV par rapport aux caractéristiques du site actuel. La région présente un terrain plat de marécages et est drainée principalement par la rivière Attawapiskat et ses affluents. Les zones adjacentes sont principalement composées de zones humides et de tourbières.

PARTICIPATION FÉDÉRALE

Les autorités fédérales ne fourniront pas de soutien financier au projet. Aucune terre domaniale, y compris des réserves de Premières nations, ne sera utilisée pour y établir des installations ou y mener d'autres activités.

Le PEMV devrait faire l'objet d'une évaluation environnementale conformément à la LCEE de 2012. Les approbations du gouvernement fédéral pour la construction, l'exploitation et le déclassement du PEMV pourraient comprendre des autorisations en vertu de *Loi sur les pêches* en fonction des modifications législatives imminentes.

EFFETS ENVIRONNEMENTAUX

Les terres dans la zone immédiate et la région du projet sont plates et essentiellement marécageuses. Les systèmes de drainage locaux sont caractérisés par de nombreux fens côtelés, des étangs peu profonds et des bogs et bogs bombés et se déversent dans la rivière Attawapiskat. Les ruisseaux sont petits et souvent de nature intermittente. La qualité des eaux de surface est assez bonne et répond généralement aux objectifs provinciaux en matière de qualité de l'eau et aux Recommandations canadiennes pour la qualité de l'environnement pour la protection de la vie aquatique, à l'exception du fer, du phosphore et du pH.

Les études de la pêche et des ressources aquatiques ont consisté notamment à évaluer l'habitat et les activités de pêche en septembre 2012 et ont porté sur le système des affluents non nommés entourant les fondrières. Un petit brochet adulte et trois ombles de fontaine adultes ont été trouvés dans l'affluent nord non nommé du site du projet. Des épinoches ont été trouvées dans dix-sept des 25 étangs à proximité. Aucun poisson de pêche sportive ou poisson de subsistance n'a été trouvé.

Certaines espèces aquatiques pourraient être touchées par les activités du projet en raison de l'empreinte des installations proposées sur les petits plans d'eau, de la réduction du débit ou des dérivations pour éviter les installations du site. Le débit des cours d'eau à proximité de la mine à ciel ouvert pourrait être réduit en raison de l'assèchement des puits pendant l'exploitation.

Une seule espèce aquatique en péril a été recensée dans la région du PEMV à ce jour. Des esturgeons jaunes ont été capturés au cours de l'été et au début de l'automne 2011 à l'aide de filets maillants et de filets fixes tendus au confluent de la rivière Nayshkootayaow inférieure et de la rivière Attawapiskat. Cet endroit est éloigné du site du PEMV et ni la rivière Nayshkootayaow ni la rivière Attawapiskat ne devraient être touchées de façon importante par le projet.

En raison du rejet des eaux de dénoyage de la fosse à ciel ouvert du PEMV dans la rivière Attawapiskat, il pourrait y avoir des répercussions sur la qualité de l'eau et le débit de la rivière. Mais ces impacts, après la mise en œuvre de mesures d'atténuation telles que celles utilisées pour la mine Victor, devraient être faibles.

Le site de la mine et les infrastructures connexes déplaceront des habitats terrestres, des forêts rabougries et des zones humides. Des effets limités sur les grands prédateurs et les animaux à fourrure sont attendus. Les perturbations causées aux oiseaux migrateurs, y compris des espèces en péril, pourraient être atténuées par l'existence d'une abondance d'habitats appropriés à proximité.

Un total de 13 espèces en péril sont connus dans la région dont trois sont inscrites sur la liste provinciale des espèces menacées, ce qui pourrait nécessiter l'obtention d'un permis provincial concernant les espèces en péril, conformément aux exigences de la *Loi sur les espèces en voie de disparition*, si les activités proposées du projet nuisaient aux espèces en question ou à leur habitat. Il n'existe pas de terres fédérales dans l'empreinte du projet et, par conséquent, il ne sera pas nécessaire d'obtenir un permis fédéral concernant les espèces en péril.

Aucune espèce aviaire en péril inscrite au niveau provincial n'a été observée sur le site du PEMV au cours des enquêtes de terrain récentes (2012). La seule espèce en péril inscrite au niveau fédéral observée, un mainate rouilleux (dont l'habitat est très répandu dans toute la zone du PEMV), est considérée comme préoccupante dans l'Annexe 1 de la *Loi sur les espèces en péril*.

Des caribous ont été observés dans la région. Le développement du PEMV ne déplacera pas suffisamment de terres non développées pour avoir un impact négatif sur cette espèce selon la Stratégie de rétablissement du caribou des bois (MRN 2008).

La réalisation du projet ne devrait pas entraîner de changements dans l'environnement des terres fédérales, dans une autre province que l'Ontario ou à l'extérieur du Canada. Le site n'empiète pas sur des terres de réserve des Premières nations ou des terres faisant l'objet de revendications territoriales.

Les impacts sur les communautés autochtones qui seront évaluées pourraient comprendre des effets potentiels sur les activités traditionnelles et l'utilisation des terres, des effets potentiels sur la santé, et des effets potentiels sur les ressources du patrimoine culturel. Ces impacts (le cas échéant) devraient être largement atténués par le placement stratégique des installations de façon à réduire l'empreinte du PEMV et éviter les zones qui accueillent normalement des ressources culturelles, l'application des règles sur les routes d'hiver afin de réduire le nombre des incidents et l'indemnisation des exploitants pour les perturbations et déplacements de terres, et la faune et la flore connexes.

COMMUNICATION AVEC LES GROUPES AUTOCHTONES

De Beers consulte activement la Première nation d'Attawapiskat et les Premières nations de la baie James et les fait participer depuis plus d'une décennie. Les groupes autochtones locaux participent activement à la planification du projet et sont consultées sur la mine Victor. De Beers a signé des ententes sur les répercussions et les avantages (ERA) avec un certain nombre de Premières nations locales pour définir des protocoles et des engagements concernant leur participation continue à la vie de la mine Victor et à de futurs développements, tels que le PEMV. Les avantages pour les communautés permettraient d'atténuer en partie les effets potentiels sur les droits ancestraux ou issus de traité.

Les principaux enjeux et intérêts soulevés par les groupes autochtones jusqu'à présent portent sur : la compréhension générale du projet, l'emploi, le piégeage, les aspects des ERA, les composantes du projet et l'exploitation minière.

Le PEMV est situé sur les terres traditionnelles de la Première nation d'Attawapiskat, et s'efforce de faire participer ses partenaires des Premières nations à la collecte et à la documentation des savoirs traditionnels et sur l'utilisation traditionnelle des terres afin de compléter les données obtenues à l'appui du développement et de l'approbation de la mine Victor adjacente. La compagnie estime qu'il est important de documenter les utilisations traditionnelles des terres et de les utiliser avec respect pour éviter ou limiter les effets potentiels.

CONSULTATION DU PUBLIC ET D'AUTRES PARTIES

Les parties prenantes ayant participé jusqu'à présent au PEMV comprennent celles qui ont un intérêt direct dans le projet ou celles qui ont pu ou pourront fournir des données pour les rapports environnementaux préliminaires. Étant donné que le PEMV se trouve dans une région très éloignée, la liste des parties prenantes sont principalement les Premières nations et les organismes gouvernementaux suivants :

Gouvernement fédéral :

- Affaires autochtones et Développement du Nord Canada;
- Agence canadienne d'évaluation environnementale;
- Environnement Canada;
- Pêches et Océans Canada;
- Santé Canada;
- Ressources naturelles Canada;
- Transports Canada;

Gouvernement provincial (Ontario) :

- Ministère du Tourisme, de la Culture et du Sport;
- Ministère des Affaires autochtones;

- Ministère du Développement économique et du commerce;
- Ministère de l'Énergie;
- Ministère du Travail;
- Ministère des Richesses naturelles;
- Ministère du Développement du Nord et des Mines;
- Ministère de l'Environnement;
- Ministère des Transports;
- Ministère de la Formation, des Collèges et des Universités
- Hydro One Networks Inc.;
- Police provinciale de l'Ontario;

Gouvernement municipal :

- Ville de Timmins;
- Village de Cochrane;
- Village de Moosonee;

Premières nations et groupes autochtones :

- Première nation Attawapiskat;
- Première nation Kashechewan;
- Première nation de Fort Albany;
- Première nation de Moose Cree;
- Première nation Weenusk (Peawanuk);
- Première nation Taykwa Tagamou (New Post);
- Première nation Marten Falls (Ogoki Post);
- Première nation Neskantanga (Lansdowne House);
- Première nation Webequie;
- Nation Nishnawbe Aski;
- Conseil de Mushkegowuk des ris de la baie James;

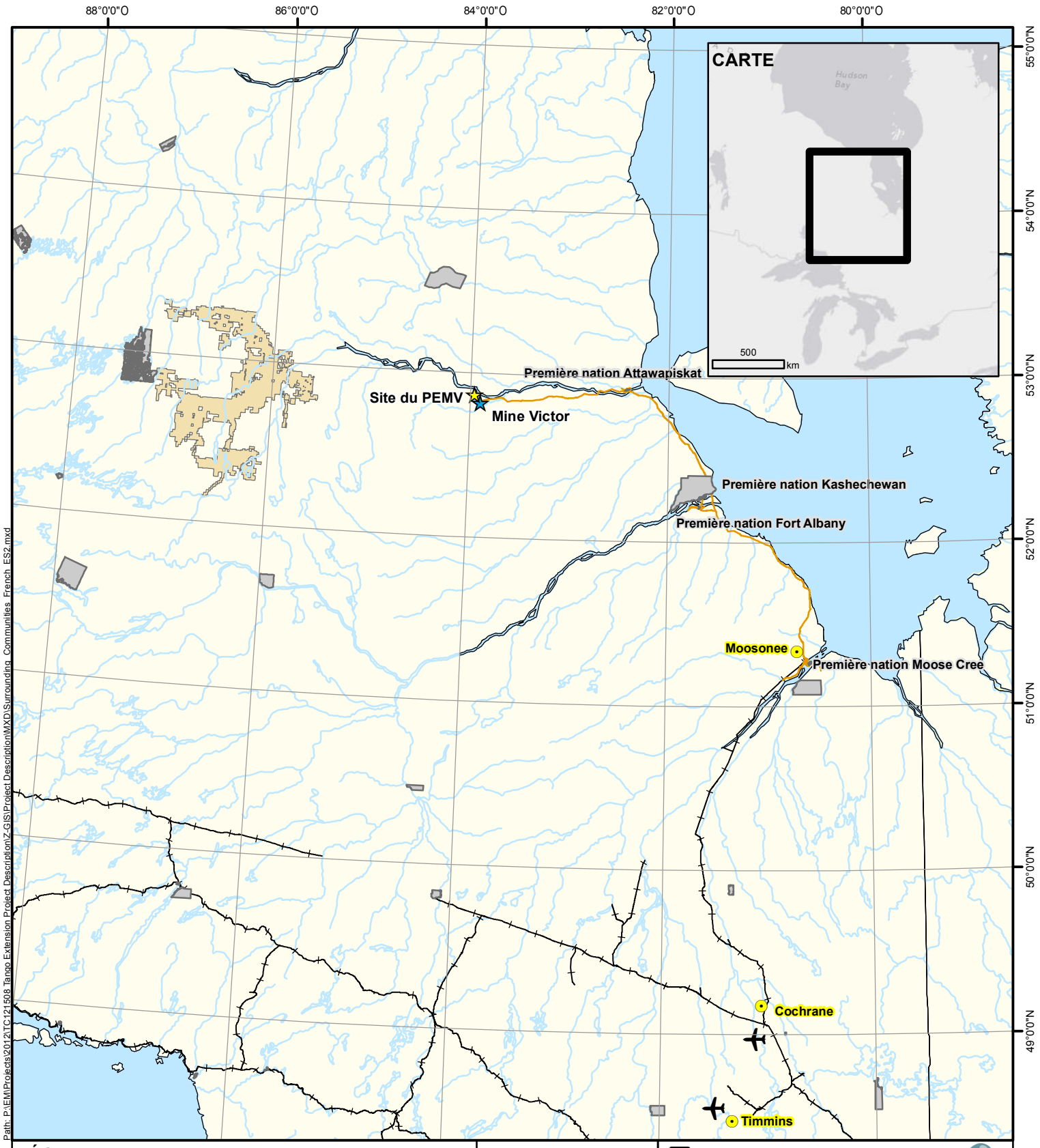
Entreprises, organisations et organisations non gouvernementales :

- Ontario Federation of Anglers and Hunters;
- Attawapiskat Resources Inc.;
- Keewaytinok Askee Enterprises (Attawapiskat);
- Bradley Young Consulting (Attawapiskat);
- Roger Nakogee Rentals & Construction (Attawapiskat);
- Kattawapiskak Development Co. Inc. (Attawapiskat);
- Koostachin Group (Attawapiskat);
- K A Joint Venture (Attawapiskat);
- Shu-Pae Stayo Enterprises (Attawapiskat);
- Joseph Fireman Ontario 190552620 (Attawapiskat);
- Masowatch Partnership Ontario 1779522 (Attawapiskat);

- Koostachin-Cecconli Joint Venture (Attawapiskat);
- ASWM Contracting Inc. (Attawapiskat);
- Meenish Enterprises (Attawapiskat);
- Tundra Hawk Rentals (Attawapiskat);
- Neegan Naynowan Stantec LP (Attawapiskat);
- ORTECH Consulting Inc. (Attawapiskat);
- Northern College;
- Chambre de commerce de Timmins et de District;
- Mines alerte Canada;
- Northwatch;
- Wildlife Conservation Society;
- Autres petites entreprises locales;

Et le public.

Le PEMV a informé et fait participer le public et les intervenants de différentes façons. Les consultations viseront à informer les citoyens au sujet de l'état d'avancement des activités d'exploration et d'exploitation minière et à fournir des informations sur les possibilités de consultation à venir. Les consultations visent maintenant à obtenir des commentaires pour les EE provinciale et fédérale et à faire participer les intervenants à la collecte des données de base, le cas échéant.



LÉGENDE

- Extension de Tango Kimberlite
- Mine Victor
- Ville
- Aéroports
- Route
- Route d'hiver
- Chemin de fer
- Réserve des Premières nations (Terre domaniale)
- Cercle de feu
- Cours d'eau

NOTA:
- Données documentaires fournies par le ministère des Richesses naturelles de l'Ontario
- Les noms des emplacements et des communautés des Premières nations ont été fournis par Affaires autochtones et Développement du Nord Canada

Datum: NAD83
Projection: UTM Zone 17N

0 25 50 100 150 200 250 Kilomètres

N O E S

De Beers Canada

amec

PROJET D'EXTENSION DE LA MINE VICTOR

Emplacement du site

PROJET N°: TC121508

FIGURE: ES-1

ÉCHELLE: 1:3,500,000

DATE : Avril 2013

300000 302000 304000 306000 308000

5864000 5862000 5860000 5858000 5856000 5854000 5852000 5850000

PEMV

Affluent sans nom

Pile de stockage de la tourbe

Pile de stockage des morts-terrains

PEMV Mine à ciel ouvert

Prise d'eau/ Station de pompage d'évacuation

4212583

1241228

Pile de stockage de roches de mine

Connecteur de la ligne de distribution

1241229

CLM436

1241227

Pile de stockage de réserve

P1052190

1241231

Services de la mine

Pile de stockage de réserve

Infrastructure du corridor

CLM455

Rivière Attawapiskat

CLM446

Route pour la prise d'eau en rivière Attawapiskat

CLM445

Ruisseau North Granny

CLM435

Potentiel KT fine (kimberlite à grains fins traitée) Stockage

1246006

Ruisseau South Granny

Rivière Nayshkootayaow

CLM437

Rivière Attawapiskat

Baie James

Attawapiskat

Site du PEMV

Mine Victor

10 km

Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z_GIS\Project Description\MXD\Site Plan French ES2.mxd

LÉGENDE

- Extension de Tango Kimberlite
- Mine Victor
- Ville
- Sentier d'accès existant
- Corridor de la route d'hiver existant
- Corridor de la ligne de transport d'électricité existant
- Bail à mine (De Beers)
- Concession (De Beers)
- Plan d'eau/grande rivière
- Cours d'eau

Détail cartographique du PEMV proposé

- Infrastructure du corridor (Route, convoyeur et pipeline d'asséchement)
- Services de la mine
- Roches minières
- Pile de stockage de réserve
- Pile de stockage des morts-terrains
- Pile de stockage de la tourbe
- Mine à ciel ouvert
- Ligne de distribution d'électricité

NOTA :
- La scène de l'image centrale a été prise en juillet 2012 et fournie par De Beers
- L'image d'arrière-plan a été prise en juillet 2012 et fournie par De Beers
- L'imagerie dans l'encadré est extraite de l'ESRI en ligne
- Les données sur les cours d'eau ont été fournies par le ministère des Richesses naturelles de l'Ontario et modifiées par AMEC

Système de coordonnées NAD 1983 UTM Zone 17N

N O E S

0 0.5 1 2 3 4 Kilomètres

De Beers CANADA

amec

PROJET D'EXTENSION DE LA MINE VICTOR

Carte conceptuelle du PEMV

PROJET Nº: TC121508 | **FIGURE: ES-2**

Échelle :1:40,000 | DATE: Avril 2013

300000 302000 304000 306000 308000

5864000 5862000 5860000 5858000 5856000 5854000 5852000 5850000

Affluent sans nom

Rivière Attawapiskat

Ruisseau North Granny

Ruisseau South Granny

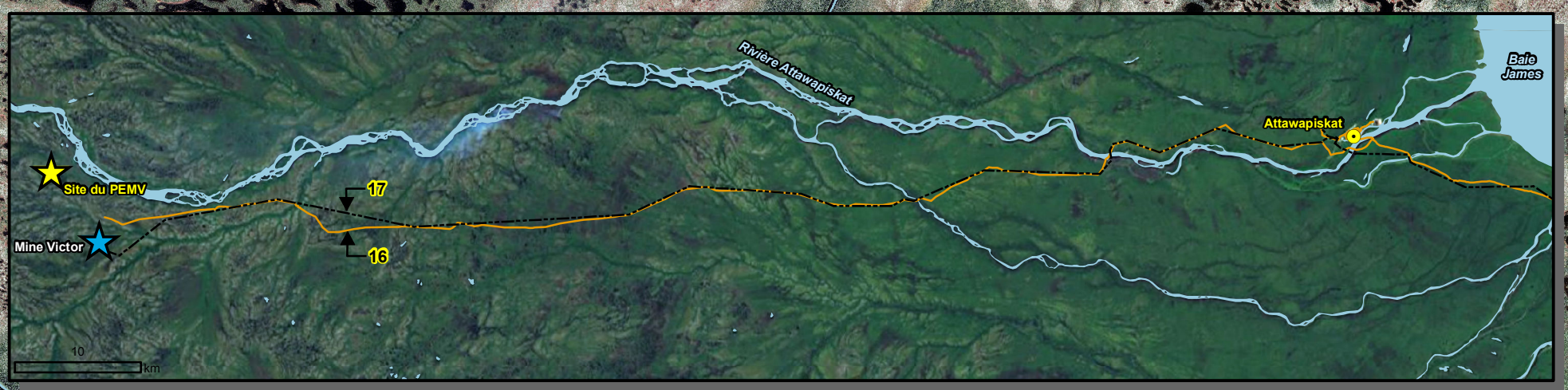
Rivière Nayshkootayaow

MINE VICTOR

1241227 1241228 1241229 1241231 4212583

CLM436 CLM455 CLM446 CLM445 CLM435 CLM437 1246006 P1052190

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24



LÉGENDE

- Extension de Tango Kimberlite
- Mine Victor
- Ville
- Corridor de la route d'hiver
- Corridor de la ligne de transport d'électricité
- Plan d'eau/Grande rivière
- Cours d'eau
- Digue de confinement de Kimberlite à grains fins traitée approuvée (Pas encore construite)
- Bail à mine (De Beers)
- Concession (De Beers)

Caractéristiques existantes de la mine Victor*

1 - Piste d'atterrissage
2 - Carrière principale
3 - Carrière au Sud
4 - Mine à ciel ouvert (digue de Kimberlite à grains fins traitée)
5 - Complexe de logements
6 - Bâtiment de broyage
7 - Broyeur
8 - Réservoir de carburante
9 - Services (Eau potable, Traitement des eaux usées, Incinérateur)
10 - Déchargel
11 - Pile de stockage de muskeg/tourbe
12 - Pile de stockage de morts-terrains
13 - Pile de stockage de kimberlite traitée à grains grossiers
14 - Station de pompage de la rivière Attawapiskat
15 - Route de la prise d'eau de la rivière Attawapiskat
16 - Route d'hiver sud
17 - Ligne de transport d'électricité de 115 kV
18 - Écoulement de la rivière Nayshootayaow Pipeline complémentaire
19 - Installation de mélange d'explosifs (L'emplacement peut changer)
20 -Pile de stockage de roches de mine
21 - Digue de la KT à grains fins 1 (kimberlite traitée)
22 - Digue de la KT à grains fins approuvée (Pas encore construite)
23 - Pipeline complémentaire, ruisseau North Granny
24 - Pipeline complémentaire, ruisseau South Granny

*Les chiffres en surbrillance jaune indiquent les installations existantes de la mine Victor qui seront réutilisées pour le PEMV.

NOTA:
- La scène de l'image centrale a été prise en juillet 2012 et fournie par De Beers
- Les données sur les cours d'eau ont été fournies par le ministère des Richesses naturelles de l'Ontario et modifiées par AMEC
- Les caractéristiques de la mine datent de 2011 Rapport ESPS (Entente sur le programme de suivi)

0 0.5 1 2 3 4 kilométres

Système de coordonnées NAD 1983 UTM Zone 17N

N O E S

De Beers CANADA

amec

PROJET D'EXTENSION DE LA MINE VICTOR

Mine Victor
Caractéristiques existantes

PROJET N°: TC121508 | **FIGURE: ES-3**

ÉCHELLE: 1:40,000 | DATE: Avril 2013

Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Existing_Features_French_ES2.mxd

1.0 GENERAL INFORMATION AND CONTACTS

1.1 General Description of Project

De Beers Canada Inc. (De Beers) has been exploring the James Bay lowlands for diamonds since 1962. The potential for diamond-bearing resources in the local area was first identified from the presence of kimberlite boulders along the Attawapiskat River in 1986. Kimberlite pipes are volcanic pipes that originate deep within the earth, and are the primary host rock of diamonds. Exploration (leading to advanced exploration) has been conducted since that time as deemed warranted, and was conducted seasonally when winter and frozen ground conditions allowed the primary means of access.

Sixteen kimberlites were identified by De Beers in the Unorganized Township, approximately 100 km west of Attawapiskat. One of these kimberlites was the Victor kimberlite, which is now an operating diamond mine (since 2008) that is expected to operate until 2018. The Victor Mine was approved under the *Canadian Environmental Assessment Act* on August 18, 2005 and subsequently developed. The Victor Mine is accessible only by air and by seasonal winter road, which connects to Attawapiskat, which in turn provides connections along the James Bay coast to Moosonee, Ontario.

Exploration of the other kimberlites in the region surrounding the Victor Mine, including the Tango Extension kimberlite, has continued during operation of the Victor Mine, with the intent of extending the operation at the Victor site including the continuation of employment and contractual opportunities.

The development of an open pit at the Tango Extension kimberlite (the Victor Mine Extension Project or VMEP) for processing at the currently operating Victor Mine, is the subject of this Project Description. The Tango Extension kimberlite is located approximately 6.5 kilometres (km) northwest of the Victor mine, and approximately 100 km west of Attawapiskat (Figure 1). It is intended that the extraction of diamond-bearing rock from the Tango Extension kimberlite would be initiated during 2017 or 2018, the last year(s) of the Victor Mine operations, although development would be required earlier.

Additional project details are provided in Section 3.

1.2 Project Contact Information

1.2.1 Designated Project Name

The name of the designated project is the Victor Mine Extension Project (VMEP).

1.2.2 Proponent Name

The proponent of the proposed undertaking is De Beers Canada Inc.

1.2.3 Proponent Address

De Beers Canada Inc.
900-250 Ferrand Drive
Toronto, Ontario M3C 3G8
Telephone: (416) 645-1710

1.2.4 Proponent CEO

Leo Fusciardi, Vice President, Technical
De Beers Canada Inc.
250 Ferrand Drive, Suite 900
Toronto, Ontario M3C 3G8
c/o Tony.Guthrie@debeerscanada.com
Telephone: (416) 645-1710

1.2.5 Principal Contact People

De Beers Canada Inc.:

Brian Steinback
Environmental Superintendent, Victor Mine
De Beers Canada Inc.
c/o 119 Pine St. South, Suite 310
Timmins, Ontario P4N 2K3
Brian.Steinback@debeerscanada.com
Telephone: (416) 645-3888, Extension 5126
Mobile: (416)-432-9815

Consultant:

AMEC Environment & Infrastructure (AMEC) is working with De Beers to obtain environmental approvals for the proposed mine.

Sheila Daniel, M.Sc., P.Geo., Senior Associate Geoscientist
AMEC Environment & Infrastructure
A Division of AMEC Americas Limited
160 Traders Blvd. East, Suite 110

Mississauga, Ontario L4Z 3K7
sheila.daniel@amec.com
Telephone: (905) 568-2929, Extension 4123
Mobile: (416)-524-5928

1.3 Overview of Consultation to Date

De Beers holds an office Timmins that offers residents an accessible location to learn about the Project. Through meetings, site tours and regular communications, De Beers strives to ensure engagement with members of the local communities. The range of stakeholders will continue to grow and evolve throughout the various project stages and reflect varying levels of interest and issues over time. Key stakeholders and Aboriginal groups who are expected to have an interest in the VMEP going forward were identified during the early consultation efforts and can be considered in the following categories:

- Federal Government;
- Provincial (Ontario) Government;
- Municipal Government;
- First Nations;
- Business, organizations and non-governmental organizations; and
- General public.

A comprehensive list of the jurisdictions, stakeholders and Aboriginal groups consulted to date is presented in Sections 6 and 7.

1.4 Other Relevant Information

1.4.1 Environmental Assessment Processes

The Victor Mine was subject to a Comprehensive Study-level Federal Environmental Assessment (EA) pursuant to the *Canadian Environmental Assessment Act*. Natural Resources Canada was the lead Responsible Authority. Approval was given by the Federal EA on August 18, 2005. The primary documents associated with that approval are AMEC (2004) and federal Responsible Authorities (2005).

This Project Description is being submitted to determine whether or not the VMEP will require completion of a Federal EA, pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012). The federal "Regulation Designating Physical Activities" identifies the physical activities that constitute the designated projects that could require an EA. Section 8 of the Regulation identifies one of the designated projects as:

> "The construction, operation, decommissioning and abandonment of a facility for the extraction of 200,000 m^3/a or more of ground water or an expansion of such a facility that would result in an increase in diversion capacity of more than 35%."

Current engineering designs and dewatering experience at the Victor Mine suggest that the VMEP, will require the extraction of 200,000 cubic metres per annum (m^3/a) or more of groundwater in order to safely and efficiently mine the Tango Extension kimberlite at the VMEP. Without dewatering in excess of 200,000 m^3/a, the VMEP could not proceed and the development of the VMEP is dependent upon the dewatering activity.

For that reason, De Beers has submitted this Project Description which discusses the VMEP and all related activities and not solely the dewatering aspect which is the designated project to the Canadian Environmental Assessment Agency (CEA Agency). If the CEA Agency determines that a Federal EA is required, the Project Description will be used to develop Environmental Impact Statement Guidelines, which identify the scope of the EA required for the project.

1.4.2 Regional Study

The VMEP is not located in a region that has been subjected to a regional environmental study.

1.5 Project Description Organization and Content

As indicated in the preamble, this document has been prepared, in order to provide federal authorities with information regarding the proposed VMEP in order to assist decision making in regards to the applicability of the CEAA, 2012. It has purposefully been organized in the same format / order suggested in the "*Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012*" (CEA Agency 2012). Appropriate headings have been placed in the document to indicate such, even when not applicable.

2.0 PROJECT INFORMATION

2.1 General Description, Context and Objectives

De Beers is proposing to construct and operate an open pit diamond mine at the Tango Extension kimberlite, with the support of the nearby currently operating, Victor Mine. This proposed undertaking is herein referred to as the VMEP. The diamond-bearing rock (ore) extracted will transported to and processed at the existing Victor Mine processing plant, with the intent of recovering diamonds for sale. The Victor Mine is an operating diamond mine located proximal to the Tango Extension kimberlite. The Victor Mine has valid environmental approvals for all facilities in place. Development of the VMEP is intended to extend the life of the Victor Mine processing operations. The preliminary site layout for the VMEP proposes to place the

limited additional facilities required in close proximity to the VMEP open pit, to the extent practical. The new facilities will be located primarily on private, patented lands leased by De Beers.

Open pit mining operations will be progressed to a planned three million tonnes per year (Mt/a). Peat, overburden and mine rock[1] stripped from the open pit will be stored in adjacent stockpiles. Diamond-bearing rock will be transported to, and processed at, the Victor Mine processing plant. Water from dewatering the VMEP open pit will likely be discharged to the environment after treatment if necessary, utilizing existing Victor Mine infrastructure. Fine processed kimberlite (FPK) from the mill process is proposed to be preferentially stored in the Victor Mine open pit to assist with reclamation of that pit, or alternatively in an expansion to the currently approved Victor Mine Fine Processed Kimberlite Containment (FPKC) facility. Coarse processed kimberlite also derived from the processing plant will be stockpiled near the Victor Mine processing plant, or also stored within the Victor Mine open pit.

The VMEP will otherwise be supported by the Victor Mine, including administration, accommodations, maintenance and waste management.

2.2 Designated Activities

The federal "Regulation Designating Physical Activities" identifies the physical activities that constitute the designated projects that could require completion of a Federal EA. The following section may apply to the VMEP:

> Section 8: *The construction, operation, decommissioning and abandonment of a facility for the extraction of 200,000 m^3/a or more of ground water,....*

2.3 Components and Activities

2.3.1 Physical Works

2.3.1.1 Overview

De Beers proposes to construct, operate and ultimately reclaim an open pit diamond mine at the VMEP property (Figure 2). Figure 3 provides a conceptual layout showing the approximate scale of VMEP and project boundary. Figure 4 shows the existing facilities at Victor Mine and highlights those existing facilities at Victor Mine that will be included in VMEP. The VMEP and Victor Mine are located within mineral leases P1052190, P1246006, CLM435, CLM436, CLM437, CLM445, CLM446 CLM455, and mining claims 1241227, 1241228, 1241229,

[1] Mine rock, also termed waste rock or development rock, is rock that must be extracted to gain access to the mineralized ore.

1241231, and 4212583. The existing winter road and transmission line from Attawapiskat to Victor Mine are located primarily on Crown land.

The VMEP site plan (Figure 3) will be refined further as a result of ongoing consultation activities, land agreements and engineering studies. The plan suggests areas of proposed development, rather than actual design features.

This section provides a description of the VMEP as currently proposed based on available information. As engineering studies progress and more government agency, Aboriginal and public consultation occurs, some Project aspects may change.

The VMEP is designed to:

- Utilize well-understood, conventional technologies used in northern Canada diamond mining operations;
- Respect the interests of area land uses and land users; and
- Minimize the overall Project footprint and impacts.

2.3.1.2 New Physical Works

Project components will include new works and re-used of existing works (Figures 3 and 4).

The major new physical works associated with the VMEP are expected to include most or all of the following:

- Open pit;
- Stockpiles (peat, overburden and mine rock as well as low grade kimberlite ore if necessary);
- Maintenance shop, emergency refuge and office / lunchroom;
- Access roads (approximately <12 km total) and pipelines, ore conveyor, power infrastructure (generator and local distribution line) and fuel storage facilities, connecting the VMEP and Victor Mine sites;
- Water management facilities and general site drainage works;
- Limited domestic waste storage / handling;

- Aggregate extraction (contingency);

- Storage of FPK in the Victor Mine open pit (once operations cease therein) or by an expansion of the existing approved FPKC facility at the Victor Mine; and

- Storage of coarse PK in a stockpile proximal to the Victor Mine processing plant or within the Victor Mine open pit (once operations cease therein).

- Possible minor relocation of the existing explosives manufacturing and storage facilities to the opposite side of the existing road to the water intake, to facilitate road improvements to serve the new open pit;

All of these works will be under the care and control of De Beers.

VMEP Open Pit

The current VMEP open pit design proposes a final pit measuring approximately 650 m in diameter, and up to 200 m deep. The surface expression will measure approximately 36 ha. Mining will occur at a rate of approximately 3 Mt/a of kimberlite ore. Pit development will result in approximately 7,620,000 m^3 of overburden, 780,000 m^3 of peat and 9,900,000 m^3 of mine waste rock. The mine life is anticipated of the VMEP to be up to 7 years, depending on final resource valuations and detailed mine design.

The pit wall slopes will be designed for safety based on applicable industry standards. The benches in rock will be developed by blasting. Water from the proposed pit will be removed by means of a pit perimeter wellfield developed outside the pit boundary. This water will be collected and conveyed to the Attawapiskat River by pipeline to the existing pumphouse that currently supports the Victor Mine dewatering wellfield. Sump(s) will be created at the base of the open pit for in-pit water management with excess water pumped to surface for transfer to a dedicated mine water management pond, prior to discharge to the Attawapiskat River through the same pipeline. Surface water will be diverted away from the mine pit by ditches and/or dikes as needed.

Blasted rock will be extracted at the mining face using a shovel excavator (or equivalent) and transferred into haul trucks for transport to surface. Diamond-bearing rock (ore), mine rock, overburden and peat removed from the open pit will be trucked to surface for processing or permanent storage. Ramp widths will be designed to accommodate the necessary heavy equipment.

VMEP Stockpiles (Peat, Overburden and Mine Rock)

Mine development is expected to generate up to a maximum of approximately 780,000 m^3 of peat, 7,620,000 m^3 of overburden and 9,900,000 m^3 of mine rock. Peat, overburden and mine rock will be stockpiled for permanent disposal on the VMEP site, with a portion of the peat and overburden used for final site reclamation activities. The proposed locations of the respective stockpiles are shown on Figure 4.

The principal criteria for selection of the stockpile locations were the following:

- Areas within reasonably close proximity to the mine to minimize the overall Project environmental footprint, reduce greenhouse emissions associated with heavy equipment travel and to achieve economic efficiencies of operation;

- Provide for a smaller number of larger stockpiles that can be managed more efficiently, rather than having several smaller, scattered stockpiles;

- Position stockpiles in a manner such that drainage from the stockpiles can be suitably collected and managed in accordance with anticipated environmental approval requirements; and

- Minimize potential adverse effects to aquatic and terrestrial habitats.

The proposed peat, overburden and mine rock stockpile locations described below and shown conceptually on Figure 4 are based on a preliminary assessment of alternatives. This arrangement may be further refined through the EA and related processes. Stockpile locations provided herein should therefore be regarded as preliminary.

The proposed peat stockpile area is located north of the open pit. The geotechnical properties of the peat materials generally support stockpiles of 4 m to 6 m height. An area of approximately 20 ha has been allocated in the conceptual site plan for the peat stockpile.

The proposed overburden stockpile area is located directly northwest of the open pit. Stockpiles of 6 m to 8 m height are proposed based on current knowledge of the material's geotechnical properties. An area of approximately 118 ha has been allocated in the conceptual site plan for an overburden stockpile, although the entire area may not be needed.

The area southwest of the open pit was selected as the preferred location for mine rock storage (Figure 4). To minimize handling, and to stay within De Beers held lands the mine rock stockpile must be located within close proximity to the open pit and within the lease footprint. The selected mine rock stockpile area measures approximately 96 ha. The final stockpile(s) within the mapped area will consider such factors as: aquatic habitat, drainage control, land ownership, mine closure and other factors. It is anticipated that the final average stockpile

height could be in the order of 10 m to 12 m depending on the stockpile footprint and other factors.

Although locations have yet to be defined, it is expected that a smaller scale temporary ore stockpiles could be developed closer to the processing plant at the Victor Mine to allow for continuous plant operations during poor weather conditions. There is the potential for a similar stockpile at the VMEP site to accommodate poor weather conditions for transport, or mechanical breakdown.

An area (approximately 27 ha) located south of the proposed open pit has also been designated as a contingency location for mine rock or overburden storage, if it is determined to be needed based on ongoing engineering design.

The mine rock and overburden stockpile will be surrounded by a 100 m wide natural buffer of muskeg that will trap suspended solids, prior to passive release to the environment (the allowance for a buffer zone is included within the stockpile boundary in Figure 4). Tango Extension mine rock is strongly neutralizing with minimal metal leaching potential, consistent with the Victor Mine.

VMEP Buildings

The following facilities are currently anticipated to be required at the VMEP site:

- Mine dry / washroom;
- Mine office / lunchroom;
- Local maintenance shop; and
- Emergency refuge.

The facilities at the VMEP site are proposed to be located in one centralized area southeast of the open pit, positioned far enough away from the open pit to protect workers and facilities from blast (fly) rock (Figures 4). These facilities will be supported by related transport, piping, conveying and power infrastructure as needed.

Limited quantities and types of chemicals are anticipated to be stored at the VMEP site. The primary chemicals to be used and potentially stored at the VMEP site are: fuels (diesel, gasoline and potentially propane gas). All fuels, chemical and reagents will be transported, stored and handled in accordance with applicable regulations and good management practice. Diesel fuel storage in the order of approximately 130,000 litres (L) may be required at the VMEP site based on current preliminary engineering information. The primary bulk storage area for fuels will remain at the Victor Mine. Explosives will be manufactured at the Victor Mine site and transported to the VMEP pit as needed and will not be stored at the VMEP site.

Infrastructure and Linear Features (roads and pipelines, power, conveyor)

The VMEP will be supported by the existing all-season and winter roads associated with the Victor Mine, which are shown on Figure 3 and 4. A new road is required connecting the VMEP to the existing Victor Mine road network. The traffic to and from the VMEP site will follow the existing all-season road for approximately 5 km towards the existing water intake pumphouse on the Attawapiskat River. It is expected that short sections of that road will be widened by a few metres periodically to provide passing lanes for haul trucks. Alternatively this entire section of road may be widened slightly to support an ore conveyor from the VMEP site to the Victor process plant. There is the potential that a short spur road may be developed parallel to the Attawapiskat River Intake Road, to provide ongoing access to the explosive manufacturing and storage area.

A new section of road approximately 3.2 km long will connect the VMEP site to this existing road to the VMEP as shown in Figure 4. A local VMEP road network will be required, including a perimeter road of approximately 3.5 km around the mine pit to support dewatering wells and pipelines; and a few thousand metres of haul roads leading to and across the various stockpiles of mine rock, overburden and peat. Detailed site layouts are not yet available and some operational flexibility will be required, but the total length of all new roads for the VMEP is not expected to exceed 12 km.

The following new pipelines will be required for the VMEP:

- A discharge pipeline from the proposed open pit to the Attawapiskat River or connecting to the existing Victor Mine pipeline to the Attawapiskat River; and

- A discharge pipeline from the Victor Mine processing plant to the Victor open pit (assuming that discharge of FPK to the FPKC facility is not selected).

The existing power distribution line (13.8 kV) along the Attawapiskat River Intake Road will be modified and extended to support the VMEP (Figure 4).

A conveyor may be used to transport ore from the VMEP open pit area to the processing plant. The preliminary location for the conveyor is shown as the infrastructure corridor on Figure 4. If this option for ore transport is selected, it would be located in part adjacent to the Attawapiskat River Intake Road, and then eastward to the Victor processing plant.

Domestic and Industrial Waste Handling

Domestic sewage for the VMEP construction and operations phases will be temporarily stored at the VMEP site and periodically transported by tanker truck for treatment using the existing

package sewage treatment plant (membrane bioreactor) at the Victor Mine. As there are no accommodations at the VMEP site, the volume will be comparatively small.

Industrial non-hazardous wastes created at the VMEP will be transported to the Victor Mine for handling in the existing approved waste management system. Hazardous wastes will be hauled off site from the Victor Mine to an approved facility.

Water Management

In addition to the discharge from the wellfield and pit sumps discussed earlier, site water management at the VMEP may include as required;

- Containment berms around stockpiles;
- Site diversion berms;
- Culverts for general site drainage;
- General site ditching; and
- A ditch system and / or settling pond with fen treatment to remove silt and suspended particulates from site drainage.

Aggregate Extraction

There may be a requirement for aggregate extraction, if available mineral wastes (mine rock and overburden) are not acceptable for foundation or other construction needs. If needed, approval may be sought for development of a quarry at a local bedrock outcrop.

Processed Kimberlite Storage

Fine and coarse processed kimberlite (PK) are by-products of the Victor Mine diamond recovery process. FPK discharge slurry from the processing of VMEP ore is planned to be deposited in the base of the existing Victor Mine open pit. If deposition to the Victor open pit should prove not feasible or not preferred, the existing approved FPKC facility at the Victor Mine may be expanded, potentially by raising the height of the entire Victor Mine FPKC or an individual cell, and/or by creating a new cell (approved) to accommodate the additional volume. Effluent from the management of the FPK is expected to treated in the same manner as the currently approved and regulatory compliant system. The FPK slurry is strongly neutralizing (by factors of 100), and is not metal leaching. Coarse PK (coarsely crushed kimberlite) will be stored in surface stockpile(s) proximal to the Victor Mine processing plant, potentially through the

expansion of the existing Victor Mine coarse PK stockpile, or may also be deposited within the Victor pit.

2.3.1.3 Reliance on Existing Physical Works

The VMEP will preferentially continue to use many of the existing approved facilities at Victor Mine site (Figures 3 and 4), including:

- Processing plant;
- Maintenance shop, warehouse and administration complex;
- Accommodations complexes;
- Explosives manufacturing and storage facilities (with potential for relocation or development of a spur road for new access);
- Local access roads and pipelines, power infrastructure and fuel storage facilities;
- FPK storage in Victor open pit or at existing FPKC facility (as currently approved or expanded);
- Coarse processed kimberlite storage;
- Domestic and industrial waste handling;
- Water treatment and management facilities;
- Winter road between Attawapiskat and Victor Mine;
- Regional transmission line; and
- All-season airstrip.

All of the Victor Mine components were approved through a previous Federal EA process and have been operating in compliance with the Federal requirements. These listed components are currently, and are planned to continue to be, under the care and control of De Beers, with the exception of the existing regional infrastructure.

The existing Victor Mine processing plant uses dense media separation and x-ray sorting to segregate the diamonds from the kimberlite ore. The process plant has been designed to maximize internal water recycling to the extent feasible. Process water needs are not expected to change and will continue to be drawn from an existing intake structure in the Attawapiskat River, a large river with an average annual flow of 41.5 million cubic metres per day (m^3/d; AMEC 2004a,b). Further description of the associated processes is provided in Section 2.4.2.

It is expected that a maximum of approximately 200 construction workers will be required to develop the VMEP site. Construction and operations staff will be accommodated at the existing Victor Mine accommodation complex.

Explosives needed for the mine development will be prepared in the explosive manufacturing and storage facility at Victor Mine and transported to the VMEP on internal roads as necessary.

The Victor Mine (and VMEP) is accessible by land only when the Victor Mine - Attawapiskat winter road and the James Bay winter road are in place. The current configuration of the Victor Mine - Attawapiskat winter road has been in regular use since 2004. The winter road season generally extends from mid-January to late March, at its longest duration, assuming optimal climatic conditions. This winter road connects by means of the existing James Bay winter road / James Bay barge system to Moosonee, where a rail connection to further south is available. The site is otherwise accessible only by air, by means of the Victor Mine all-season airstrip.

2.3.2 Anticipated Size / Production Capacity

The anticipated size or production capacity of the designated project, with reference specifically to the thresholds set out in the Regulations Designating Physical Activities, is as follows:

- The quantity of water taking required to dewater the open pit has not as yet been firmly quantified. Based on the mine design and preliminary groundwater model, it is fully expected that the groundwater takings required for the anticipated production capacity of the groundwater discharge will be in the order of 30,000,000 to 50,000,000 m^3/a, which exceeds the Designated Project Regulations threshold amount of 200,000 m^3/a.

The purpose, dimensions and capacity of the proposed and existing physical works related to the VMEP are provided in Table 2-1.

2.3.3 Expansion

Development of the VMEP allows extension of the Victor Mine life. The project does not constitute an expansion of the existing Victor Mine pit operations. The new pit at the Tango Extension kimberlite will allow continuance of the operation of the processing plant at the Victor Mine.

2.3.4 Description of Related Activities

Primary activities related to the VMEP not otherwise described in Sections 2.3.1 and 2.5.2 include:

- Completion of conceptual, feasibility and detailed engineering studies;
- Finalization of additional land acquisitions, if any;
- Obtaining financing for Project development;
- Completion of legal / business agreements, if any;
- Re-negotiation of IBAs with:
  - Attawapiskat First Nation (AttFN),
  - Kashechewan First Nation (KFN),

  - Fort Albany First Nation (FAFN) and
  - Moose Cree First Nation (MCFN)
- Hiring of individuals and contractors; and
- Development of Project Management and Environmental Management plans for the VMEP site (or modification to Victor Mine plans).

2.4 Emissions, Discharges and Wastes

2.4.1 Atmospheric Emissions

Air Emissions

Air emissions will derive from point source and fugitive sources, with fugitive sources likely to contribute the majority of the air emissions. The primary point source air emissions are expected to be suspended particulate (dust) from the conveyor(s) if any, and crusher(s). Measures will be taken to minimize dust creation at the plant site and to utilize dust collection devices where practical. Primary crushing at the VMEP site is expected to take place in an enclosed structure to provide shelter and to reduce dust escaping into the environment. Additional dust control will be installed if needed.

Fugitive dust will be released from: drilling and blasting operations (within the open pit); loading and offloading of peat, overburden, mine rock and ore; vehicle and heavy equipment travel on gravel roads; and from wind entrainment from stockpiles and other exposed earth materials. Water and other Provincially-approved dust suppressants will be used as required to control dust emissions as needed.

Construction phase diesel power generation (if required), and vehicle and heavy equipment use during all Project phases, will release particulates, sulphur dioxide (SO_2), and nitrogen oxides from the combustion of fuel. Nitrogen gases, carbon dioxide and other trace gases will also be released from explosives usage.

Greenhouse Gas Emissions

Greenhouse gas emissions during the construction phase will derive principally from diesel fuel combustion in heavy equipment operation along with minor diesel-fired power generation if required. During the construction and operations phases transmission line grid power will be used to meet the majority of Project stationary equipment power demands, thereby reducing potential greenhouse gas emissions at site. Greenhouse gas emissions associated with other fuel sources such as gasoline and propane at the VMEP are expected to be minor.

Noise Emissions

The principal anthropogenic noise sources at the VMEP site are expected to derive from open air, heavy equipment operation, such as that associated with the mining and handling of peat, overburden, ore and mine rock. During the mine construction phase, there will be additional heavy equipment operation as well as diesel generators that will contribute to overall noise emissions.

2.4.2 Liquid Discharges

Wellfield Water and Minewater

A wellfield of up to approximately 12 wells will encircle the VMEP open pit to intercept natural groundwater flow and reduce the quantity of groundwater reporting to the pit walls and floor. Based on pumping at the Victor Mine, the wellfield may intercept up to approximately 150,000 m^3/d at full development. Intercepted natural groundwater will be transferred through a pipeline and discharged to the Attawapiskat River through a pumphouse that incorporates a mixing function as has been approved previously for the Victor Mine.

Despite the installation and operation of the wellfield, the proposed open pit will also intercept groundwater and runoff from adjacent areas and will receive direct precipitation. Preliminary groundwater modelling indicates that when fully developed, at steady state, the VMEP open pit will intercept less than 150,000 m^3/d (annualized) of water that will need to be removed to maintain a dry and safe working environment. More detailed groundwater modelling will be conducted to better define groundwater inflow rates and to determine mine water removal rates for all phases of mine operations as engineering design progresses. Direct precipitation input to the open pit is expected to average approximately 228,847 m^3/a (average 627 m^3/d), based on a mean annual precipitation rate of 690 millimetres (mm) and an approximate open pit catchment area of approximately 331,662 square metres (m^2). Total dewatering requirements will be further refined once the final pit catchment area is more precisely delineated.

Minewater from the open pit will contain suspended solids from general mining and earthmoving activities; ammonia residuals from ammonia-based explosives; and residual hydrocarbons from heavy equipment operation. In-pit sump(s) will provide for preliminary suspended solids removal and will allow for the removal of residual hydrocarbons. Ammonia residuals will be managed at source through best management practices for explosives handling and through extended effluent aging in dedicated sumps and / or minewater pond(s) prior to any discharge to the environment. Options for additional ammonia treatment are available if needed but are not expected to be required based on the Victor Mine operation. Minewater will be directed to a pond for settling and pumped to the Attawapiskat River for discharge (along with the wellfield water).

Processing Plant and Associated Water Usage / Discharge

Processing of the kimberlite ore will occur at the existing Victor Mine processing plant comprising crushing and screening, dense media separation, fines separation, and magnetic separation; followed by x-ray and laser sorting, weighing and packaging. No significant changes to the existing processing technology or approach are expected to accommodate the VMEP ore. If alterations are required to the processing methodology, they are not expected to alter the waste products or effluent / emissions produced (but could for example include an additional internal physical separation process). The primary reagents in the process are ferro-silicon powder used in the dense media separation and flocculant, utilized during the thickening stage. There are no hazardous materials used in the processing of kimberlite.

The diamond recovery process is dominantly a wet process, and requires an average of approximately 6,200 m^3/d of water. The Victor Mine processing plant has been designed to maximize internal water recycling to the extent possible; however, there will be a net loss of water associated with the pumping of FPK to the Victor Mine open pit or FPKC facility. The primary source of recycled water will be from the thickeners that increase the solids content in the FPK slurry to approximately 50% by weight. Minor amounts of water will be lost in the moisture content maintained in the coarse PK sent for disposal, and through evaporation from the drying process that is necessary for x-ray sorting to occur.

Fresh process water will continue to be drawn from an existing intake structure in the Attawapiskat River at a similar or lower rate than currently utilized to process the Victor Mine ore. The amount of freshwater required will be reduced by the amount of water that enters the process plant with the mined kimberlite, and by active recycling of water from the FPKC facility. This will vary seasonally, but may be as much as 900 m^3/d.

The FPK discharge slurry from the processing of VMEP ore is planned to be deposited in the base of the existing Victor open pit. The deposited FPK will help seal the base of the open pit from groundwater inflow from the lower aquifer when mining and dewatering of the Victor Mine ceases. The lower aquifer is a source of naturally more saline water. Deposition of FPK from the processing of VMEP ore may facilitate closure of the Victor open pit, allowing it to be more easily integrated into the existing environment, due to the reduced influx of saline water and the stabilization of more saline waters in the lower sections that are infilled with FPK. Provincial approvals will be required for this deposition.

The open pit is of sufficient size that little discharge from the Victor pit is expected to be required during the early years of operation if it is used to store VMEP FPK. Excess water from the Victor pit during the later years, if any, is expected to be treated and discharged via either the existing Victor Mine Phase 1 or Phase 2 mine water treatment ponds. Following treatment the

water may be discharged to either the Attawapiskat River or to North Granny Creek, depending on its salinity and other provincially regulated water quality requirements.

If deposition to the Victor open pit should prove not feasible, the existing FPKC facility at the Victor Mine will be expanded, potentially by expanding currently approved cells or creating an additional cell. Discharge from the FPKC facility including the collected seepage and runoff from toe collection ditches, will continue report to the existing polishing pond for final settling of the suspended solids before final release to North Granny Creek or pumping to the Attawapiskat River. If expansion of the FPKC facility is required, an amendment to the existing provincial approval will be needed.

General Site Runoff

Runoff from the mine rock and overburden stockpiles at the VMEP site will contain suspended solids and residual ammonia in the case of mine rock stockpiles. The mine rock will not be acid generating or metal leaching. The mine rock and overburden stockpile will be surrounded by a 100 m wide natural buffer of muskeg that will trap suspended solids, prior to passive release to the environment.

Domestic Sewage

Domestic sewage during the construction and operations phase of the VMEP will be collected and temporarily stored in appropriately designed and sized tanks for regular trucking to the Victor Mine sewage treatment plant. The existing Victor Mine sewage treatment plant is a modern membrane bioreactor plant that operates under provincial environmental approval, which allows for the collection of sewage from remote work areas for treatment.

2.4.3 Solid Wastes

Mining Waste

Solid mineral wastes expected to be produced by the VMEP include peat, overburden, mine rock, FPK and coarse PK. Peat, overburden and mine rock will be re-used as practical and reasonable for construction or reclamation purposes or stored in surface stockpiles. FPK will be stored in the Victor Mine open pit (on cessation of mining), or in the Victor Mine FPKC facility. Coarse PK will be stored in surface stockpiles proximal to the Victor Mine processing plant.

Further detail is provided in Section 2.3.1.2.

Domestic Waste

Domestic wastes produced at the VMEP Project site are likely to include very limited quantities of: food scraps, refuse, scrap metal, glass, plastic, wood and paper. Domestic non-hazardous solid waste product will be in the order of 1,500 m^3/a, and will be transported to the existing approved, Victor Mine waste management system for handling / disposal.

Special Management Waste

Special management wastes at the site are expected to include: waste petroleum products and packaging, waste glycol, petroleum contaminated soil and waste explosives. All special management wastes with the exception of waste explosives, will be transported to the Victor Mine site as soon as needed / practical for handling within the existing approved Victor Mine waste management system which meets all regulatory requirements.

Explosive waste will be destroyed according to an approved methodology by the explosives contractor or licensed personnel at the VMEP site.

2.5 Construction, Operation, Decommissioning and Abandonment Phases and Scheduling

2.5.1 Construction

A significant amount of work will be required over a relatively short period of time to complete Project feasibility and engineering studies, and to obtain the necessary environmental approvals, in order to commence mine construction as early as 2016 and initiate mine production in 2018 (assuming all Project approvals are obtained). The construction phase will commence with the stripping of peat and overburden from the open pit footprint, in whole or in part. This can only be effectively undertaken during the colder months, which is a significant factor for the project schedule.

The primary construction phase activities will include:

- Completion of feasibility and engineering studies;
- Application for, and receipt of applicable environment-related approvals, including meeting any / all Federal and Provincial EA requirements;
- Procurement of materials and equipment;
- Movement of construction materials to the Victor / VMEP sites;

- Development and implementation of environmental protection and monitoring plan(s) for construction;

- Development of an all-season access road connecting the VMEP site to the existing road from the Victor Mine to the Attawapiskat River, and the widening of part of the existing Attawapiskat River Intake Road to accommodate haul truck traffic.

- Stripping of peat and overburden, and initiation of open pit mine development; and

- Establishment of site drainage works;

Construction of associated buildings and facilities;

- Construction and energizing of a 13.8 kV distribution line from the Victor Mine site to the VMEP site; and

- Preparation of infrastructure for discharge of FPK to the Victor Mine open pit or expansion of the FPKC facility (and if needed, expansion of the facility itself);

Other construction activities will be sequenced according to manpower and equipment availability and site conditions. Most activities will involve working in wet or poorly accessible terrain, and are best carried out under frozen ground conditions. Project sequencing will also consider environmental aspects, such as fish spawning and bird nesting seasons.

2.5.2 Operations

The site is anticipated to commence operations in 2018, concurrent with the completion of mining of the Victor Mine open pit. A transition period is expected to be required during which time it is planned to keep the processing plant running using kimberlite stockpiled from the Victor Mine open pit to allow time to initiate production mining of the Tango Extension kimberlite and avoid unnecessary disruptions in production and expenditures on additional mobile equipment. The VMEP mine life is anticipated to be up to a maximum of 7 years.

During the VMEP operations phase, peat, overburden and mine rock will be extracted from the VMEP pit for re-use or stockpiling. Diamond bearing ore will be crushed in the vicinity of the pit and will be conveyed to the process plant ore feed stockpile, or it will be trucked to the existing primary crusher / ore stockpiles for sizing and processing. Sized ore will be processed to recover diamonds for periodic shipment offsite.

As the operations phase continues, the open pit and associated mineral waste stockpiles will become progressively larger and deeper / higher.

Solid and liquid wastes / effluent will be managed to ensure regulatory compliance. Environment-related activities that will be carried out during the operations phase are anticipated to include:

- Ongoing management of chemicals and wastes;
- Water management;
- Air quality and noise management;
- Environmental monitoring and reporting; and
- Progressive site reclamation where practical.

2.5.3 Decommissioning, and Closure and Abandonment

Closure of the VMEP site will be governed by the Ontario *Mining Act* and its associated Regulations and Codes. The *Act* requires that a closure plan be filed for any mining project before the project is undertaken, and that financial assurance be provided prior to substantive development to ensure that funds are in place to carry out the Closure Plan.

The objective of closure is to reclaim the mine site area to a naturalized and productive condition on completion of mining. The terms naturalized and productive are interpreted to mean a reclaimed site without infrastructure (unless otherwise negotiated), that while different from the existing environment, is capable of supporting plant, wildlife and fish communities.

It is expected that active phase of reclamation of the VMEP site will take approximately 1 year after operations cease, although there will be open pit flooding, environmental monitoring and potentially effluent quality management thereafter.

Open Pit

The VMEP open pit will be passively flooded on closure to create a pit lake, through natural groundwater and precipitation inputs. Other measures to be taken to reclaim the pit may, or are likely to include:

- Remove all infrastructure and equipment within the open pit and clean up any contamination (petroleum hydrocarbons or explosives);

- Leave a ramp in place such that exit would be possible in the case of inadvertent access;

- Shape and revegetate overburden pit slopes to a stable condition and to facilitate riparian habitat along the pit lake margins; and

- Block the entrance to the open pit; a boulder or traditional security fence will be installed around the pit perimeter during or following active mining operations to ensure safety while the pit is flooding;

Peat, Overburden and Mine Rock Stockpiles

Progressive rehabilitation of peat, overburden, mine rock and coarse PK stockpiles will be undertaken where practical, once the maximum height of each stockpile has been reached and/or as each lift is completed, to minimize the amount of reclamation required at closure. Reclamation of certain areas will include the placement of overburden over rock either in full or in part, seeding using appropriate seed mixtures and hand planting with tree seedlings, as appropriate to expedite the colonization by indigenous species. Investigations will also be undertaken to determine the feasibility of establishing specific wildlife habitats. As such, parts of the mine rock stockpiles may be left as bare rock to mimic the exposed limestone and dolostone of the natural bioherms in the area.

FPKC Facility

Should it be determined that deposition of FPK into the Victor open pit is not feasible, expansion such as by adding a new cell to the existing approved FPKC facility at Victor Mine may be required. Engineering studies and designs are still required for the proposed addition of another cell.

The principal concerns associated with closure of the FPKC facility involve long term slope stability, erosion control, drainage, vegetation cover and aesthetics. Based on studies for similar kimberlite at the Victor Mine, it is anticipated that the FPK generated by the VMEP will not have potential for acid generation or metal leaching.

Drainage and discharge from the FPKC facility will continue to be by the overflow spillway(s). Any flow control structures will be removed from the spillways once the cell is complete, and the spillway(s) will be deepened if necessary to ensure efficient drainage of runoff. The surface of the FPKC facility cells will be contoured to minimize ponding and promote drainage. Muskeg and/or overburden will be harrowed into the cells of the FPKC facility, followed by seeding. Based on design and studies for the existing FPKC facility cell dams, the overall hazard potential classification of the FPKC facility dam for the new cell is anticipated to be very low. The dams will be covered with approximately 0.5 m of overburden and peat, and seeded or hydroseeded with an appropriate seed mixture.

Aggregate Sources

If new, dedicated quarries or pits are developed as aggregate sources during the construction and operation phases of the VMEP, these will be reclaimed according to provincial approvals

and standards, which may include natural flooding to create pond features.

Buildings, Machinery, Equipment and Infrastructure

All buildings, machinery, equipment and infrastructure associated with the VMEP will be transported to the dedicated onsite demolition landfill expected to be developed at the Victor Mine site for the disposal of non-hazardous demolition wastes (such as concrete, steel, wallboard and other inert materials) generated by mine closure.

Salvageable machinery, equipment and other materials associated with the VMEP will be dismantled and taken offsite for sale or reuse if economically feasible, or cleaned of oil and grease where appropriate and deposited within the Victor Mine site demolition landfill. There will be no polychlorinated biphenyl (containing equipment at the site. Gearboxes or other equipment containing hydrocarbons that cannot be readily cleaned will be removed from equipment and machinery and trucked offsite for disposal at a licensed facility.

All above grade concrete structures will be broken and reduced to near grade as required. Concrete structures and below grade facilities (if any) will be infilled if needed. Affected areas will be contoured, covered with overburden as needed and revegetated.

Petroleum Products, Chemicals and Explosives

All petroleum products and chemicals will ultimately be removed from the VMEP site. Empty tanks will be sold as scrap or reused offsite; or cleaned to remove any residual fuel / chemicals and deposited within the Victor Mine demolition landfill. An environmental site investigation will be conducted at the end of operations or early in the closure phase. Soil found to exceed acceptable criteria will be remediated onsite or transported offsite to an approved disposal facility.

The explosives stockpile will be depleted towards the end of operations and any remaining explosives will be detonated on site or as otherwise required by regulations at the time.

Roads, Pipelines and Power Lines

Site roads will be scarified, edges re-sloped as appropriate, and revegetated either actively or passively, when no longer needed to support final reclamation, long term site management and environmental monitoring. Safety berms, if any, along the perimeter of haul roads will be bladed out. Culverts will be removed and roads breached at the culvert locations on site to allow natural drainage.

There will be a number of pipelines at the site. Pipelines or pipeline sections will be sealed and left in place; or purged if needed, and where possible, will be dismantled and disposed of in the onsite demolition landfill.

Onsite power lines and associated materials that have no salvage value will be dismantled and deposited in the demolition landfill. Other power equipment and materials will be taken off site for sale or reuse.

Site Drainage and Water Structures

General site drainage will remain at closure with the exception of the removal of culverts at water crossings during site road reclamation activities as appropriate. Water intake structures at the Attawapiskat River will be reclaimed by removing any structures and mechanical components for disposal in the demolition landfill. Pipelines currently in place for watercourse flow supplementation will be left in place until commitments stipulated in the associated approvals are satisfied.

Victor Mine Site Closure

Reclamation of the Victor Mine site is subject to a certified closure plan pursuant to the Ontario *Mining Act*. Reclamation of any Victor Mine facilities will be conducted in accordance with that closure plan or as amended.

Table 2-1: Summary of VMEP Facility Capacity / Size

Item	Approximate Capacity / Size*
Mine	**Open pit** • Production rate of approximately 2.5 Mt/a of ore • 650 m in diameter, 200 m deep, with surface expression of 36 ha
Mineral waste management	**Peat and overburden stockpiles** • Peat stockpile covering 19.6 ha, estimated height of 4 m to 6 m high • Overburden stockpile 118 ha to 131 ha, estimated height of 6 to 8 m **Mine rock stockpile** • Up to a 96 ha surface footprint, 10 m to12 m in height • Contingency stockpile area measuring, 390 m x 700 m (27 ha) **FPK Storage** FPKC facility new cell (if selected): • Covering 137 ha • Maximum dam heights are expected to be in the range of 8 m to 10 m above grade • Size may be reduced by raising existing cells if practical Victor Pit FPK Storage (if selected): • Victor Mine open pit (maximum extent) will cover a surface area of 80 ha (estimate-currently at 67 ha) at full development • Maximum thickness of FPK storage within abandoned Victor pit is approximately 180 m **Coarse PK Storage** • Expansion of Victor Mine coarse PK stockpile; or • Development of a dedicated coarse PK stockpile at an estimated height of 12 m
Buildings (proposed at the VMEP site based on preliminary design)	• Minor buildings will include a maintenance shop (37 m x 18 m) emergency refuge shelter (15 m x 15 m), and office/lunchroom (20 m x 20 m) • All dimensions preliminary and approximate
Infrastructure (proposed)	• Culverts: minor culverts anticipated to be required on the VMEP site to facilitate general drainage of the muskeg in relation to proposed onsite roads • Pipeline: discharge from proposed VMEP wellfield and pit (pit dewatering) to Victor Mine pipeline or pumphouse, approximately 2 km • Temporary domestic septage storage at the VMEP for haulage and processing at Victor Mine site (20,000 L) • Power infrastructure: 2.5 km extension and 5.5 km twinning of the 13.8 kV distribution line along Attawapiskat River Intake Road, requiring a new / additional 30 m wide right-of-way. **Other** • Workforce: 200 construction workers will be required, with a lesser number required for permanent workforce (full time personnel) during peak operations; to be housed at existing Victor Mine facilities. • Marine transport facilities / railways: not applicable

* Based on engineering to date and subject to change

3.0 PROJECT LOCATION

3.1 Designated Project Location

3.1.1 Project Coordinates

The VMEP is situated in an Unorganized Township, approximately 100 km west of Attawapiskat, Ontario (Figures 1 and 2). Project coordinates are as follows:

- Centroid of the proposed open pit is: Universal Transverse Mercator (UTM) 300934E, 5861863N (NAD 83 Zone 17); latitude / longitude (degrees - minutes - seconds) 83° 57' 27.7" W, 52° 52' 10.6" N (decimal degrees: -83.9577, 52.8696);

- Linear corridor (road and distribution line) endpoints: UTM 305077E, 5856569N, latitude / longitude 83° 53' 35.04" W, 52° 49' 24.72" N (decimal degrees: -83.8930, 52.8235); to UTM 301022E, 5861530N, latitude / longitude 83° 57' 22.29" W, 52° 51' 59" N (decimal degrees: -83.9562, 52.8666)

- Linear pit dewatering pipeline endpoints: UTM 303294E, 5862028N, latitude / longitude 83° 55' 22.03" W, 52° 52' 18.82" N (decimal degrees: -83.9228, 52.8719); to UTM 301224E, 5861820N, latitude / longitude 83° 57' 12.14" W, 52° 52' 9.35" N (decimal degrees: -83.9534, 52.8693)

- Centroid of Victor Mine: UTM 305717E, 5856173N (NAD 83 Zone 17); latitude / longitude (degrees - minutes - seconds) 83° 53' 0.0" W, 52° 49' 12.8" N (decimal degrees: -83.8833, 52.8202);

3.1.2 Site Plan

The preliminary site layout shown in Figure 4, proposes to place the required mine related facilities in close proximity to the open pit, to the extent practicable, on lands to which VMEP has rights, access, or expects to have access. Figure 3 provides a preliminary site plan schematic showing the approximate scale of VMEP and site. The site plan will be refined further as a result of ongoing consultation activities, land agreements and engineering studies. This plan suggests areas of proposed development, rather than actual design features.

3.1.3 Maps of Designated Project Components

Figures providing the following information are included with this document:

- Watercourses and waterbodies (Figures 3 and 4);
- Watersheds (Figure 5);
- Linear infrastructure components (Figure 4);
- Existing land use (Figures 3 and 7);
- Archaeology sites (Figure 14);
- Location of Aboriginal reserves (Figure 1);
- Federal lands (Figure 1);
- Nearby communities (Figure 1);
- Nearby residences (none);
- Fisheries and fishing areas (Figure 4);
- Environmentally sensitive areas (Otoskwin / Attawapiskat Waterway Park; Figure 5);
- Air quality and noise (Figure 8);
- Bedrock geology (Figure 9);
- Regional geology (Figure 11); and
- Electromagnetic Imagery (Figure 10).

As applicable, provincial and international boundaries are shown on the individual figures. The VMEP is quite distant from any provincial or international boundary.

3.1.4 Photographs of Work Locations

Appendix A includes a photographic series which provide an overview of the VMEP site and environs, including the existing Victor Mine.

3.1.5 Legal Description of Land

The VMEP property in the area of the Tango Extension kimberlite, comprises a portfolio of one mining lease (CLM436, mining and surface rights), five unpatented mining claims (claims 1241227, 1241228, 1241229 and 1241231) and one land use agreement with Cliffs Chromite Far North / Debuts Diamonds Inc. (claim 1189377) covering an aggregate area of approximately 6.2 square kilometres (km^2) located in the James Bay lowlands (Figure 3). The Tango Extension kimberlite is situated on lease CLM436.

The Victor Mine property (as of August 2012) comprises a portfolio of mining leases CLM455, CLM435 (on which the open pit resides), CLM437, CLM446, 1246006 and P1052190. These leases cover an aggregate area of approximately 50 km^2 located in the James Bay lowlands.

3.1.6 Proximity to Other Aspects

Residences

There are no residences within the project area. The nearest permanent residences are located in the community of Attawapiskat, approximately 100 km away.

Traditional Territories

The VMEP site and surrounding lands are predominantly undeveloped wilderness, situated within the traditional lands of the AttFN.

Federal Lands

The closest federal lands are Attawapiskat Indian Reserve 91 (Ekwan River, approximately 70 km to the north) and Attawapiskat Indian Reserve 91a, located at the mouth of the Attawapiskat River, approximately 100 km away.

Watercourses and Waterbodies

The Project site area is positioned within the Attawapiskat River watershed. The Attawapiskat River drains east to James Bay.

Environment Canada maintains two flow monitoring stations on the Attawapiskat River in the region (04FC001 Attawapiskat River below Muketei River and 04FC002 Attawapiskat River above Lawashi). A small tributary of the Attawapiskat River, herein referred to as the unnamed tributary, is situated north of the VMEP site (Figure 4). De Beers plans to install a flow monitoring station on the unnamed tributary.

North Granny Creek and South Granny Creek (04FC011) are minor creeks situated south of the VMEP site, that drain to the Nayshkootayaow River (04FC010) which in turn drains to the Attawapiskat River.

Linear Components

Linear components of the VMEP will include a 13.8 kV distribution line, ore conveyor(s), discharge pipeline and an all-season road connecting the VMEP with the Victor Mine. Figures 3 and 4 illustrate these components, along with existing Victor facilities.

Power to support site preparation, construction and operations would be derived from the existing 13.8 kV distribution line that services the Victor Mine and a proposed additional line, which will be adjacent to the first (13.8 kV). One of the lines may be dismantled in the future,

with the newer line remaining to support all power demands (13.8 kV). If necessary, power supply could be supplemented by temporary onsite diesel power generation, particularly during the early construction phase.

The all-season road that runs from the Victor site to the Attawapiskat River Intake pumphouse may be widened in whole or part, to allow heavier traffic and a conveyor route.

Various pipelines will be needed on the VMEP site to transport and discharge water between various facilities, including a new line from the open pit dewatering wellfield to the Attawapiskat River pumphouse, and potentially a new pipeline from the processing plant to the Victor Mine open pit for FPK transfer.

Other Features of Existing or Past Land Use

The principal local features of existing or past land uses are those related to existing industrial use in the area, namely the Victor Mine. Mineral exploration is evident throughout the region. The remaining area is wilderness. The area also supports some traditional pursuits by area First Nations, including hunting, trapping and fishing.

Location of Aboriginal Groups and Traditional Territories

The VMEP site does not overlap with any First Nation reserve lands or lands under land claim and the VMEP itself is located primarily on De Beers' leased lands. The VMEP does however, reside on AttFN traditional lands. The existing 115 kV transmission line and coastal winter road that supports the Victor Mine cross the traditional territories and/or reserves of KFN, FAFN, MCFN and MoCreebec Council.

Federal Land and Related Lands of Interest

There are no federal lands in the vicinity of the VMEP that are included within the proposed Project development area.

Nearby Communities and Residences

There are no communities in the immediate vicinity of the VMEP. The nearest community is the community of Attawapiskat, a First Nation Reserve located approximately 100 km to the east.

The closest local non-Aboriginal communities to the Project site are Moosonee (population 1,725, census 2011), Timmins (population 43,165, census 2011) and Cochrane (population 17,580, census 2011). Timmins is one of the five distinctly larger northern Ontario cities (along with Thunder Bay, Sault Ste. Marie, Sudbury, and North Bay), and is located, by air, 550 km north of Toronto and 520 km south of the VMEP site. Cochrane is located 106 km northeast of

Timmins, and is connected to the VMEP site, by means of the Attawapiskat-Victor winter road, the James Bay coastal winter road and the Ontario Northlands Railway (ONR).

Fisheries and Fishing Areas

The local watercourses in the vicinity of the project do not support a commercial fishery. This includes the Attawapiskat River, the unnamed tributary, North and South Granny Creek and the Nayshkootayaow River.

Baseline fish and fish habitat inventories were conducted in September 2012, in the vicinity of the VMEP site. Twenty-five ponds were investigated for the presence of fish. Seventeen of the twenty-five ponds were found to support only Brook Stickleback. No other fish, including game or sustenance fish were captured in the pond investigation.

For the unnamed tributary, one small adult Pike and three adult Brook Trout were observed in the section directly north of the Tango Extension kimberlite. Also observed, were close to three dozen beaver dams in the same section of the tributary. The lower reaches of the watershed provide diversity of fish habitat (however no game or sustenance species were captured in that area).

Environmentally Sensitive Areas

There are no Areas of Natural and Scientific Interest, or Provincially Significant Wetlands within or proximal to the general Project site area. The Attawapiskat Karst Life Science Site (NHIC) is present in the area, but footprint information is not available at this time

The Otoskwin / Attawapiskat River Candidate Waterway Park is located approximately 16 km to the east and 14 km west of the VMEP land holdings.

3.2 Land and Water Use

3.2.1 Zoning Designations and Land Use Plans

The VMEP, Victor Mine and environs are positioned within an Unorganized Township. There is no zoning designation or land use plan in place for the area.

3.2.2 Current Land Ownership and Mining Rights

The VMEP site lands are dominantly mineral leases held by De Beers for surface and mining rights. Please refer to Section 3.1.5 for a legal description of land tenure for the VMEP. A land use agreement is in place with Cliffs Chromite Far North / Debut Diamonds Inc. for claim

#1189377. This agreement allowed the construction and ongoing use of the current all-season road which crosses the claim, and placement of electrical transmission lines and pipelines.

Additional land deals are being negotiated as of the time of the Project Description preparation which could allow a more optimized footprint. These agreements are expected to be completed well before the proposed construction start, but do not impact the viability of the VMEP.

There are currently no operating mines in the region. The closest mine is the Detour Lake Mine located northeast of Cochrane Ontario, approximately 425 km cross country, southeast of the VMEP.

There is substantial mineral exploration across the Far North, and particularly related to the Ring of Fire, centred approximately 180 km west and upstream of the VMEP.

3.2.3 Management Plans

As the VMEP is within an unorganized municipality, there is no zoning designation for the area. There is no land use policy as per the Crown Land Use Atlas for the VMEP site.

There is no Forest Management Plan or Crown-managed forest at the VMEP site or environs. Muskeg is pervasive near the VMEP site.

3.2.4 Marine Terminal Aspects

There are no marine terminal aspects associated with the VMEP.

3.2.5 Port Aspects

There is no planned port facilities associated with the VMEP.

3.2.6 Aboriginal Lands / Resource Involvement

The VMEP site does not overlap with any First Nation reserve lands. Therefore the VMEP will not require access for, use, occupation, exploration, development or production of resources occurring on First Nation Reserve lands.

The Project however, does occur on traditional lands of the AttFN. The Project footprint is not currently used for traditional purposes by the AttFN as it lies within the "no hunting zone" as designated in the IBA held with the AttFN for the Victor Mine. Subsistence fishing does occur in the Attawapiskat River, but none occurs within the unnamed tributary north of the VMEP. As such the VMEP is not anticipated to require access for, use or occupation of, or the exploration,

development and production of lands and resources currently used for traditional purposes by Aboriginal peoples.

De Beers has actively involved local Aboriginal groups historically and continues to do so in the planning of the VMEP. De Beers has previously negotiated comprehensive IBAs for the Victor Mine with four First Nations (AttFN, KFN, FAFN, MCFN) to set protocols and commitments for ongoing involvement for the life of the project and community benefits that would, in part, help mitigate any potential effects to Aboriginal or Treaty rights. Engagement with First Nations is ongoing regarding the VMEP and proposed activities at the Tango Extension kimberlite. Further detail is provided in Section 6.

4.0 FEDERAL INVOLVEMENT

4.1 Federal Financial Support

There is no proposed or anticipated federal financial support associated with the Project.

4.2 Federal Land Requirements

There is no federal land required or proposed to be used to carry out the Project.

4.3 Federal and Other Regulatory Requirements

Table 4-1 summarizes the types of federal environmental approvals that could potentially be required for the VMEP. In some instances multiple environmental approvals could be required. Other engineering / licensing approvals are not summarized herein.

A number of provincial environmental approvals are also expected to be required to construct and operate the VMEP. Table 4-2 provides a preliminary listing of some of the provincial approvals anticipated to be required, or likely to be required, for the construction and operation of the VMEP.

Table 4-1: Preliminary List of Federal Environmental Approvals

Permit/License	Responsible Agency	Description
Authorization(s) for Harmful Alteration, Disruption or Destruction of Fish Habitat *Fisheries Act*	Fisheries and Oceans Canada	Potentially for the establishment of the open pit, which overlaps a small muskeg pond; creek crossings; mine dewatering groundwater effects that may cause disruption to watercourses supporting fisheries; and/or mine rock stockpiles potentially overprinting fish-bearing muskeg ponds.
Amendment to existing manufacturing, storage and transportation of explosives Explosives Regulations, *Explosives Act*	Natural Resources Canada	Potential need to relocated existing Victor Mine explosives facilities, which may require an alteration to the existing approval.
Review of Works in Navigable Waters *Navigable Waters Protection Act*	Transport Canada	Potentially for alteration of Navigable Waters, such as through establishment of pipeline crossing over the unnamed tributary.

Table 4-2: Preliminary List of Provincial Environmental Approvals

Permit/Licence/Assessment	Agency Responsible	Description
Permit to Take Water (various) *Ontario Water Resources Act*	MOE	Taking of water of greater than 50,000 L per day for drilling and testing of dewatering wells, mine construction excavations, mine dewatering and potentially other requirements.
Environmental Compliance Approvals *Environmental Protection Act*	MOE	Establishment and operation of an industrial sewage treatment facility (such as minewater pond); and management of air emissions.
Environmental Compliance Approvals *Environmental Protection Act*	MOE	Management of air and noise emissions.
Environmental Compliance Approval Amendment *Environmental Protection Act*	MOE	Amend existing industrial sewage discharge approval (Victor Mine) to include VMEP mine water. Amend existing industrial sewage (domestic) waste water treatment to include hauled sewage from VMEP washroom facilities or apply for a separate ECA for a contained, on site sewage system at VMEP.
Work Permit, Forestry Licence or other Approval *Public Lands Act / Lakes and Rivers Improvement Act / Crown Forest Sustainability Act*	MNR	Work / construction on Crown land, including below the high water mark of local watercourses, winter roads, discharge pipeline and distribution line .
Species At Risk Screening *Endangered Species Act*	MNR	Potentially for the management of activities related to Species At Risk.
Closure Plan Amendment *Mining Act*	MNDM	For mine construction / production including that related to the eventual VMEP decommissioning at mine closure.

MOE: Ministry of the Environment
MNDM: Ministry of Northern Development and Mines
MNR: Ministry of Natural Resources

5.0 ENVIRONMENTAL EFFECTS

The following sections describe the anticipated environmental effects. Background information and available data is also provided to characterize the setting.

5.1 Physical, Biological and Human Environment

5.1.1 Climate, Air Quality and Noise

The potential environmental effects to the atmospheric environment from VMEP may include: noise, particulate, greenhouse gases and other air emissions from blasting, heavy equipment operations and stockpiling activities; as well as ongoing air emissions from the Victor Mine.

Modelling of emissions was completed for the Victor Mine activities (construction and operations phases). Results were compared to the MOE A7 Guidelines (Combustion and Air Pollution Control requirements for New Municipal Waste Incinerators). Results of modelling showed that applicable federal and provincial air quality standards will be met at the property boundary.

The model runs indicated that the only criteria that have the potential to be exceeded are the 24-hour total particulate (dust) standard at the claim boundary, and the 1-hour criterion for maximum NOx concentrations. The model predicted that the 120 $\mu g/m^3$ criterion for total particulate would be exceeded on one day out of two years.

Noise modelling results reported in the Victor Federal EA show that MOE sound level criteria for a Class 3 condition are expected to be met at the Victor property boundary (i.e., at the property boundary), and that a lower 30 dBA sound level would be attained at the perimeter of a 3 km buffer zone around the Victor site development area.

To mitigate the potential VMEP effects, affected areas will be sprayed with water or other applicable treatments to minimize dust generation on travelled surfaces. De Beers proposes to continue to make effective use of appropriate mufflers on machinery and dust suppression technologies. Generators and compressors will be housed in either insulated buildings or containers to dampen noise generation, and other reasonable measures will be taken to minimize unnecessary noise emissions. Workplace standards for noise are mandated by the Ontario Occupational Health and Safety Act, and De Beers will comply with these standards

The following paragraphs discuss available data to characterize the climatological, air quality and noise settling, where available and as appropriate.

Station Locations and Regional Studies

The Project site is located in the James Bay Lowlands eco-region of the Hudson Plains eco-zone (Wiken 1986), a poorly drained flat landscape dominated by extensive muskeg. It is in the region of sporadic discontinuous permafrost (permanently frozen ground), although permafrost is not prevalent at the site. This eco-region has a humid high boreal eco-climate (Ecoregions Working Group 1989) mainly influenced by the moderating effects of Hudson Bay and James Bay evident during the summer, depending on the distance inland. In the winter, cold, dry arctic air typically lingers and the moderating effects of Hudson Bay and James Bay are minimal due to ice cover. As there is very little topographical relief throughout the James Bay Lowlands, temperature and precipitation are influenced mainly by latitude and proximity to Hudson Bay or James Bay.

The nearest regional meteorological stations with long term historical climate data are operated by Meteorological Service of Canada of Environment Canada and are located at Moosonee, approximately 225 km southeast of the Project site; and at Lansdowne House, located about 285 km west of the Project site. The station location information is summarized in Table 5-1.

The closest meteorological station to the VMEP site is located approximately 4 km to the south at the Victor Mine site. It became operational in March 2000 and measured wind speed and direction, temperature, relative humidity, net radiation, precipitation, and snow depth. Barometric pressure and pan evaporation were added to the system in 2002. In April 2008, a new upgraded weather station was installed at site. The new station provides data on all of the parameters listed above, as well as for solar radiation and heat flux.

Since the summer of 2010, the Victor Mine site has also hosted and acted as a base of operations for an Ontario Ministry of the Environment (MOE) climate research station that is located about 15 km south of the mine. This is part of a long-term global warming / carbon flux study. The mine has also acted as a base of operations since that same time, for an Ontario Ministry of Natural Resources (MNR) research program on the sporadic muskeg permafrost present in the region. For that program, a number of long-term monitoring stations were installed near the mine to monitor effects of climate change on these features.

Air quality is being monitored at the Victor Mine site as part of its provincial operational approvals. The existing air quality monitoring program requires passive, 30-day average SO_2 and nitrogen dioxide (NO_2) sampling at (or near) the Victor Mine property boundary from May 1 to October 31 each year. These passive systems were installed in 2008 at locations adjacent to the dustfall monitoring locations (Figure 8). The closest station is located approximately 2 km southeast of the VMEP site. This program follows standardized protocols from the Province of Alberta, as Ontario has not formalized methods for this type of monitoring at remote sites such as the Victor Mine site.

Temperature and Precipitation

Table 5-2 presents long-term temperature and precipitation data (1971 to 2000) for the regional station Moosonee UA and Lansdowne House.

The climate at the site area is characterized by long, cold winters and shorter, warm summers. With respect to the proposed VMEP development and future operations, cold winter conditions are essential to: winter road access to the Project site from Attawapiskat and Moosonee; and for ground access around the site area (winter roads and trails), until such time as more permanent all-season on site access to the Victor Mine infrastructure can be constructed.

According to the Victor climate station, the average temperature measured Victor Mine site from July 2008 to August 2012 was -0.3 degrees Celsius (°C). The maximum recorded temperature was 25°C (August 22, 2008) and lowest temperature recorded to date was -36.85°C (January 23, 2011).

Between July 2008 and August 2012, the average daily precipitation rate measured at the Victor Mine climate station was 1.37 mm with a maximum amount of 56.9 mm measured on July 29, 2010.

Relative Humidity

Relative humidity is the gravimetric ratio of water vapour in a unit volume to the water vapour that would prevail under saturated conditions at a certain temperature. Relative humidity is not available for the region from the Canadian Climate Normals. The average relative humidity recorded at the Victor Mine climate station from July 2008 to August 2012 was 80.53 % with ranges from 39.75 % (March 2, 2010) to 99.9 % (July 5, 2010).

Wind Speed and Direction

The wind data of the two regional stations (Lansdowne House and Moosonee) show a dominant wind direction from the west in winter and from the southwest in summer. The range of average wind speeds for the two stations is 10.1 km per hour to 17 km per hour (Environment Canada 2012).

Wind speed (mean daily and hourly) and direction data have been collected at the Victor Mine site climate station since April 2000. Wind speed averaged 15.85 km per hour and the predominant direction was west/southwest, for the period of record.

Net Radiation

Net radiation is the algebraic sum of incoming and outgoing all-wave radiation (short-wave and long-wave) resulting from both incident solar and far infrared radiation from the landscape measured in watts (W). Solar radiation drives the hydrologic cycle and affects the timing and intensity of snowmelt, evaporation, onset and break-up of ice, and the number of open water days; in addition to air, soil and water temperatures.

Between July 2008 and August 2012, the maximum daily net radiation recorded from the Victor Mine site climate station was 196 W/m^2, and the minimum daily net radiation for the period of record was -263.2 W/m^2, with an overall average of 47.89 W/m^2 measured in that time frame.

Snow Depth

The average yearly snow depth measured at the Moosonee UA station was 18 centimetres (cm) (1971 to 2000; (Environment Canada 2012). At the Lansdowne House station the average yearly snow depth was 22 cm (1971 to 2000; Environment Canada 2012).

A snow depth survey is completed in March each year at five locations in the VMEP area. Generally those areas with a higher tree density accumulated more snow, and those with a lower tree density, less. The melt rate between all landscape forms was the same (not statistically significantly different); however, while certain areas may have a relatively higher tree density, the actual tree density is still quite low due to the stunted size of the trees. As such, shading was minimal and therefore melt was largely controlled by the radiation budget which is essentially uniform across this flat, open, landscape (Whittington et al. 2012).

Permafrost

Permafrost is found within three zones in the James Bay Lowlands: continuous permafrost, a relatively narrow area at the north margin of Hudson Bay; widespread discontinuous permafrost (also largely confined to the northern bay area); and scattered discontinuous permafrost, which includes most of the James Bay coast including the VMEP site. The area surrounding the VMEP site has sporadic discontinuous permafrost, ranging from 10 to 50% permafrost composition (NRCAN 2012).

Permafrost has been found only sporadically in the VMEP area, most notably as peat plateau bogs and palsa bogs. More extensive development of these features tends to be more common closer to the James Bay coast. At the Victor Mine site linear permafrost features have been found in the more prevalent fen habitat, and perpendicular to the direction of drainage. The areal extent of permafrost in the VMEP area is well under 5%.

Air Quality

Dustfall measurements are collected at the north, south, east and west property boundaries of the Victor Mine to measure dust loadings to the natural environment during the non-winter period (May through October). Data from 2011 (Table 5-3) indicate that dust loadings derive mainly from vehicular traffic on all-season gravel roads during dry periods, as well as from other sources such the stockpiling of materials. Water truck sprays are used to control road dust as needed. The data show no clear trend to indicate that downwind sites, south and east of the Victor Mine site, are dustier than upwind sites to the north and west. Loadings at Station DF-4 proximal to the VMEP site which represent the current baseline (Figure 8) ranged from 0.263 grams per square metre per thirty days (g/m^2/30 days) to 3.43 g/m^2/30 days.

Snowpack samples are collected at the end of March each year at the dustfall locations (Figure 8), as a composite of three sub-samples, spaced 10 m apart. Snowpack thickness is noted and the samples are melted and analysed for parameters listed in Table 5-4. The data represent cumulative dust loadings over the entire winter, and provide insight as to how analyte concentrations may be affected by accumulated snowfall over the winter, as well as by melt events, wind direction and other factors. Data are compared to Provincial Water Quality Objectives (PWQO) for information purposes only, as these standards apply to receiving waters and are not specific to snow samples.

Snowmelt results for station DF-4, the station closest to the VMEP site, met PWQO for all parameters, with the exception of one occurrence of pH (5.81), which was below the lower objective of 6.5 milligrams per litre (mg/L).

High-volume (hi-vol) and low-volume (lo-vol) air sampling systems function to determine the mass concentrations of suspended airborne particulate (<100 microns), and associated heavy metals, by drawing a known volume of air through a pre-weighed filter medium. A hi-vol sampler has been established near the Attawapiskat River pumphouse (HV-4A). Hi-vol samples were collected during 2011 on 30 occasions, at approximately 6-day intervals, between the dates of May 8 and October 29, 2011. Each sample consisted of a 24-hour composite. The samples were analyzed for total suspended particulate, mercury, cadmium and lead. Results for all four parameters were well below applicable regulatory standards, with the heavy metals generally occurring at non-detectable levels (Table 5-5).

Passive (lo-vol), 30-day average, SO_2 and NO_2 sampling was completed at four locations near the Victor Mine property boundary during 2011, including at the hi-vol location (Figure 8, Table 5-6). The tabled data are for 30-day average results. There are no MOE 30-day standards for SO_2 or nitrogen oxide (NO_x) gas concentrations; however, Schedule 3 of O. Reg. 419/05 provides local air quality standards for 24-hr average concentrations for these two parameters which can be used as a general point of comparison. The O. Reg. 419/05 24-hr standards are 275 $\mu g/m^3$ for SO_2 and 200 micrograms per cubic metre ($\mu g/m^3$) for NO_x, approximately 105

parts per billion (ppb) and 106 ppb, respectively. The measured Victor Mine site boundary values were well below these threshold values, with maximum measured values of 0.6 ppb NO_x and 0.5 ppb SO_2.

Noise

Noise monitoring data were collected and analyzed most recently in 2011/2012 at the Victor Mine site along two transect lines extending outward from the centre of the site (Figure 8). Station NW75 is closest to the proposed VMEP open pit. Ambient noise measurements were conducted over approximately 96-hour time periods. Attended sound measurements were conducted at site monitoring stations on a 10 minute or one-hour intervals at approximately 96 hour periods.

The L90 monitoring station data (northwest transect closest to the VMEP) show summer noise to be very low. At the 2.5 km marker, sound levels generally remains below 40 decibels (dB), and at the 5.0 and 7.5 km markers, the level ranged from the noise floor to approximately 35 dB. During winter monitoring, wind speeds were low and noise increased as distance from the site increased. It is therefore likely that something other than the mine or road traffic contributed to the ambient sound environment during this period. In all cases measurements were below the MOE criteria of 40 dB for a Class 3 environment.

5.1.2 Geology, Physiography and Soils

Geology

The VMEP is situated within the James Bay lowlands of the Hudson Platform. The geology of the Hudson Platform consists of Paleozoic rocks overlying Archean and Proterozoic terrain. Paleozoic rocks are the erosional remnants of a much more expansive cratonic cover that included Lower Paleozoic platform type areas in both the north and south (Sanford et al. 1998). Two large Phanerozoic sedimentary basins are divided by a northeast trending Transcontinental Arch (formerly the Cape Henrietta Maria Arch). The Hudson Bay Basin is found to the north of this arch and the Moose River Basin lies to the south, and the VMEP is located on its southern flank. The Project area lies near the crest of the Trans Continental arch, so that the strata dip very gently (less than 2°) from northwest to southeast.

The eroded surface of the granitic basement rocks is first overlain by 0 m to 4 m of basal sandstone. Three middle to late Ordovician units overly the Precambrian granite: the Bad Cache Rapids Group, the Churchill River Group, and the Red Head Rapids Formation. These units represent several transgressive marine and regressive environments.

The Ordovician sequence is overlain unconformably by Silurian units, including the Severn River and Ekwan River Formations (representing shallow intertidal to subtidal marine

environments), and the Attawapiskat Formation (representing reef and inter-reef environments). The upper bedrock formations into which mining is planned to occur are described below.

Sedimentary rocks of the Ekwan River Formation and underlying Severn River are fine-grained, thinly bedded limestones that alternate with 3 m to 6 m thick beds of mottled, cherty, and fossiliferous limestone (AMEC 2004a). Dolostone is rare, but when present occurs in thin beds of 1 m to 1.5 m thick. Both the Severn and Ekwan Formations were deposited in shallow sub-tidal zones of an open marine environment. The lower boundary of the Severn River Formation is approximately 220 m below the land surface at the Victor Mine site and the Tango Extension kimberlite.

The Attawapiskat Formation is the bedrock stratum closest to the surface. The formation is composed of inter-reef and reef deposits that represent an open marine, sub-tidal depositional environment of mid-Silurian age. The inter-reef deposits are composed of uniform beds of mudstone and dolomitic limestone that flank and overlie the reefs. The limestone reef or bioherm units are abundant in large fossils and reef-building calcareous algae, corals, and stromatolites. Portions of the Attawapiskat Formation outcrop along the Attawapiskat River and Nayshkootayaow River, and as bioherms projecting out of the muskeg as isolated rock islands.

Kimberlite pipes are the diamond bearing rock that intrudes upward through the bedrock formations. The Victor and Tango Extension kimberlites are part of the Attawapiskat Kimberlites in the area that were intruded in a southeast to northwest trending line above a deep seated dyke system in near identical structural settings.

Based on the available drilling exploration information, the Tango Extension kimberlite is hosted in the same formations as the Victor kimberlite and the formations are present in similar thicknesses with two exceptions. The Tango Extension kimberlite appears to be encircled by a ring of Jurassic mudstones that may have been deposited in an isolated depression. There is also a deepening of the basement rock on the southeast side of the Tango Extension kimberlite, where the depth to granitic basement was deeper than expected in a one exploration hole drilled to the west of the pipe.

The Tango Extension kimberlite is intruded through deeply buried Archaean granitic basement rocks and into overlying near horizontally layered mid-Paleozoic sedimentary rocks. Since emplacement approximately 155 to 180 million years (Ma) ago during the mid-Jurassic, erosion has removed the upper part of the kimberlite and most of the younger rocks in the area, leaving a sequence of older layered rocks around the kimberlite intrusion. This remaining sequence of sedimentary rocks at the Tango Extension kimberlite is approximately 290 m thick. The layered rock primarily consists of shales in the deeper portion of the sequence and limestone in the upper part of the sequence. The upper limestones are aquifers, with other significant water producing zones present as layers in the deeper shales and at the contact of the shales and granitic basement.

Geochemistry

Geochemical analysis of host rock and kimberlite from the VMEP is summarized in Appendix B. Similar to the Victor Mine rock, the neutralizing (acid consuming) potential of the mine rock is high, and that the acid generating potential is very low. Heavy metal levels are also generally low. Development of acid mine drainage at the VMEP site is accordingly not expected.

Physiography and Surficial Materials

The sedimentary rocks are overlain by Quaternary till and glaciomarine sediments of 20 m to 40 m thick, which is absent in locations where bioherms in the upper limestones that protrude through to surface. In the area of the proposed VMEP open pit, overburden depths are as much as 20 m thick. The till and glaciomarine sediments are aquitards, and as demonstrated by dewatering at the Victor Mine, are capable of preventing the draining of the muskeg by dewatering where the overburden exists in thicknesses of more than several metres.

Marine sediments first covered the region when the Tippecanoe Sea began transgressing over the Canadian Shield (approximately 450 million years ago). Deposition of sediments continued until Late Ordovician time (approximately 438 million years ago) when a minor sea regression caused a period of aerial erosion. By early Silurian time, two areas with active deposition, still inundated by water, underwent subsidence. Simultaneous uplift of the central Transcontinental Arch also occurred at this time (Norris 1993). The Attawapiskat Kimberlites intruded between 155 and 180 million years ago through the Transcontinental Arch and met ~600 m of pre-basin sediments. Since that time, approximately 300 m of sediment has been eroded away.

Glaciers covered the region until approximately 7,000 to 8,000 years ago. The weight of the glaciers depressed the bedrock, creating a large, shallow depression in the landscape. When the glaciers retreated, meltwater flooded the depression to form the Tyrell Sea, which covered James Bay, Hudson Bay and the associated Lowlands. Regional overburden derives initially from material deposited by the glaciers that was subsequently reworked by meltwater to create marine sediments and beach deposits (Martini et al. 1980, Cowell et al. 1991).

Since deglaciation of the Keewatin ice sheet roughly 8,000 years ago, the Hudson Bay region has experienced 180 m of isostatic rebound. Presently the basin rises at approximately 1 centimetre per year. The quick rebound of the crust in this area has caused the reactivation of many basin faults.

The physiography of the VMEP is characterized by flat, poorly drained terrain. Pervasive muskeg consists of fen and bog communities. More prominent glacial depositional features (eskers, outwash deposits, and kames) are absent from the immediate VMEP area. The closest such feature to the Project site is an esker/outwash feature, located approximately 17 km to the

west of the Victor Mine site. There are also small sporadic areas of slightly raised, permanently frozen ground (palsas) in the vicinity.

Evolution of the James Bay Lowlands also involved the build-up of extensive organic (muskeg or peat) deposits. In comparatively cold climates, where drainage is poor and where there is excess rainfall, organic (plant) materials are created faster than they decay. As a result, there is a net accumulation of dead muskeg matter that slowly builds up as peat. The depth of peat deposits in the VMEP area generally ranges from about 1.1 m to 3.4 m with an average depth of about 2 m away from the river margins.

5.1.3 Hydrology and Hydrogeology

Hydrology

Potential effects to nearby watercourses identified for the Victor Mine included predicted reductions in groundwater discharge to the Attawapiskat River and Nayshkootayaow River, and a potential reduction in water stored in wetlands with the Granny Creek watershed. The reductions in groundwater discharge to the Attawapiskat River and Nayshkootayaow River were due to the proximity of the mine to segments of these rivers that flowed over bedrock. The VMEP site is located significantly further from the Nayshkootayaow River and the capture of significant groundwater discharge to this river by pumping at the VMEP is not anticipated.

Dewatering at VMEP is expected to cause a reduction in groundwater discharge to the Attawapiskat River, and the effect is expected to be similar to what was predicted for the Victor Mine. At the Victor Mine, groundwater discharge to the Attawapiskat River is estimated to be reduced by 14,200 m^3/day. However, this represents only a fraction of a percent of the flow in this river, and the discharging of water from the open pit to the river more than replaces the reduced groundwater discharge, and as such dewatering has had no measurable effect on the river.

Based on experience at the Victor Mine, dewatering at the VMEP is also expected to potentially lower water levels in the bedrock aquifers beneath some smaller area watercourses, including the unnamed tributary. Throughout the region, the bedrock aquifer is separated from the muskeg and creek / tributary water system by layers of glacial, marine and peat sediments, except at a few isolated bioherms sites and cuts made by major rivers. At the Victor Mine, monitoring has demonstrated that these overburden sediments have been sufficient to prevent widespread drying of the muskeg system by dewatering or cause draining of the Granny Creek, even where Granny Creek passes within a few hundred metres of the Victor Mine. The same sediments are also present near VMEP and as such no significant dewatering of the muskeg or draining of local creeks is anticipated.

Area hydrological systems are described in the following paragraphs.

Surface water features in the VMEP area include: an unnamed tributary to the Attawapiskat River located to the north of the VMEP site (watershed of 49,000 km^2 opposite the site) that flows from west to east; muskeg pond systems that characterize almost all this part of the James Bay lowlands; and the Attawapiskat River (Figure 4 and 5). Much of the unnamed tributary is thought to flow across relatively thick overburden, although there is at least one short section where the tributary flows close to potential bioherm features. Flow has been monitored in this tributary since 2010, and in both of the last two winters the tributary has frozen to bottom (i.e. no measureable flow).

South of the VMEP lie the headwaters of North Granny Creek (watershed of approximately 46 km^2), a minor tributary of the Nayshkootayaow River watershed of 1,840 km^2 opposite the VMEP site, which itself drains into the Attawapiskat River (Figure 5). Depending on site development and engineering studies, there may be VMEP facilities that cross into the North Granny Creek watershed to connect with the Victor Mine.

Annual runoff yields for the region are in the order of 260 mm to 300 mm. There is a pronounced seasonal flow regime, with the highest flows occurring during the spring melt, and lowest flows during mid to late winter, with a secondary less pronounced low flow period in the late summer.

Further detail is provided below regarding the unnamed tributary, North Granny Creek and the Attawapiskat River.

Unnamed Tributary System

The unnamed tributary is a small watershed with a total catchment area of 44 km^2 just upstream of its confluence with the Attawapiskat River.

Ten instantaneous flow measurements for unnamed tributary were collected between September 2010 and August 2012. Measurements ranged from 0.04 m^3/s to 2.39 m^3/s. The Granny Creek system has a comparable watershed of 46 km^2 (Table 5-7). It is expected that the unnamed tributary system will demonstrate similar hydrologic attributes to that of Granny Creek.

Granny Creek System

North Granny Creek has a watershed of 46 km^2. Flows for North Granny Creek are measured at Station NG-001 which was established in September 2005. Station 04FC011, located further downstream at the confluence of North Granny Creek and South Granny Creek was established in June 2000.

Water level data are measured continuously using a pressure transducer and data logger, with water levels being converted to flows through comparisons with site specific flow / water level

rating curves. Manual measurements are taken monthly in winter when there is ice cover because rating curves are not accurate under ice cover.

Monthly and mean annual flow data for the 04FC011 Station are shown in Table 5-7 for the period of record. The data show marked seasonal extremes in flow, from effectively zero flow in late winter in some years (2004, 2007 and 2008), to flows in excess of 100,000 m^3/d during spring melt conditions, and in some wet fall conditions. Flows in 2011 were higher than average for the period of January through April, but were lower than average throughout most of the rest of the year (Figure 12).

Attawapiskat River

Attawapiskat River flows opposite the VMEP site are calculated by prorating flows from Water Survey of Canada Station 04FC001 located upstream on the Attawapiskat River, just below its confluence with the Muketei River. The watershed area at the Water Survey of Canada station measures 36,000 km^2, whereas near the Victor Mine site, the Attawapiskat River has a watershed area of 43,500 km^2. Calculated river flows opposite the Victor Mine site for period of 2006 through 2011 are shown in Figure 13.

River flow data show a pattern consistent with other regional hydrologic systems, namely low winter flows, followed by a strong peak during the spring freshet, reduced summer flows, and a generally smaller fall peak flow except for the fall of 2007, when the fall peak flow exceeded the spring freshet flow.

Hydrogeology

The potential effects of the proposed VMEP open pit mine in the hydrogeology of the area are well understood from experience and ongoing monitoring at the nearby existing Victor Mine. Significant pumping from a ring of dewatering wells will be required to maintain dry, safe working conditions in the proposed VMEP open pit. The dewatering will result in a decline in groundwater levels in the main bedrock aquifers with the highest drawdowns expected in the deeper confined aquifer, and lower drawdowns in the upper aquifer due to the release of water from storage and recharge from the overburden and surface water features. The drawdown will propagate outwards from the VMEP open pit for distances of several kilometres, reaching to the Attawapiskat River, capturing groundwater that would otherwise discharge to the river, and possibly causing infiltration beneath the river. As with the Victor Mine, the quantity of water reaching the proposed open pit dewatering system from the Attawapiskat River is expected to be only a very small portion of the flow in the river, and no measurable losses in flow in the river are expected. In addition, water from the Victor open pit is returned, via pumping, back to the Attawapiskat River.

Drawdown in the upper bedrock aquifer will also cause increased leakage from the overlying

muskeg system, primarily focussed in small areas in the immediate vicinity of bedrock bioherms that protrude through the overburden. Elsewhere, relatively thick overburden sediments will reduce the amount of water leaking through overburden. Detailed monitoring in bioherms (carbonate rock formation in mound or lens shape) and non-bioherm areas within the Victor drawdown cone have indicated that wide spread drying out of the muskeg does not occur, even very close to bioherms due to the replacement of water in the muskeg by precipitation and the low hydraulic conductivity of even thin layers of overburden materials. The same process also protects smaller creeks flowing over the overburden from significant water loss.

As with the Victor Mine, pumping from the bedrock aquifer initially draws water from storage, including a large portion of low chloride water in the upper aquifers. Over time as this stored upper aquifer water is depleted, chloride concentrations in the discharge water are expected to rise with time, but not to concentrations above those observed at the Victor Mine. In this case, the increase in chloride concentrations may happen at a slightly higher rate due to depletion of some water from storage by previous dewatering at Victor. Additional characterisation of the chloride concentrations in the aquifers combined with predictive groundwater transport modelling along the lines used at Victor is planned to assess this factor.

Other interactions between the existing Victor Mine and the proposed VMEP are not expected, as dewatering at the two mines is only expected to overlap for a short period during the development phase for the VMEP, and the proposed expansion lies in the outer fringe of the Victor Mine drawdown cone. Refilling of the Victor open pit with water from the Attawapiskat River will also help groundwater levels around Victor Mine recover.

As with the Victor Mine, hydrogeological studies are proposed to determine if large individual karst features are present, which might play a significant role in the hydrogeology of the area. No such features were found at the Victor Mine that interfered with dewatering or created unusual or unexpected drawdown effects. Previous karst surveys along the Attawapiskat River have not identified any such features near the VMEP; however, long term pumping tests with appropriate monitoring are planned to further assess this remote possibility.

The following paragraphs describe the hydrogeological setting of the VMEP and environs.

The hydrogeologic setting for the VMEP area has been determined based on information collected during exploration activities around the Tango Extension kimberlite and investigations and modelling related to the Victor Mine site. The understanding of the hydrogeology of the area has developed in stages with the following reports documenting the stages of that development:

- HCItasca Denver Inc (February, 2004). Dewatering of Victor Diamond Mine, Predicted Engineering and Environmental Factors.

- HCItasca Denver Inc (October, 2006). Hydraulic Testing and Construction of Monitoring Wells, Victor Diamond Project, Ontario.

- HCItasca Denver Inc (June, 2007). Dewatering of Victor Diamond Mine, Predicted Engineering and Environmental Factors.

- HCItasca Denver Inc (December, 2007). Predicted Baseflow and Recharge to Underlying Limestone in Granny Creek Basin.

- HCItasca Denver Inc (March, 2008). March 2008 Update of June 2007 Groundwater Flow Model Based on Data from 60,000 m^3/d Ramp Up pumping.

- HCItasca Denver Inc (April, 2008). Predicted Baseflow and Recharge to Underlying Limestone in Granny Creek Basin Using Heads from March 2008 Updated Regional Groundwater Flow Model.

- Itasca (April, 2012). Recalibration of March 2011 Victor Regional Groundwater Flow Model and Updated Simulations of Victor Mine Dewatering.

While both Victor and the VMEP sites are similar, exploration drilling has revealed a few differences between the two sites. First, the deep overburden trenches that are present to the northeast and southwest of the Victor kimberlite are not known to be present at the VMEP site. Instead, the Tango Extension kimberlite appears to be encircled by a ring of Jurassic-age mudstones that appear to have been deposited in an isolated depression, whose presence at the Victor kimberlite, if any, has long been eroded. Since this Jurassic mudstone is of limited extent, it is not expected to greatly influence the environmental effects of dewatering.

A second distinctive feature of VMEP is a deepening of the basement rock on the southeast side of the kimberlite, where the depth to granitic basement was deeper than expected in one exploration hole. A similar depression in the granitic basement has not been identified at the Victor site. The size of the depression in the granitic basement at the VMEP site is unknown, and may be restricted to the area around this single hole. There is no corresponding depression in the upper bedrock surface, although the upper part of the rock sequence at this drill site is filled with the Jurassic mudstone described above. There appears to no corresponding change in the thickness or integrity of the overlying quaternary aquitards, and this feature is not expected to influence the environmental effects of dewatering.

Groundwater measurements are available from local monitoring wells and from measurements in open boreholes drilled as exploration wells. These measurements indicate that general groundwater flow at the VMEP site is to the northeast towards the Attawapiskat River. Measurements collected to date from the Victor Mine groundwater monitoring program indicate

that the drawdown cone from the existing Victor Mine open pit may just reach the VMEP site in the deeper confined aquifers, but not in the upper aquifer (AMEC 2012).

5.1.4 Surface Water, Sediment and Groundwater Quality

Surface Water Quality

The groundwater testing and modelling studies for the Victor Mine have shown that the wellfield water discharge from the VMEP will be moderately saline, with expected chloride concentrations in the range of 800 to 1,000 mg/L prior to any blending of effluent that may be required to meet regulatory needs. Under more conservative assumptions of much higher chloride concentrations at depth and increased transmissivity near the kimberlite pipe, chloride levels could be as high as 1,400 to 1,900 mg/L Thus far, chloride concentrations in the wellfield discharge have continued to be below concentrations predicted during the Victor Mine EA and subsequent provincial permitting, wherein chloride concentrations were expected to peak at approximately 1,300 mg/L during 2010, before gradually dropping back to about 800 mg/L at the end of the mine life. Recent recalibrations of the hydrogeological models based on several years of operational data indicate that chloride concentrations at the Victor Mine will instead gradually increase to about 1,400 to1,500 mg/L during the final few years of operation, due to reduced proportions of shallower groundwater. A similar scenario is expected for the VMEP, although of shorter duration due to the reduced period of operation.

Metal concentration predictions in groundwater extracted from the Victor Mine are already lower than federal and provincial standards for both the protection of aquatic life and for drinking water, other than for calcium, magnesium and boron. A similar prediction is anticipated for the VMEP wellfield groundwater.

Mitigation measures in effect for the Victor Mine wellfield groundwater discharge, include:

- use of a settling pond during Phase 2 mining operations for the removal of suspended solids;
- maintaining the potential to blend saline effluent with non-saline surface water prior to discharge; and
- the use of an existing reinforced single point offshore discharge for rapid dispersion in the Attawapiskat River.

Similar mitigation strategies are planned for the VMEP site, if required.

The following paragraphs describe the VMEP area watercourses and waterbodies.

Unnamed Tributary

Surface water samples in the unnamed tributary were collected by De Beers at three locations TE-10-030C, TNGO-CRK-MN and TNGO-CRK-NT in 2012 (Table 5-8; Figure 15). All samples collected were analysed for general chemistry and compared to the PWQO (Table 5-8). These water quality objectives were met for all parameters with the exception of aluminum, cobalt, copper, iron, lead, silver and vanadium for some samples?. Occurrences of concentrations above PWQO are described below:

- The cobalt PWQO of 0.0009 mg/L was exceeded once at all three sampling stations. All exceedances were noted to have cloudy water and suspended sediment in the samples;
- Copper was exceeded (0.005 mg/L) at only one station TE-10-030C in the July sample;
- Iron exceeded the PWQO of 0.3 mg/L for most samples. Naturally occurring higher iron concentrations were observed during the pre-mining baseline conditions, and during Victor Mine operations at Granny Creek;
- Lead concentrations for two samples (July TE-10-030C at 0.0023, and May TNGO-MN at 0.0019) slightly exceeded the PWQO of 0.0010 mg/L;
- Silver exceeded the PWQO (0.0001 mg/L) once at all three stations; and
- Vanadium slightly exceeded the PWQO (0.006 mg/L) at TE-10-030C (0.0113 mg/L) and at TNGO-MN (0.010 mg/L).

Unnamed Watershed Muskeg Ponds and Unnamed Tributary

Surface water quality samples were also collected from area muskeg ponds and in the unnamed tributary (Table 5-9; Figure 15). The samples were tested for general chemistry, total metals and dissolved metals. The pH levels at a few muskeg ponds are below the range for PWQO of 6.5 to 8.5. All other parameters measured met the PWQO objectives except for iron concentrations in the unnamed tributary, which exceed the PWQO. These elevated levels of iron are consistent with data presented above and historical Victor Mine area background water quality.

General chemistry for the samples collected in the muskeg ponds and unnamed tributary are characteristic of the area (Table 5-10). Total phosphorus levels for some sample locations marginally exceeded PWQO.

Granny Creek

Water quality in North Granny Creek, the north branch of the Granny Creek system, which is situated south of the VEMP site, is monitored at eight locations for a number of different parameters and at various frequencies. The data are compared against PWQO for the protection of aquatic life (Table 5-11). Throughout 2011 these water quality guidelines were met for all parameters with the exception of pH, cadmium, copper, iron, lead and silver. Exceedances are described below:

- South Granny Creek (station SWF) exceeded pH limits (was lower than the lower limit of 6.5 on many occasions). Lower pH for the Granny Creek system is consistent with pre-development conditions.
- Two sample stations exceed the PWQO for copper.
- Elevated iron values in all stations are linked mainly to suspended sediment transport and to high dissolved organic carbon values. Both conditions for pH and iron are natural occurrences that were observed during the pre-mining baseline condition, and during Victor Mine operations at upstream and downstream stations.
- Silver concentrations frequently exceeded the PWQO criteria of 0.0001 mg/L.

The occasional exceedances for cadmium, copper, lead and silver were typically only slightly above guideline values and appeared to be more in the upstream reaches of the creek system. Exceedances were not observed (with the exception of iron) at the Granny Creek confluence location.

Mercury has received specific attention at the Victor Mine because of concerns expressed over the potential adverse effects of mine dewatering on local wetland (muskeg) systems, and associated mercury chemical dynamics. Total and methyl mercury concentrations in the Granny Creek system during 2011 were consistent with PWQO.

Sediment Quality

Sediment quality in the unnamed tributary was sampled late September 2012 at 36 stations. All samples typically meet Provincial Sediment Quality Guidelines (PSQG) for all parameters analysed except for three occasions (Table 5-12). Total nickel at station M0575 exceeded the PSQG of 16 milligrams per kilogram (mg/kg), with a value of 48.6 mg/kg for this sample event. Total cadmium at station NW-0200 and NW-0288 were marginally in exceedance of the 0.6 mg/kg objective threshold with values of 0.732 mg/kg and 0.713 mg/kg, respectively.

Groundwater Quality

A large number of groundwater samples have been collected from groundwater monitoring wells across the Victor Mine site which are fully expected to be of similar quality to that of the VMEP site. These wells are at various depths and represent groundwater conditions from the respective geologic units.

The local groundwater regime is moderately saline due to the marine origin of rock formations, the generally low profile of the area, and marine transgressions following the last glacial retreat. Total dissolved solids (TDS) throughout the shallow and moderate depth bedrock formations, to a depth of 220 m, average approximately 2,000 mg/L, with lower concentrations of TDS occurring in shallow bedrock zones (to a depth of approximately 35 m) away from the Nayshkootayaow River. Below 220 m, TDS concentrations increase to about 5,000 mg/L because of associations with deeper (partially soluble) evaporite deposits. The TDS concentrations also tend to increase in a horizontal plain, with increasing proximity to the Nayshkootayaow River.

Provincial and Federal drinking water standards used for comparison purposes only for chloride, sodium, iron, and TDS were exceeded in the majority of groundwater samples for shallow and intermediate depth sources, excluding those from shallow groundwater systems removed from the Nayshkootayaow River. Acute toxicity tests showed that fish and invertebrates would not be affected by direct exposure to this water, but that there could be an effect on the reproduction rate of aquatic invertebrates.

5.1.5 Aquatic Resources

Potential effects to aquatic resources are outlined in sub-section 5.2.1. A description of the area aquatic resources is provided in the following paragraphs.

An aquatic study is currently underway of the unnamed tributary in the VMEP area. During the current baseline survey in the VMEP area, one small adult pike and three adult Sturgeon were caught north of the kimberlite in the unnamed tributary.

Studies of fisheries and aquatic resources have been carried out in the VMEP area 2003 to 2011. This work included habitat assessments and fishing efforts focused on the Granny Creek, Nayshkootayaow River, Attawapiskat River and their tributaries using a variety of fishing gear (electroshocking, seines, minnow traps, trap nets and gill nets). Fishing efforts were conducted in spring, summer and fall, together with some late winter sampling efforts.

The Attawapiskat River is a very large system that originates on the Canadian Shield far to the west. The river is predominantly bedrock controlled, with numerous areas of bedrock exposure along the riverbanks, together with areas of rapids, starting from the west to a point

approximately 50 km upstream of the community of Attawapiskat. Riverbed materials throughout the river consist mainly of mixtures of gravel, cobble, and boulder.

The Nayshkootayaow River, where it passes south of the VMEP site and flows into the Attawapiskat River, consists of four main channel types that are home to a diverse fish community. According to the AttFN, the Nayshkootayaow River fish community includes lake Sturgeon, walleye, Pike, Lake Whitefish, Sucker and Brook Trout. Sturgeon and Whitefish use the Nayshkootayaow River mainly during spawning.

The majority of Granny Creek consists of slow drainage through muskeg habitat, with a thin margin of tree cover. The creek bottom is mainly muck and clay/silt, except closer to its outlet, where sands and gravels occur because of the steeper gradient. The Granny Creek fish community is composed mainly of minnow species, but also with low numbers of Brook Trout, Sucker and Pike. A greater diversity of fish species occurs in the creek mouth area, where it connects with the Nayshkootayaow River. Pike and Sucker are mainly associated with the creek mouth area.

Muskeg ponds may or may not support minnow populations depending on local conditions. Fisheries assessments were conducted by AMEC during the summer 2003 to investigate some of the larger ponds in the Victor Mine area. Where ponds do support fish, these communities are dominated by brook stickleback and finescale dace, with occasional representation of Iowa darter. The presence or absence of minnow species in muskeg ponds appears to be a function of frequency of pond inundation by creek floodwaters, compared with the frequency and likelihood of freeze-out in cold winters.

Benthos samples were collected during the July/August 1999 field program from North Granny Creek and South Granny Creek, as well as from the confluence area. Additional benthos samples were collected from South Granny Creek in July 2002. Grab type samples were dominated by true flies, and most notably by chironomids (midges), while surber sample results showed a more even distribution between the major taxonomic groups, with considerably higher numbers of Ephemeroptera / Plecoptera / Tricoptera species.

5.1.6 Vegetation Communities

Vegetation communities in the region are dominated by muskeg terrain. Muskeg consists of two principal types: bog and fen. Bog communities are dominated by a ground cover of hummocky sphagnum moss, lichens and stunted black spruce. Bogs, although still quite wet, and with the water table just below (or at) surface, tend to be slightly raised and therefore slightly drier and more structurally supportive compared with fen areas. Fens, on the other hand, are characterized by sedges and tamarack, and by a predominance of standing and frequently seeping water at surface, frequently with an abundance of ponds. Often bog and fen communities are intermixed into complexes. Tree growth is stunted by the wet conditions.

Well-developed forests, consisting mainly of black spruce with lesser amounts of balsam fir, poplar (trembling aspen and balsam poplar) and white spruce, and occasionally white birch and white cedar, are confined mainly to the river and creek margins where improved drainage occurs. Some developed tree growth also occurs on patches of frozen ground, on rock outcrops and at other such locations where a slight raise in the landscape produces improved drainage.

Some of the vegetation communities in the VMEP area have been disturbed as a result of the Victor Mine development. Vegetation communities in the undisturbed portion are consistent with regional communities.

Preliminary vegetation surveys were carried out at the VMEP site in June 2012. No federal or provincial vegetation Species at Risk (SAR) were observed during the survey.

5.1.7 Wildlife

Mammals

Ungulate (moose and caribou) densities for the whole of the Hudson/James Bay Lowlands are in the order of one moose for every 130 km^2 of land area, and one caribou for every 50 km^2. Densities are higher in preferred habitats and lower in poor habitat (AMEC 2012). Moose tend to be confined mostly to riverbank and creek margin forests. Caribou, on the other hand, tend to populate more open country, but appear to prefer mixed fen habitats where there is at least some tree cover.

Wolves and black bear are the largest predators in the region. Furbearers include beaver, muskrat, snowshoe hare, marten, mink, otter, red fox and lynx. Furbearers tend to be concentrated along the watercourses, either because they are directly associated with aquatic habitats (beaver, muskrat, mink and otter) or because they prefer forest and forest / shrubland habitats which border the creeks and rivers (marten, lynx and fox). Other small mammals including voles and shrews occur in this region as well as several bat species such as Little Brown Bat and Northern Longeared Bat, though little is known about their habitat use this far north. Marten, beaver, otter and wolf are frequently observed in the VMEP area.

Birds

The VMEP project area provides foraging habitat for many raptor species. Several raptor species were identified during the aerial surveys of the area in March 2012 including Bald Eagle, Merlin, Great Horned Owl, Northern Harrier, Osprey, Rough-legged Hawk and Sharp-shinned Hawk. These observations were largely associated with the Attawapiskat River. Generally the available raptor nesting habitat within the proposed footprint of the VMEP area as currently understood is limited; however, there are a few Black Spruce trees that may be

considered suitable for nesting. Ground nesters such as Northern Harrier could also nest in the open, wet meadows in the footprint.

The boreal forest and wetlands that make up the James Bay lowlands and VMEP area are important breeding and staging habitats for a wide diversity of migratory bird species including waterfowl, songbirds, shorebirds and raptors.

A breeding bird survey was undertaken in the VMEP area in June of 2012 found 111 individuals, comprising 25 species of breeding birds were observed, one of which is designated as a species of Special Concern (Rusty Blackbird, the habitat for which is common throughout the VMEP area). The most commonly observed species were Greater Yellowlegs (21 individuals), the Dark-eyed Junco (14) and Palm Warbler (10).

5.1.8 Species at Risk and Critical Habitat

Effects to wildlife, including SAR, from VMEP-related activities could potentially occur as a result of the following:

- general disturbance to habitats;
- general disturbance from site activities, including noise and air emissions;
- general disturbance related to site access from aircraft operations, or traffic along the winter road, most notably from noise;
- increased vulnerability to hunting due to improved hunter access along the south winter road;
- disturbance caused by baseline and/or monitoring studies, and
- direct habitat displacement associated with site construction and development.

None of these potential impacts are unique from those predicted for or experienced at the Victor Mine.

These effects will be mitigated by:

- minimizing the area impacted by VMEP facilities through strategic placement and re-use of Victor Mine facilities to the extent practical;
- the use of buffer zones;
- burying pipelines where practical;
- reclamation at mine closure;
- wildlife already accustomed to disturbance from the construction and operation of the Victor Mine;
- setting winter roads and permanent roads a minimum of 500 m away from waterways where practicable (exceptions will be at the watercourse crossings themselves); and

- continued implementation of policies for traffic control, equipment use, timing, speed limits and frequency of shipments in order to mitigate winter habitat disruption.

Noise modelling studies indicate that low sound levels, in the range of 30 dBA, will be achieved at the outer boundary of the 3 km buffer zone surrounding the Victor Mine site. These predictions have been verified by field monitoring studies conducted in both the summer and winter. Ongoing monitoring (radio collaring) shows that Woodland Caribou (a SAR) have responded to the Victor Mine operations more favourably than predicted.

Sampling in the vicinity of the VMEP area did not provide evidence of any aquatic SAR either under federal *Species at Risk Act* or provincial (*Endangered Species Act*) legislation, with the exception of Lake Sturgeon in the Attawapiskat River and Nayshkootayaow River. There are no planned construction activities associated with either watercourse. Two Lake Sturgeon were captured during the late summer / early fall of 2011 using gill net and trap nets set in the lower Nayshkootayaow River confluence of the Attawapiskat River. The trap net was situated so as to capture fish moving upstream into Nayshkootayaow River and captured one Lake Sturgeon on August 30, 2011. One Lake Sturgeon was also captured in the trap net situated so as to capture fish moving downstream into the Attawapiskat River on September 1, 2011.

The terrestrial SAR known to occur or anticipated potentially to occur around the VMEP environs are listed in Table 5-13.

A key SAR in the region is Woodland Caribou. South of the Victor Mine, Woodland Caribou tend to occur as individuals and as small to medium sized groups, as opposed to the larger herds typical of barren ground caribou. Traditional Knowledge (TK) studies indicate that movements are, to some extent, predictable between seasons, but there is also a random element to these movements, such that caribou may occur in some areas in some years, but not in other years.

An extensive program including radio telemetry studies has been ongoing since 2004 to gather more information on caribou movements in the VMEP area. Based on monitoring data collected thus far, the area of directly altered habitat is less than the predicted 28.8 km^2, and caribou (and moose) continue to use areas both within and outside of the Victor Mine buffer zones. Local caribou home ranges have also been shown to be quite large, varying from approximately 400 km^2 to 113,000 km^2, such that the area of the Victor Mine site takes on comparatively less importance relative to caribou movement.

Based on data obtained with respect to caribou thus far, it appears that:

- Within the individual home ranges for the collared caribou the footprint of the Victor Mine site is quite limited and it is unlikely that the Victor Mine is having a measurable effect on these collared animals.

- The GPS collars have recorded animal locations in close proximity to the mine site and several animals have the Victor Mine included in their 70% kernel home-ranges. Observations of caribou along the winter road and close to the mine site suggest that the mine activities have not caused major avoidance of the area.
- Since the caribou home-ranges are very large, it is not expected that the Victor Mine could have any conceivable effect on the heavy metal concentrations in tissue; however, a study of metal concentrations is to be undertaken at the request of the AttFN representatives. However, to date no caribou tissue samples have been provided by community members for analysis, despite several requests for the samples.
- Several collared animals have been observed within 60 km of the Victor Mine site during calving season, suggesting only a limited potential for mine site disturbance to local Caribou calving activities, consistent with noise propagation studies undertaken. The noise studies indicated that essentially background noise levels of 20 to 30 ambient decibels were achieved at a distance of 5 km from the Victor Mine centre. Caribou with young calves are occasionally observed on the mine site in early summer.

Various winter aerial surveys have also been carried out near to the VMEP for caribou. Typically caribou and associated track data tended to be concentrated southwest of the VMEP (and southwest of Victor Mine) closer to Mississa Lake. Most recently in December of 2011 large numbers of caribou tracks were also encountered directly south of the Victor Mine.

Other mammalian SAR that occur in the area include wolverine and Little Brown and Northern Long-eared Bats.

Wolverine require vast undisturbed areas to maintain viable populations. This species inhabits a variety of treed and treeless areas at all elevations including the northern forested wilderness, the alpine tundra of the western mountains, and the arctic tundra. This species range has been moving east each year and this species has been observed during the winter aerial surveys of this area. The Wolverine is most abundant where large ungulates are common as it relies on them for food. This species is rare in the region around the VMEP site and utilizes a large home range. Impacts are not be anticipated for this species as to date, wolverines have not been observed during any of the baseline or other field studies / observations associated with either the Victor Mine or VMEP, with a single exception. During an aerial wildlife survey in December 2011 tracks that were believed to be from a wolverine were observed near Mississa Lake, approximately 75 km Southwest of the Victor mine.

Little Brown Bat and Northern Long-eared Bat have both been recently listed as Endangered by the *Species At Risk Act* under an emergency assessment in 2012. Both species have experienced steep declines due to white-nose syndrome. Significant habitat for both species includes caves that may be used as hibernacula in the winter. No known hibernacula for these species occur in the VMEP area.

Two species of raptors known to occur in the area, Bald Eagle and Short-eared Owl are also SAR.

- Bald Eagle is listed as Special Concern for the northern Ontario region. It continues to be a Specially Protected Raptor under the *Fish and Wildlife Conservation Act*. Bald Eagle typically nest near shorelines of lakes as well as large rivers. It was observed in several locations along the Attawapiskat River during aerial surveys undertaken in March 2012. It is known to nest up to 2 km from a waterbody and could use trees within the VMEP area. No Bald Eagle nests were observed during the 2012 winter aerial survey of the VMEP site and suitable nesting trees are limited, as such the probability of this species breeding in the project area is low.

- Short-eared Owl is currently listed as a federal and provincial species of special concern. This species prefers open grasslands and marshes and its breeding range covers most of Canada excluding the high arctic (Environment Canada 2012). The region is largely comprised of open bog, fen and marsh habitats and records of breeding evidence within 100 km of the Project area, particularly along the Attawapiskat River (Cadman *et al*. 2007).

There are five migratory birds, Yellow Rail, Common Nighthawk, Olive-sided Flycatcher, Barn Swallow and Rusty Blackbird known to occur in the region that are also designated as SAR:

- Yellow Rail is designated both federally and provincially as special concern. It breeds in moist areas dominated by low herbaceous vegetation such as sedges, grasses and rushes. Breeding habitats include the edges of marshes or marshes with little or no standing water, damp fields or meadows, floodplains, and open bogs (Environment Canada 2012). The breeding range of the Yellow Rail includes all Ontario but the majority of the population breeds around the Hudson Bay Lowlands. There is very limited suitable habitat available for this species within the Project area. However, there are several records of breeding evidence within 100 km of the Project area, on the James Bay coast (Cadman *et al*. 2007). The probability of this species occurring within the Project site area is low.

- Common Nighthawk is federally designated as threatened and provincially designated as special concern. It nests on the ground in open habitats, in forests and in urban areas. In northern Ontario it prefers rock outcrops, alvars, sand barrens, bogs and fens as well as openings created by logging or natural disturbance. The breeding range for this species includes the James Bay lowlands and species probable breeding evidence along the Attawapiskat River and in the vicinity of VMEP has been ascertained during the last Breeding Bird Survey (Cadman et al. 2007). There is available open bog and

fen habitat within the Project area and the species has a moderate probability of occurrence during the breeding season.

- Olive-sided Flycatcher is currently federally designated as threatened and provincially designated as special concern. It is most often associated with open areas containing tall live trees or snags for perching. Open areas may be forest clearings, forest edges located near natural openings (such as rivers or swamps) or human-made openings (such as logged areas), burned forest or openings within old-growth forest stands. In the boreal forest, suitable habitat is more likely to be in or near wetland areas. The breeding range for this species includes the James Bay lowlands and probable breeding evidence along the Attawapiskat River and in the vicinity of Victor Mine was ascertained during the last Breeding Bird Survey (Cadman et al. 2005). There is available nesting habitat within the Project area and the species has a moderate probability of nesting there.

- Barn Swallow is currently provincially listed as threatened and has been recommended to be listed as threatened Committee on the Status of Endangered Species in Canada. It typically nests on anthropogenic structures such as bridges, but will also use cliffs and caves. It often breeds in small colonies. During the last breeding bird survey, probable breeding evidence for this species was recorded along the Attawapiskat River and in the vicinity of VMEP (Cadman et al. 2007). There is limited habitat available within the Project area and the species has a low probability of occurring there; though it may use the structures within Victor Mine site (and potentially those to be developed in association with VMEP) for nesting.

- Rusty Blackbird is federally designated as special concern. It nests in the boreal forest and favours the shores of wetlands such as slow-moving streams, peat bogs, marshes, swamps, beaver ponds and pasture edges. In wooded areas, the Rusty Blackbird only rarely enters the forest interior. During the winter, the Rusty Blackbird mainly frequents damp forests and, to a lesser extent, cultivated fields. This species is known to breed in the region and has been identified in the VMEP area.

5.1.9 Human Environment

Population and Demographics

The James Bay coastal communities include, from south to north, Moosonee, Moose Factory, Fort Albany and Kashechewan and Attawapiskat. With the exception of Moosonee, these communities form part of the Mushkegowuk Council group of First Nations. The Weenusk First Nation community of Peawanuk, though also located in the west James Bay area, is not a member of the Mushkegowuk Council, but rather is an independent First Nation. The major interaction between De Beers and regional First Nations has been with the community of

Attawapiskat, because the Victor Mine and the VMEP site are located entirely within lands traditionally used by the AttFN.

Attawapiskat has an on-reserve population of 1,928 and an off reserve population of 1,185 (AANDC 2012), and is currently governed by a Chief, a Deputy Chief, and 11 elected Councillors. Population estimates from other sources, most notably Statistics Canada, are available for 2001 (on reserve population of 1,293), but not for more recent years. The demographics of the community are heavily weighted towards the younger age groups, and as a result the community is growing relatively rapidly.

The non-aboriginal communities which are regarded as stakeholders in the VMEP are Timmins and Cochrane. Timmins has an interest as the regional mining centre, and Cochrane has an interest because of its railway connection to Moosonee. The principal importance of Cochrane to the VMEP is its connection to the northern Ontario railway and highway systems, which position it as a staging area for the Project. Cochrane is located at the junction of the Canadian National Railway (east-west orientation) and the ONR (north-south orientation). The ONR extends north to Moosonee, and is the only year-round ground link to that community. Cochrane is also located on Trans-Canada Highway 11, the main provincial highway through northeastern Ontario.

Regional Economy

The Project and Attawapiskat occur in the northwest Ontario census division, while much of the impacted regional economy occurs in northeast Ontario census division. The northern region of Ontario has often lagged behind Ontario as a whole for employment. In recent years, employment has closely approximated that of Ontario. Unemployment spiked in 2009 to approximately 9% for Ontario and northeast / northwest Ontario as a result of the recession and has been steadily decreasing since. Unemployment for northeast, northwest and all of Ontario was 7.8%, 7.4%, and 7.8%, respectively (Statistics Canada 2012). It should be noted that in the nearest communities (Attawapiskat, Kashechewan and Fort Albany), the unofficial unemployment rate can reach as high as 80% in some communities. The Victor Mine current workforce is comprised of members of the aboriginal community and generally ranges from 30% to 50% at any given point in time.

Community Infrastructure and Services

Attawapiskat is the closest community to the VMEP. It is a small Aboriginal community consisting of buildings, yard areas, gravel roads, air transport facilities, barge handling facilities, power supply systems, water and sewage distribution systems, telecommunications systems, solid waste disposal facilities, airstrip and similar elements.

The community is serviced from Moosonee by the west James Bay coastal winter road and by barge through James Bay during the summer, as well as by air. There is also a permanent transmission line connection. The coastal winter road is developed and maintained annually and typically operates from late January to early April, weather permitting. Barge service is provided by MTL out of Moosonee. The airstrip is a commercial all-season gravel strip measuring 1,067 m. Air Creebec runs scheduled flights into the community. The winter road and transmission line extend to the Victor Mine site. In 2012 a cellular telephone service was initiated in the community.

Traditional activities (hunting, fishing, trapping, and gathering) are practiced by a proportion of the AttFN population. Hunting and fishing provide food to households, both those of the people who hunt and fish and the households with which they share the harvest. Hunting and trapping also generate cash income from hides and furs. These activities are also very important from a cultural and recreational perspective. Most traditional activities are practiced along the James Bay Coast and along or near the major rivers and creeks, where resources such as fish, waterfowl, moose and fur bearing animals are more abundant and accessible. The Attawapiskat River is the primary travel artery to the interior.

Mineral Exploration, Forestry and Agriculture

The Victor Mine is the only producing mine in the area; however, there is ongoing exploration in the area. Metalex Ventures Ltd., located 60 km to the west, is currently exploring the area for diamonds. The Ring of Fire is located approximately 180 km to the southwest of the VMEP site is a large potential chromite deposit development. The closest operating mine is the Detour Lake Mine located northeast of Cochrane Ontario, approximately 425 km cross country, southeast of the VMEP.

Forestry and agricultural resources are not harvested in the area (there is no forest management unit).

Recreation and Tourism

VMEP is remote and receives limited recreational use, with such use focused on the Attawapiskat River canoe route. There are no parks in the immediate vicinity of the VMEP. The closest park is the Otoskwin-Attawapiskat River Provincial Waterway Park that extends from the headwaters of the Otoskwin River, downstream a distance of approximately 420 km to the confluence of the Attawapiskat River and Muketei River. This confluence is approximately 100 km upstream from the VMEP, and well outside of the proposed VMEP development area (Figure 5). The goals of the Otoskwin-Attawapiskat River Waterway Park are to protect the significant natural and cultural features of the waterway, and to provide opportunities for wilderness recreation, principally canoeing (MNR 2002).

5.2 Potential Changes Related to Federal Legislation

5.2.1 Fish and Fish Habitat (*Fisheries Act*)

Impacts to the Attawapiskat River, the unnamed tributary and North Granny Creek fish habitat associated with the VMEP may include:

- Continued use of the Attawapiskat River outfall and intake (used for Victor Mine operations) and any associated changes to shoreline substrate conditions and profiles in the immediate water outfall and intake zones;
- Continued discharge of groundwater extracted from a wellfield discharge to the Attawapiskat River; and
- Surface flow reductions within North Granny Creek and/or the unnamed tributary, under low flow conditions
- Possible work in or near water for placement of water crossings (pipeline, conveyor) and culverts.

A variety of fish species are present within the local watercourses and ponds within the Project site area. See Section 5.1.5 of this report for further information.

Any new permanent or long-term VMEP components (such as culverts) that are required to be placed within watercourses will be designed to maintain fish passage, and will take into account the resident species of fish within the system. Permanent features such as the open pit and stockpiles that are placed in areas that may be determined to be fish habitat will be permanent and would permanently displace the aquatic features in question.

Dewatering associated with providing safe access for mining the Tango Extension kimberlite may result in some reduction of flows within the unnamed tributary. Although in most cases this is not expected to result in a meaningful flow reduction (i.e. less than 15% reduction from natural flows), a notable flow reduction may be possible based on the preliminary hydrogeological model, particularly during low flow periods. Similarly, it is expected that water will continue be drawn from the Attawapiskat to support processing operations. The water taking quantities and timing are very small in comparison to Attawapiskat River flows and are more than offset by water discharged from mine dewatering so no meaningful flow reduction will occur in that river.

Potential effects to the environment related to the VMEP are summarized in Table 5-14.

5.2.2 Species at Risk (*Species at Risk Act*)

Table 5.13 summarizes the terrestrial SAR known or potentially present in the VMEP area.

None of the fish species in the immediate VMEP area are Federal SAR with the exception of Lake Sturgeon which is known to be present in the Attawapiskat River downstream of the VMEP site.

5.2.3 Migratory Birds (*Migratory Birds Convention Act*)

No direct effect on migratory birds is anticipated, apart from effects on terrestrial habitat. In order to minimize the potential for incidental take of any nesting migratory birds, clearing of vegetation and any proposed work activities in migratory bird habitat will be completed outside of the active breeding season, generally avoiding the period of May to August. If clearing or other destructive work is required in migratory bird habitat during the nesting season, a nest survey will be conducted by a qualified avian biologist immediately prior to commencement of the work to identify and locate active nests of species covered by the *Migratory Bird Convention Act*.

5.3 Potential Changes Related to Federal Lands

There are no Federal lands in the vicinity of the VMEP including within the proposed Project development area. No changes to Federal lands inside or outside of Ontario, nor inside or outside of Canada are expected as a result of the VMEP.

5.4 Potential Effects on Aboriginal Peoples from Changes to the Environment

Table 5-14 provides a summary of changes to the environment related to proposed Project activities, and the potential effects on aboriginal peoples as a result of those changes.

Potential effects on aboriginal peoples primarily relate to:

- traditional pursuits and land use
- health; and
- cultural heritage resources.

The region has experienced a shift towards more cross-cultural contact through the development and operation of the Victor Mine (potentially reduced income from trapping and economic transition into the wage based economy). The extent to which traditional values and skills have and can be maintained during the VMEP operation is a result of a very large number of variables, only some of which will be attributable to the project specifically.

There will be some displacement of lands by the VMEP facilities and infrastructure. For safety reasons, it is anticipated that there will be no hunting in the immediate vicinity and within a zone of 3 km radius from the VMEP site. The similar hunting prohibition zone will remain in place at the Victor Mine. Trapping is planned to be prohibited within the principal site development zone near the Tango Extension kimberlite. Trapping will continue to be prohibited within the existing Victor Mine development zone.

Health effects include accidents from vehicle traffic on the south winter road, accumulation of contaminants through the consumption of traditional foods and medicines (in relation to project emissions), effects on potable water sources, direct air emissions, and noise. These are not expected to change from that predicted for the Victor Mine. Thus far, there is no reported meaningful harvesting of plants from areas near the Victor Mine site.

With regard to meat, a concern raised during the Victor Mine Federal EA was the potential for the magnification of metals, primarily heavy metals. An analysis of the Victor area kimberlite ore and limestone (to which Tango Extension geology has been proven to date to be similar) shows that metal concentrations were all less than soil guideline values for residential and parkland settings, with the exception of two (out of 35) silver samples. Water samples tested for mercury and all other metals gave results that were better than Ontario Drinking Water Standards, with the exception of sodium. Similar results are anticipated for VMEP, as the pit is situated in similar geology. Air emission modelling for the Victor Mine indicated that applicable environmental and health standards will be met for all parameters, with the possible exception of total particulate concentrations, which have the potential to occasionally exceed the provincial standard (marginal rare occurrences).

For noise, the principal considerations will be workplace noise standards and comfort for sleeping. Workplace standards are mandated by the Ontario Occupational Health and Safety Act, and De Beers will continue to comply with these standards.

Cultural heritage resources (burial sites, camp sites, sites of spiritual significance, and archaeological features) in the area of the project are typically located along the larger rivers. No new development is proposed near a major river, such as the Attawapiskat River.

Mitigation for these effects is proposed to include implementation of workforce policies. These policies will be, relevant to traditional pursuits, intended to minimize the contact between the residents of Attawapiskat and the out-of-area project workforces, control inappropriate behaviours when contact does occur, help to ensure that Aboriginal employees have opportunity to engage in traditional activity. The policies will also encourage workplace conditions that accommodate Aboriginal culture. Fly-in, fly-out employment also provides rotational time for the pursuit of traditional activities.

The loss of use of traditional lands for the VMEP is planned to be minimized through the re-use of Victor Mine facilities and infrastructure where practical, and the strategic placement of new facilities. Mitigation is also expected to occur through compensation for observed disturbances to wildlife and the consequent reduction in harvests, or obligation to move harvesting activities to locations away from De Beers' activity. There will be no limitation on fishing.

Vehicle traffic incidents will continue to be mitigated through public education and clear, enforced rules for vehicle operators.

The Ontario Ministry of Culture will be notified if archaeological features are discovered during site construction. If human remains are encountered during construction (or other activities), the AttFN; the Ontario Ministry of Culture, Tourism and Sport; Nishnawbe Aski Police Services; and the Cemeteries Registrar of the Ministry of Consumer Services will be immediately contacted.

During the development and operation of the Victor mine there has been a concerted effort to employ workers and contractors drawn from the local First Nations communities, consistent with the objectives and targets set out in the respective Impact Benefit Agreements. This secure employment income has in some cases resulted in shifts to the place of residence, either to other coastal communities or to larger centres such as Cochrane and Timmins. Anecdotally, this is in many cases driven by a desire to access improved housing, education, health care etc. or to consolidate or support family members who are already living outside their home communities. In some cases the reverse is true, where workers who previously lived and worked in Southern communities have been able to return to their home communities now that they had secure employment at the mine. The net effect is believed to be a generally higher level of mobility into, between and out of the coastal First Nations communities, which has both positive and negative social effects. This is expected to continue if the proposed VMEP project proceeds, extending the local employment opportunities.

Table 5-1: Regional Meteorological Stations

Station Name	Station Number	Location (dd° mm')		Elevation (m)	Period of Record
		Latitude (N)	Longitude (W)		
Moosonee UA	6075425	51° 16'	80° 39'	10	1932 to 2002
Lansdowne House	6014350	52° 14'	87° 53'	255	1941 to 1989
Lansdowne House (AUT)	6014353	52° 11'	87° 48'	252	1989 to 1998
Lansdowne House (AUT)	6014353	52° 12'	87° 56'	251	1998 to 2002

Table 5-2: Temperature and Precipitation at Regional Meteorological Stations

Parameter (1971 to 2000)	Station Moosonee UA	Station Lansdowne House
Yearly Average of Daily Temperature (°C)	**-1.1**	**-1.3**
Daily Average Temperature January(°C)	-20.7	-22.3
Daily Average Temperature July (°C)	15.4	17.2
Yearly Average Rainfall (mm)	**493.9**	**488.7**
Average Rainfall (mm) January	0.7	0
Average Rainfall (mm) July	101.3	107.5
Yearly Average Snowfall (cm)	**212.9**	**241.6**
Snowfall (cm) January	40.8	31.3
Snowfall (cm) July	0	0
Yearly Average Precipitation (mm)	**681.6**	**699.5**
Precipitation (mm) January	33.9	26.6
Precipitation (mm) July	101.3	107.5

Source: Canadian National Climate Data and Information Archive (Environment Canada 2012)

Table 5-3: Total Dustfall Monitoring

Month	Total Dustfall -2011 (g/m^2/30 days)				Total Dustfall Average	Total Monthly Precipitation (mm)
	DF J-1 East	DF J-2 South	DF J-3 West	DF J-4 North		
May	*46.6*	*9.54*	*31.9*	*12.8*	*25.210*	48.8
June	*206*	*90.9*	*78.9*	*177*	*138.200*	39.1
July	*15.8*	*54.9*	*11.7*	*28.7*	*27.775*	68.8
August	0.204	0.209	0.313	0.263	0.247	127.3
September	0.351	0.543	0.071	0.422	0.347	122.4
October	0.291	1.13	0.334	3.43	1.296	66.5
Average	0.282	0.627	0.239	1.372	-	-
Minimum	0.204	0.209	0.071	0.263	-	-
Maximum	0.351	1.130	0.334	3.430	-	-
No. of valid samples	3	3	3	3	-	-

Note: Total dustfall includes the water insoluble and soluble fractions
Italicized numerals = glycol added to the samples on direction of the lab, these samples are void due to falsely large weights.

TABLE 5-4
VMEP AREA - SNOW SAMPLING ANALYTICAL DATA

Station	Date	pH	Total Suspended Solids	Chloride	Sulphate	Nitrate	Beryllium	Calcium	Cadmium	Cobalt	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	Silver	Sodium	Strontium	Titanium	Vanadium	Zinc
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
PWQO		6.5-8.5					0.01-1.1*		0.001-0.005*	0.0009	0.0089	0.001-0.005*	0.3	0.001-0.005*			0.04	0.025	0.0001					0.02
DF-1 (East of Site)	8-Mar-11	8.71	75.7	5.65	<1	0.12	<0.0005	66.6	<0.0001	**0.0037**	**0.0147**	**0.0083**	**5.42**	0.003	14.6	0.162	<0.001	0.016	**0.00075**	1.96	0.0788	0.413	0.0146	**0.025**
DF-2 (South of Site)	8-Mar-11	6.88	14.2	5.08	<1	<0.1	<0.0005	2.7	<0.0001	0.0005	0.0031	0.002	0.205	<0.001	1.05	0.0066	<0.001	0.007	**0.00108**	0.15	0.0065	0.0073	<0.001	0.007
DF-3 (West of Site)	9-Mar-11	**4.97**	1.5	5.35	<1	<0.1	<0.0005	2.4	0.0001	0.0003	0.0021	0.0038	0.17	<0.001	0.591	0.0055	<0.001	0.003	**0.00045**	0.39	0.0057	0.0037	<0.01	**0.028**
DF-4 (North of Site)	10-Mar-11	**5.81**	3.7	<0.2	<1	<0.1	<0.0005	1.5	<0.0001	0.00018	0.00087	<0.001	0.055	<0.001	0.306	0.0068	<0.001	0.001	<0.0001	0.11	0.0034	0.0016	<0.001	0.0102
Near Residence	8-Mar-11	6.54	44.5	<0.2	<1	<0.1	<0.0005	5.3	<0.0001	0.0004	0.0041	<0.001	0.18	<0.001	0.833	0.0067	<0.001	0.005	0.00014	0.55	0.0062	0.0057	<0.001	0.004
PWQO		6.5-8.5					0.01-1.1*		0.001-0.005*	0.0009	0.0089	0.001-0.005*	0.3	0.001-0.005*			0.04	0.025	0.0001					0.02

* Value depends on Hardness

Exceeds PWQO

Table 5-5: Hi-Vol and Lo-Vol Ambient Air Sample Results, VMEP Area

Station and Metric	Units	Parameters and Concentrations (2011)			
		TSP	Hg	Cd	Pb
Hi-Vol-4					
Number of Samples	n	30	30	30	30
Sample Dates	May 8 - Oct 29	-	-	-	-
Mean Value	µg/m^3	11.5	0.0000271	ND	ND
Observed Range	µg/m^3	4.2 - 30.3	1.2E-5 - 4.2E-5	-	-
Lo-Vol-04					
Number of Samples	n	30*	-	30	30
Sample Dates	May 8 - Oct 29	-	-	-	-
Mean Value	µg/m^3	7.46	-	<0.028	<0.042
Observed range	µg/m^3	<4.17 - 12.92	-	<0.028	<0.042
Lo-Vol-02					
Number of Samples	n	31**	-	31	31
Sample Dates	May 8 - Oct 29	-	-	-	-
Mean Value	µg/m^3	7.69	-	<0.028	<0.042
Observed Range	µg/m^3	<4.17 - 14.72	-	<0.028	<0.042

Station locations: Refer to Figure 8
* 15 of 30 samples below method detection limit
** 22 of 31 samples below method detection limit
O. Reg. 419/05 24-h average standards: Total Suspended Particles (TSP) - 120 µg/m^3; Mercury (Hg) - 2 µg/m^3;
Cadmium (Cd) - 0.25 µg/m^3; Lead (Pb) - 2 µg/m^3
Detection Limits: TSP (Hi-Vol) - 2.8 µg/m^3; TSP (Lo-Vol) - 4.17 µg/m^3
Cd (Lo-Vol) <0.028 µg/m^3, Pb (Lo-Vol) <0.042 µg/m^3
ND = non detect

Table 5-6: Passive Air Quality Monitoring, VMEP Area

Month	PM-1 East		PM-2 South		PM-3 West		PM-4 North		DUP 8 (PM-2)	DUP 9 (PM-1)	Blank	Blank
	NO_2	SO_2	NO_2	SO_2	NO_2	SO_2	NO_2	SO_2	NO_2	SO_2	NO_2	SO_2
May 2011	<0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.3	0.2	0.06	0.15
June 2011	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.2	0.05	0.15
July 2011	NA	0.2	0.1	0.2	0.1	<0.1	0.1	<0.1	0.2	<0.1	0.04	0.12
August 2011	0.4	<0.1	0.3	<0.1	0.1	<0.1	0.4	0.1	<0.1	<0.1	0.05	0.15
September 2011	0.5	0.3	0.4	<0.1	<0.1	<0.1	0.1	<0.1	0.2	0.1	0.03	0.19
October 2011	0.5	0.5	0.3	0.3	0.2	0.1	0.3	0.2	0.6	0.3	0.03	0.16
Arithmetic mean	0.3	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.3	0.2	0.04	0.15
Max. concentration	0.5	0.5	0.4	0.3	0.2	0.1	0.4	0.2	0.6	0.3	0.06	0.19
Min. concentration	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.03	0.12
Detection limit (mdl)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	NA	NA
No. samples <mdl	2	1	1	3	2	4	1	3	1	2	NA	NA

Note: Results expressed in parts per billion.

Table 5-7: Granny Creek Measured Average Annual and Monthly Flows - Station 04FC011

Year	Month												Mean
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2000	NA	NA	NA	NA	NA	103,165	41,986	25,576	24,848	50,567	R	R	49,228
2001	R	R	R	R	R	104,314	123,299	56,431	105,222	117,805	163,573	27,869	99,788
2002	14,729	7,888	4,327	47,178	480,255	164,818	11,766	106,829	137,110	61,484	31,188	15,465	90,253
2003	7,769	3,902	1,837	1,517	143,646	44,747	23,859	5,347	21,866	60,879	12,621	947	27,411
2004	67	151	0	3,158	D	D	D	D	D	D	D	D	N/A
2005	3,526	1,659	D	D	D	39,872	98,789	48,879	66,306	97,112	48,178	26,149	47,830
2006	13,398	4,402	3,022	D	D	52,042	32,825	31,660	40,501	100,421	54,558	12,631	34,546
2007	2,512	0	0	NA	69,837	63,919	38,707	28,512	165,888	260,928	52,324	8,726	62,850
2008	2,377	475	0	NA	191,789	141,831	88,500	49,579	30,154	39,796	32,597	15,184	53,844
2009	7,299	6,067	7,825	46,992	366,791	170,546	139,003	167,864	89,696	98,948	146,029	21,619	105,723
2010	9,912	11,113	8,426	54,345	34,557	29,294	35,208	65,168	36,841	29,890	29,756	18,845	30,280
2011	12,700	9,763	10,282	64,714	127,181	49,162	28,253	33,696	99,101	98,150	50,285	12,182	49,622
Mean	7,429	4,542	3,969	30,638	202,008	87,610	60,200	56,322	74,321	92,362	62,111	15,962	58,123

Notes: Data expressed in m^3/day

D - Station damaged, no data available

R - Station removed, no data available

NA - Insufficent data

Average annual runoff: 238mm (Based on years 2000 to 2010. Annual average is based on monthly data averages)

Average annual flow predicted in CSR was 32,000 m^3/day for each branch, or 64,000 m^3/day combined system

Watershed area: 91.6km^2

Table 5-8: Surface Water Quality, Unnamed Tributary

Parameter		pH-IH	pH-L	Cond-IH	Cond-Lab	TDS	Hard-T	Alk-M	NH3 un-ion	N-NH3	C-DOC	P-T	Sulphate	N-NO2	N-NO3	Chloride-Lab	Ag-D	Ag-T	Al-D	Al-T	As-D	As-T	Be-D	Be-T	Ca-D	Ca-T	Cd-D	Cd-T	Co-D	Co-T	Cr-D
units		\	pH	µS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
PWQO		6.5-8.5							0.02									0.0001		0.075		0.005		0.011				0.0002		0.0009	
CEQG		6.5-9							0.019											0.1		0.005						0.000017			
EQWin Station Code	Collect Date																														
TE-10-030C	27-Jul-11		10.50		2000	1150	249	60.7					221			441	<0.00010	**0.00029**	0.0056	**0.0812**	0.0012	0.0020	<0.00050	<0.00050	64.1	102	<0.00010	<0.00010	<0.00010	0.00024	0.0026
	27-Jul-11		8.29		7810	8440	2240	61.1					852			2380	<0.00010	<0.00010	<0.0010	0.0457	0.021	**0.0191**	<0.00050	<0.00050	481	524	<0.00010	<0.00010	0.00096	**0.00118**	0.0041
	27-Jul-11		11.04		2380	1360	317	153					50.4			552	<0.00010	<0.00010	<0.0010	0.0638	0.0020	0.0036	<0.00050	<0.00050	83	132	<0.00010	<0.00010	0.00016	0.00027	0.0026
TNGO-CRK-MN	9-Jan-12	6.94	7.33	176.4	127	30	72.8	60.6	<0.002	0.213	25.7	0.018	<1	<0.03	<0.1	1.7	<0.00010	<0.00010	0.0393	0.13	<0.0010	<0.0010	<0.00050	<0.00050	19.2	23.5	<0.00010	<0.00010	0.00031	0.00047	<0.00080
	10-Feb-12	7.34	7.94	222.9	196	190	167	122	<0.002	0.433	28.7	0.152	<1	<0.03	<0.1	2.68	<0.00010	<0.00010	0.0576	**0.954**	0.0010	0.0013	<0.00050	<0.00050	28.5	42.8	<0.00010	<0.00010	0.00029	**0.00141**	0.0048
	8-Mar-12 *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5-Apr-12	6.47	6.98	75.9	72.5	260	22.8	28.4	<0.002	0.051	13.9	0.016	<1	<0.03	<0.1	1.1	0.00011	<0.00010	0.0287	0.0699	<0.0010	<0.0010	<0.00050	<0.00050	8.54	11.5	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
	7-May-12	7.96	7.28	70.9	64.9	30	138	31	<0.002	<0.01	10.4	0.0142	<1	<0.03	<0.1	0.84	0.00014	<0.00010	0.0705	**3.53**	<0.0010	0.0015	<0.00050	<0.00050	10.7	41.7	<0.00010	0.00010	<0.00010	**0.00213**	<0.0010
	2-Jun-12	7.2	7.22	43.5	36.5	70	20.4	33.5	<0.002	<0.01	17.8	0.0218	<1	<0.03	<0.1	0.55	<0.00010	<0.00010	0.0274	**0.0728**	<0.0010	<0.0010	<0.00050	<0.00050	5.09	6.5	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
	12-Jul-12	7.17	7.48	57	64.9	120	32.3	28.8	<0.002	0.021	24	0.0218	<1	<0.03	<0.1	0.52	<0.00010	<0.00010	0.025	**0.108**	<0.0010	<0.0010	<0.00050	<0.00050	10.2	10.7	<0.00010	<0.00010	<0.00010	0.00014	<0.0010
	3-Aug-12	6.98	7.19	81.8	94	170	44.9	45	<0.002	0.03	21.6	0.020	1	<0.03	<0.1	0.7	<0.00010	<0.00010	0.012	**0.082**	<0.0010	<0.0010	<0.00050	<0.00050	15.1	15.8	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
	6-Sep-12	7.34	7.73	93.3	106	100	47.3	47	<0.002	<0.01	20.0	0.032	<1	<0.03	<0.1	1.1	<0.00010	<0.00010	0.017	**0.24**	<0.0010	<0.0010	<0.00050	<0.00050	13.3	13.7	<0.00010	<0.00010	<0.00010	0.00010	<0.00080
	6-Oct-12	8	7.4		64.8	<25	28.8	24.5	<0.002	0.031	31.6	0.0101	<1	<0.03	<0.1	1.39	<0.00010	**0.00092**	0.0271	**0.0822**	<0.0010	<0.0010	<0.00050	<0.00050	7.9	8.06	<0.00010	<0.00010	<0.00010	0.00010	<0.00080
TNGO-CRK-NT	9-Jan-12	6.74	7.27	139.7	124	170	69.8	58	<0.002	0.231	25.7	0.0781	<1	<0.03	<0.1	5.02	<0.00010	<0.00010	0.041	**0.305**	<0.0010	<0.0010	<0.00050	<0.00050	18.7	23.5	<0.00010	<0.00010	0.00032	0.00060	<0.00080
	10-Feb-12	7.13	7.62	206.1	186	190	103	87.4	<0.002	0.486	27.5	0.024	<1	<0.03	<0.1	2.46	<0.00010	<0.00010	0.0283	**0.117**	0.0010	<0.0010	<0.00050	<0.00050	27	31.3	<0.00010	<0.00010	0.00044	0.00054	0.0045
	8-Mar-12 *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5-Apr-12	6.38	6.90	75.8	69.5	<25	22.7	26.7	<0.002	0.04	13.6	0.014	<1	<0.03	<0.1	1.2	<0.00010	<0.00010	0.029	0.0563	<0.0010	<0.0010	<0.00050	<0.00050	7.92	9.19	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
	7-May-12	8.24	7.49	67.8	60.3	<25	174	28	<0.002	<0.01	10.9	0.0455	<1	<0.03	<0.1	0.63	<0.00010	<0.00010	0.0792	**0.89**	<0.0010	<0.0010	<0.00050	<0.00050	9.81	51.3	<0.00010	<0.00010	<0.00010	**0.00096**	<0.0010
	2-Jun-12	7.50	7.14	41.9	34.1	70	18.5	15.8	<0.002	<0.01	17.5	0.0097	<1	<0.03	<0.1	0.5	<0.00010	<0.00010	0.0293	**0.0757**	<0.0010	<0.0010	<0.00050	<0.00050	4.75	5.94	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
	12-Jul-12	7.14	7.46	50.1	68.9	220	29.7	26.3	<0.002	0.021	23	0.021	<1	<0.03	<0.1	0.5	<0.00010	<0.00010	0.0226	**0.094**	<0.0010	0.0011	<0.00050	<0.00050	9.72	9.69	<0.00010	<0.00010	<0.00010	0.00010	<0.0010
	3-Aug-12	7.06	7.43	79.7	88	<25	41.6	39	<0.002	0.04	21.7	<0.001	<1	<0.03	<0.1	0.6	<0.00010	<0.00010	0.016	**0.080**	<0.0010	0.0010	<0.00050	<0.00050	14.3	14.9	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
	6-Sep-12	7.33	7.51	112.4	129	110	56.6	55	<0.002	<0.01	19.8	0.036	<1	<0.03	<0.1	1.2	<0.00010	<0.00010	0.031	**0.226**	<0.0010	<0.0010	<0.00050	<0.00050	15.1	16.9	<0.00010	<0.00010	<0.00010	<0.00010	<0.00080
	4-Oct-12	7.1	7.34	-	54.2	40	24.1	20.5	<0.002	<0.01	32.5	0.0082	<1	<0.03	<0.1	1.19	<0.00010	**0.0001**	0.0268	0.0366	<0.0011	<0.0010	<0.00050	<0.00050	5.72	7.03	<0.00010	<0.00010	<0.00010	0.00010	<0.00080

NOTES

PWQO	Provincial Water Quality Objective
CEQG	Canadian Environmental Quality Guideline
0.001	PWQO Exceedance
0.001	CEQG Exceedance
*	Frozen-Dry; No water flow at this location
**	PWQO is for clay-free samples

Table 5-8: Surface Water Quality, Unnamed Tributary
(continued)

Parameter		Cr-T	Cu-D	Cu-T	Fe-D	Fe-T	Hg-D	Hg-T	Mg-D	Mg-T	Mn-D	Mn-T	Mo-D	Mo-T	Na-D	Na-T	Ni-D	Ni-T	Pb-D	Pb-T	K-D	K-T	Sb-D	Sb-T	Ti-D	Ti-T	Se-D	Se-T	Sr-D	Sr-T	V-D	V-T	Zn-D	Zn-T
units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
PWQO		0.0089		0.005		0.3		0.0002						0.04				0.025		0.001				0.02				0.1				0.006		0.02
CEQG								0.000026						0.073														0.001						0.03
EQWin Station Code	Collect Date																																	
TE-10-030C	27-Jul-11	0.0058	0.0021	**0.0060**	<0.020	0.13			0.587	5.01	<0.0010	0.0109	0.0057	0.0057	<0.10	273	<0.0010	0.0077	<0.0010	**0.0023**					<0.0010	0.0037			1.77	1.8	0.0034	0.0041	<0.0010	0.0122
	27-Jul-11	0.0041	0.0082	**0.0076**	<0.020	0.15			231	252	0.18	0.203	0.0279	0.0263	<0.10	744	0.018	0.0245	<0.0010	<0.0010					0.0025	0.0056			12.9	14.4	0.0108	**0.0113**	<0.0010	0.0095
	27-Jul-11	0.0032	0.0036	**0.0157**	<0.020	0.085			0.116	1.28	<0.0010	0.0073	0.0312	0.0308	180	267	0.0106	0.0159	<0.0010	<0.0010					<0.0010	0.0034			1.34	1.61	0.0057	0.0084	<0.0010	0.0072
TNGO-CRK-MN	9-Jan-12	<0.00080	<0.0010	<0.0010	2.01	2.61	<0.00010	<0.00010	1.97	2.55	0.278	0.34	<0.0010	<0.0010	1.85	2.17	<0.0010	0.0016	<0.0010	<0.0010	0.25	0.35	<0.00050	<0.00050	0.0016	0.0060	<0.0010	<0.0010	0.030	0.0359	<0.0010	<0.0010	<0.0010	<0.0010
	10-Feb-12	0.0031	<0.0010	0.0019	3.63	**6.03**	<0.00010	<0.00010	2.21	6.51	0.187	0.461	<0.0010	<0.0010	2.16	2.87	0.0015	0.0032	<0.0010	0.0012	0.44	0.77	<0.00050	<0.00050	0.0064	0.0707	<0.0010	<0.0010	0.0398	0.046	0.0018	0.0038	0.0028	0.011
	8-Mar-12 *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5-Apr-12	<0.0010	<0.0010	<0.0010	0.456	**0.832**	<0.00010	<0.00010	1.04	1.45	0.0352	0.0591	<0.0010	<0.0010	0.99	1.41	<0.0010	<0.0010	<0.0010	<0.0010	0.55	0.75	<0.00050	<0.00050	<0.0010	0.0029	<0.0010	<0.0010	0.0097	0.0099	<0.0010	<0.0010	0.0020	0.0018
	7-May-12	0.0078	0.0040	0.0032	0.28	**5.17**	<0.00010	<0.00010	0.686	8.77	0.0084	0.11	<0.0010	<0.0010	0.72	1.13	<0.0010	0.0052	<0.0010	**0.0019**	0.25	1.22	<0.00050	<0.00050	0.0039	0.218	<0.0010	<0.0010	0.0101	0.033	<0.0010	**0.010**	0.0032	0.0115
	2-Jun-12	<0.0010	<0.0010	<0.0010	0.19	**0.322**	<0.00010	<0.00010	0.645	1.01	0.0021	0.0152	<0.0010	<0.0010	0.77	0.77	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.10	<0.00050	<0.00050	<0.0010	0.0045	<0.0010	<0.0010	0.0059	0.0069	<0.0010	<0.0010	0.0020	0.0014
	12-Jul-12	<0.0010	<0.0010	<0.0010	0.668	**1.1**	<0.00010	<0.00010	1.27	1.45	0.0084	0.0395	<0.0010	<0.0010	1.13	1.12	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.10	<0.00050	<0.00050	<0.0010	0.0050	<0.0010	<0.0010	0.0081	0.013	<0.0010	<0.0010	<0.0010	<0.0010
	3-Aug-12	<0.0010	<0.0010	<0.0010	1.5	**1.8**	<0.00010	<0.00010	2.26	2.28	0.029	0.043	<0.0010	<0.0010	1.2	1.1	<0.0010	<0.0010	<0.00010	<0.0010	0.10	0.20	<0.00050	<0.00050	<0.0010	0.0030	<0.0010	<0.0010	0.024	0.026	<0.0010	<0.0010	<0.0010	0.0020
	6-Sep-12	<0.00080	<0.0010	<0.0010	0.87	**2.1**	<0.00010	<0.00010	2.45	2.85	0.012	0.142	<0.0010	<0.0010	1.2	1.5	<0.0010	<0.0010	<0.00010	<0.0010	0.30	0.40	<0.00050	<0.00050	<0.0010	0.013	<0.0010	<0.0010	0.034	0.036	<0.0010	<0.0010	<0.0010	0.0010
	6-Oct-12	<0.00080	<0.0010	<0.0010	0.454	**0.761**	<0.00010	<0.00010	1.5	1.6	0.0031	0.0251	<0.0010	<0.0010	1.46	1.53	<0.0010	<0.0010	<0.00010	<0.0010	0.29	0.32	<0.00050	0.0006	<0.0010	0.0037	<0.0010	<0.0010	0.0176	0.0304	<0.0010	<0.0010	0.0014	0.0027
TNGO-CRK-NT	9-Jan-12	<0.00080	<0.0010	<0.0010	2.05	**2.75**	<0.00010	<0.00010	1.98	2.67	0.308	0.39	<0.0010	<0.0010	1.89	2.2	<0.0010	0.0011	<0.0010	<0.0010	0.26	0.37	<0.00050	<0.00050	0.0020	0.0183	<0.0010	<0.0010	0.029	0.0342	0.0011	0.0010	0.0031	<0.0010
	10-Feb-12	<0.0010	<0.0010	<0.0010	3.89	**4.24**	<0.00010	<0.00010	2.44	3.21	0.394	0.409	<0.0010	<0.0010	2.36	3.02	0.0012	0.0014	<0.0010	<0.0010	0.48	0.55	<0.00050	<0.00050	0.0032	0.0070	<0.0010	<0.0010	0.0354	0.0365	0.0016	<0.0010	0.0030	0.0045
	8-Mar-12 *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5-Apr-12	<0.0010	<0.0010	<0.0010	0.453	**0.794**	<0.00010	<0.00010	0.98	1.19	0.0407	0.0569	<0.0010	<0.0010	0.96	1.18	<0.0010	<0.0010	<0.0010	<0.0010	0.52	0.61	<0.00050	<0.00050	<0.0010	0.0019	<0.0010	<0.0010	0.0090	0.0097	<0.0010	<0.0010	0.0015	0.0015
	7-May-12	0.0018	<0.0010	0.0021	0.279	**1.7**	<0.00010	<0.00010	0.72	9.47	0.0106	0.0987	<0.0010	<0.0010	0.72	0.76	<0.0010	0.0023	<0.0010	0.0017	0.25	0.43	<0.00050	<0.00050	0.0037	0.0421	<0.0010	<0.0010	0.0086	0.0337	<0.0010	0.0039	0.0021	0.0047
	2-Jun-12	<0.0010	<0.0010	<0.0010	0.20	**0.346**	<0.00010	<0.00010	0.586	0.893	0.0024	0.0169	<0.0010	<0.0010	0.66	0.66	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.10	<0.00050	<0.00050	<0.0010	0.0032	<0.0010	<0.0010	0.0050	0.0057	<0.0010	<0.0010	<0.0010	0.0012
	12-Jul-12	<0.0010	<0.0010	<0.0010	0.614	**1.1**	<0.00010	<0.00010	1.21	1.32	0.0071	0.0448	<0.0010	<0.0010	1.07	1.06	<0.0010	<0.0010	<0.0010	<0.0010	<0.10	<0.10	<0.00050	<0.00050	<0.0010	0.0053	<0.0010	<0.0010	0.0075	0.0119	<0.0010	<0.0010	0.0014	0.0012
	3-Aug-12	<0.0010	<0.0010	<0.0010	1.5	**1.9**	<0.00010	<0.00010	2.23	2.26	0.036	0.054	<0.0010	<0.0010	1.1	1.1	<0.0010	<0.0010	<0.00010	<0.0010	0.10	0.10	<0.00050	<0.00050	<0.0010	0.0030	<0.0010	<0.0010	0.023	0.025	<0.0010	<0.0010	<0.0010	0.0030
	6-Sep-12	<0.00080	<0.0010	<0.0010	0.51	**1.9**	<0.00010	<0.00010	2.85	3.41	0.077	0.143	<0.0010	<0.0010	1.2	1.6	<0.0010	<0.0010	<0.00010	<0.0010	0.30	0.50	<0.00050	<0.00050	0.0020	0.012	<0.0010	<0.0010	0.039	0.043	<0.0010	0.0010	0.0020	0.0030
	4-Oct-12	<0.00080	<0.0010	<0.0010	0.451	**0.681**	<0.00010	<0.00010	1.23	1.17	0.0038	0.0167	<0.0010	<0.0010	1.42	1.42	<0.0010	<0.0010	<0.00010	<0.0010	<0.10	<0.10	<0.00050	<0.00050	<0.0010	<0.0010	<0.0010	<0.0010	0.0163	0.017	<0.0010	<0.0010	<0.0010	<0.0010

NOTES

PWQO	Provincial Water Quality Objective
CEQG	Canadian Environmental Quality Guideline
0.001	PWQO Exceedance
0.001	CWQG Exceedance
*	Frozen-Dry; No water flow at this location
**	PWQO is for clay-free samples

Table 5-9: Surface Water Quality, Unnamed Tributary and Muskeg Ponds - Total Metals
(Data Provided By Neegan Naynowan Stantec LP)

ANALYSIS OF WATER - TOTAL METALS																				
Maxxam ID				EO8647	EO8648	EN1059	EN1077	EN1060	EN1062	EN1063	EN1061	EN1064	EN1065	EN1066	EN1078	EN1080	EN1079	EN1081	EO8649	EO8631
Sampling Date			**PWQO**	23/09/2012	23/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	23/09/2012	23/09/2012
COC Number			**MOEE**	36969204	36969204	36969201	36969202	36969201	36969201	36969201	36969201	36969201	36969201	36969201	36969202	36969202	36969202	36969202	36969204	36969203
Stantec Sample ID	**UNITS**	**RDL**	**1994**	**IP0397**	**IP0465**	**M-0535**	**M-0575**	**M-0578**	**M-0711**	**M-0713**	**M-0725**	**M-0727**	**M-0771**	**M-0811**	**M-0927**	**M-0954**	**M-0974**	**M-1038**	**MIDDLE POND**	**NB1**
Total Metals by ICPMS																				
Total Aluminum (Al)	ug/L	0.2	15, 75 (3)	24.8	31.8	11.7	19.8	23.9	22.1	31.6	30.7	33.2	30.7	30.6	29.8	31.9	28.1	31.2	26.6	50.1
Total Antimony (Sb)	ug/L	0.02	20	<0.020	<0.020	<0.020	0.162	0.024	<0.020	<0.020	<0.020	0.133	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Arsenic (As)	ug/L	0.02	100	0.622	0.693	0.573	0.58	0.681	0.474	0.598	0.617	0.504	0.531	0.67	0.485	0.549	0.606	0.537	0.427	0.516
Total Barium (Ba)	ug/L	0.02	-	1.84	2.56	7.18	6.79	6.46	1.61	2.68	2	1.86	2.23	2.5	1.68	2.22	2.44	2.06	0.964	1.88
Total Beryllium (Be)	ug/L	0.01	11 (4)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Bismuth (Bi)	ug/L	0.005	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Boron (B)	ug/L	50	200	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Total Cadmium (Cd)	ug/L	0.005	0.1 (4)	0.018	0.011	0.009	0.032	0.043	0.008	0.014	0.011	0.016	0.014	0.011	0.012	0.015	0.007	0.016	<0.0050	<0.0050
Total Chromium (Cr)	ug/L	0.1	100	0.37	0.38	0.79	0.66	0.44	0.5	0.47	0.62	0.43	0.49	0.53	0.41	0.5	0.51	0.61	0.29	0.52
Total Cobalt (Co)	ug/L	0.005	0.6	0.028	0.023	0.031	0.098	0.033	0.022	0.028	0.028	0.027	0.024	0.023	0.024	0.023	0.025	0.026	0.018	0.049
Total Copper (Cu)	ug/L	0.05	1, 5 (4)	0.607	0.133	0.397	0.378	1.32	0.292	0.59	0.604	0.327	0.489	0.618	0.371	0.432	0.481	0.693	0.05	0.118
Total Iron (Fe)	ug/L	1	300	298	305	185	385	414	153	260	148	306	214	166	154	155	153	149	183	747
Total Lead (Pb)	ug/L	0.005	5-25 (4)	0.092	0.163	0.139	0.112	0.247	0.181	0.251	0.145	0.261	0.184	0.194	0.203	0.175	0.172	0.191	0.037	0.063
Total Lithium (Li)	ug/L	0.5	-	<0.50	<0.50	1.46	1.06	1.28	<0.50	<0.50	0.74	<0.50	<0.50	0.71	<0.50	<0.50	0.69	<0.50	<0.50	0.57
Total Manganese (Mn)	ug/L	0.05	-	2.88	4.22	2.77	13.8	3.86	2.44	4.73	3.9	4.68	3.95	4.68	4.88	3.45	2.88	3.83	1.46	19.1
Total Mercury (Hg)	ug/L	0.002	0.2 (5)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Molybdenum (Mo)	ug/L	0.05	10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nickel (Ni)	ug/L	0.02	25	0.146	0.046	0.475	2.75	0.328	0.085	0.079	0.066	0.115	0.064	0.071	0.038	0.096	0.056	0.056	0.03	0.135
Total Selenium (Se)	ug/L	0.04	100	<0.040	<0.040	0.07	0.063	0.051	<0.040	0.068	0.063	0.069	0.051	0.04	0.04	0.057	0.05	0.074	<0.040	<0.040
Total Silicon (Si)	ug/L	100	-	879	699	3260	2860	852	200	356	108	448	392	236	304	236	238	318	289	1070
Total Silver (Ag)	ug/L	0.005	0.1	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Strontium (Sr)	ug/L	0.05	-	9.55	9.92	58	55.5	22.2	6.29	9.42	3.8	7.59	8.1	7.56	6.5	7.32	8.69	7.9	8.55	11
Total Thallium (Tl)	ug/L	0.002	0.3	<0.0020	<0.0020	0.003	0.002	0.003	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	<0.0020	<0.0020	<0.0020
Total Tin (Sn)	ug/L	0.2	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Titanium (Ti)	ug/L	0.5	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.6
Total Uranium (U)	ug/L	0.002	5	<0.0020	<0.0020	<0.0020	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.005
Total Vanadium (V)	ug/L	0.2	7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Zinc (Zn)	ug/L	0.1	20	3.02	2.53	1.63	2.62	3.12	2.01	2.87	1.79	3.09	2.56	2.85	2.46	2.18	1.77	2.29	1.54	1.93
Total Zirconium (Zr)	ug/L	0.1	4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Calcium (Ca)	mg/L	0.05	-	5.63	6.29	9.98	11.8	6.74	2.88	3.48	2.21	3.54	3.06	3	2.66	2.79	2.97	2.79	4.53	9.52
Total Magnesium (Mg)	mg/L	0.05	-	0.563	0.581	2.81	3.57	1.55	0.457	0.434	0.342	0.397	0.417	0.408	0.35	0.442	0.454	0.485	0.504	1.05
Total Potassium (K)	mg/L	0.05	-	0.129	0.11	0.18	0.145	0.287	0.121	<0.050	0.095	0.072	0.1	0.094	0.086	0.096	0.102	0.112	0.056	0.069
Total Sodium (Na)	mg/L	0.05	-	0.792	0.521	3.71	2.62	4.63	0.881	0.764	0.972	0.751	0.821	0.975	0.604	0.82	1.17	0.989	0.917	1.21
Total Sulphur (S)	mg/L	10	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total hardness as CaCO3 (mg/L)				16.4	18.1	36.5	44.3	23.2	9.08	10.5	6.93	10.5	9.36	9.16	8.1	8.79	9.28	8.96	13.4	28.1
pH	pH Units		6.5-8.5	6.8	7	7.35	7.58	6.75	6.44	5.93	6.01	5.64	6.02	5.87	5.74	6.03	6.33	6.63	6.91	7.3

RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
(1) Dissolved greater than total.
Reanalysis yields similar results.
(2) Matrix Spike outside acceptance criteria
(10% of analytes failure allowed)
(3) Variable - pH dependant.
pH 4.5-5.5: 15ug/L; pH 5.5-6.5: within 10% of background
pH 6.5-9.0: 75 ug/L
(4) Hardness dependant
(5) Filtered water sample
- No guideline
Shaded cells indicate exceedence of PWQOs

Table 5-9: Surface Water Quality, Unnamed Tributary and Muskeg Ponds - Total Metals
(Data Provided By Neegan Naynowan Stantec LP)
continued

EO8632	EO8629	EN1058	EN1057	EO8633	EO8634	EO8635	EO8636	EO8637	EO8638	EO8645	EO8646	EO8630	EN1083	EN1082	EO8650
23/09/2012	22/09/2012	16/09/2012	16/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	22/09/2012	16/09/2012	16/09/2012	23/09/2012
36969203	36969203	36969201	36969201	36969203	36969203	36969203	36969203	36969203	36969203	36969204	36969204	36969203	36969202	36969202	36969204
NB1 DUP	**NB2**	**NB3**	**NB6**	**NE 0203**	**NE0203 DUP**	**NW 0200**	**NW 0267**	**NW 0277**	**NW 0288**	**NW 0327**	**NW0327 DUP**	**TA1**	**W-0720**	**W-0925**	**WEST POND**
47.7	48.1	45.9	40	33.5	37.5	42.3	31.5	14.8	9.55	6.2	5.02	38.6	35.2	28.7	13.1
<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.025	<0.020
0.515	0.559	0.593	0.55	0.437	0.428	0.535	0.481	0.438	0.383	0.333	0.329	0.579	0.475	0.532	0.395
1.87	1.83	2.21	2.67	1.86	2.03	1.36	2.43	2.88	1.7	2.14	2.14	2.28	1.94	1.85	2.11
<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010
<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
<0.0050	<0.0050	0.011	<0.0050	0.013	0.016	0.011	<0.0050	0.006	<0.0050	0.007	0.011	<0.0050	0.013	0.014	0.007
0.42	0.37	0.5	0.51	0.29	0.37	0.42	0.41	0.33	0.39	0.33	0.36	0.36	0.56	0.48	0.43
0.051	0.045	0.066	0.041	0.019	0.0330 (3)	0.021	0.018	0.02	0.026	0.018	0.019	0.055	0.032	0.025	0.013
0.083	0.09	0.165	0.416	0.11	0.253	0.094	<0.050	0.162	0.078	0.136	0.18	0.19	0.505	0.715	0.149
729	758	924	593	76.2	76.1	352	529	220	257	251	258	874	157	175	209
0.053	0.053	0.137	0.15	0.131	0.139	0.113	0.101	0.04	0.035	0.027	0.033	0.03	0.317	0.28	0.048
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	0.53	<0.50	0.93	<0.50	<0.50	<0.50
17.9	18.7	32	13.5	13.6	13.7	3.29	2.04	3.49	1.42	1.63	1.68	4.06	8.16	5.72	6.87
<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
0.13	0.116	0.119	0.095	0.067	0.083	0.109	0.033	0.084	0.072	0.055	0.038	0.183	0.094	0.049	0.114
<0.040	0.042	0.068	<0.040	<0.040	<0.040	<0.040	0.049	0.084	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
1050	1040	968	855	130	134	523	206	179	188	226	233	1130	167	251	1060
<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
10.9	9.61	9.48	8.1	2.27	2.37	7.16	8.04	15.2	10.9	13.9	13.8	19.3	4.71	4.91	9.96
<0.0020	<0.0020	0.002	0.002	0.002	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.002	0.002	<0.0020
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.35	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1.02	1.25	1.23	0.69	<0.50	0.75	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	<0.50
0.005	0.004	0.002	0.004	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.021	<0.0020	<0.0020	<0.0020
<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2.08	2.02	2.35	2.3	2.07	2.23 (2)	2.43	1.88	1.05	1.4	0.97	0.97	1.55	3.24	2.69	1.5
<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
9.32	8.1	6.91	5.76	1.2	1.24	5.29	5.58	9.28	6.75	8.3	8.61	16.8	2.43	2.46	8.1
1.04	0.938	0.809	0.615	0.246	0.25	0.527	0.506	0.808	0.555	0.636	0.64	2.35	0.347	0.319	0.749
0.068	0.059	0.063	<0.050	0.138	0.141	0.11	0.111	0.219	0.128	0.141	0.15	0.15	0.073	0.066	0.157
1.25	1.17	1.15	1.04	0.375	0.388	0.737	0.86	1.9	1.03	1.25	1.26	2.47	0.633	0.592	0.826
<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
27.6	24.1	20.6	16.9	4.02	4.13	15.4	16	26.5	19.2	23.3	24.1	51.6	7.49	7.47	23.3
7.37	7.32	6.94	6.82	5.56	5.79	6.77	7.04	7.52	7.34	7.6	7.47	7.59	5.3	5.84	7.52

RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
(1) Dissolved greater than total.
Reanalysis yields similar results.
(2) Matrix Spike outside acceptance criteria
(10% of analytes failure allowed)
(3) Variable - pH dependant.
pH 4.5-5.5: 15ug/L; pH 5.5-6.5: within 10% of background
pH 6.5-9.0: 75 ug/L
(4) Hardness dependant
(5) Filtered water sample
- No guideline
Shaded cells indicate exceedence of PWQOs

Table 5-10: Surface Water Quality, Unnamed Tributary and Muskeg Ponds - General Chemistry
(Data Provided By Neegan Naynowan Stantec LP)

ANALYSES OF WATER - GENERAL CHEMISTRY																	
Maxxam ID			EO8647	EO8648	EN1059	EN1077	EN1060	EN1062	EN1063	EN1061	EN1064	EN1065	EN1066	EN1078	EN1080	EN1079	EN1081
Sampling Date		**PWQO**	23/09/2012	23/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012	16/09/2012
COC Number		**MOEE**	36969204	36969204	36969201	36969202	36969201	36969201	36969201	36969201	36969201	36969201	36969201	36969202	36969202	36969202	36969202
Stantec Sample ID	**UNITS**	**1994**	**IP0397**	**IP0465**	**M-0535**	**M-0575**	**M-0578**	**M-0711**	**M-0713**	**M-0725**	**M-0727**	**M-0771**	**M-0811**	**M-0927**	**M-0954**	**M-0974**	**M-1038**
Nitrite (N)	mg/L	-	<0.0050 (1)	<0.0050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)	<0.050 (1)
Calculated Parameters																	
Total Hardness (CaCO3)	mg/L	-	16.4	18.1	36.5	44.3	23.2	9.08	10.5	6.93	10.5	9.36	9.16	8.1	8.79	9.28	8.96
Nitrate (N)	mg/L	-	<0.020	<0.020	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Misc. Inorganics																	
Cyanide + Thiocyanate	mg/L	0.005	0.00108	0.00132	<0.00050	0.00062	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Fluoride (F)	mg/L	-	0.014	0.015	0.034	0.026	0.022	0.011	0.013	0.017	0.014	<0.010	0.01	<0.010	<0.010	0.012	0.016
Dissolved Hardness (CaCO3)	mg/L	-	13.3	15	36.7	43.2	22	9.31	10.2	6.12	9.26	9.33	8.92	7.74	8.49	9	8.7
Dissolved Organic Carbon (C)	mg/L	-	19.1	19.5	22	24.5	23.6	17.3	23.7	16.1	24.5	19.6	21.4	20.5	19.7	19.8	20.6
Total Residual Chlorine	mg/L	0.002			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Alkalinity (Total as CaCO3)	mg/L	-	7.19	8.6	28.4	38.3	8.55	4.37	3.41	2.22	1.87	3.3	2.76	2.77	3.33	4.4	4.65
Alkalinity (PP as CaCO3)	mg/L	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bicarbonate (HCO3)	mg/L	-	8.77	10.5	34.6	46.7	10.4	5.33	4.16	2.71	2.28	4.03	3.37	3.38	4.06	5.37	5.67
Carbonate (CO3)	mg/L	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hydroxide (OH)	mg/L	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Anions																	
Dissolved Sulphate (SO4)	mg/L	-	<0.50	<0.50	<5.0 (2)	<5.0 (2)	<5.0 (2)	<0.50	<5.0 (2)	<5.0 (2)	<5.0 (2)	<0.50	<5.0 (2)	<5.0 (2)	<5.0 (2)	<5.0 (2)	<5.0 (2)
Dissolved Chloride (Cl)	mg/L	-	1.3	1.4	8.3 (2)	5.9 (2)	13 (2)	1.4	<5.0 (2)	<5.0 (2)	<5.0 (2)	1.7	<5.0 (2)	<5.0 (2)	<5.0 (2)	<5.0 (2)	<5.0 (2)
Nutrients																	
Ammonia (N)	mg/L	0.02 (4)	0.092	0.1	0.051	0.051	0.082	0.075	0.049	0.046	0.05	0.056	0.059	0.038	0.049	0.051	0.064
Total Total Kjeldahl Nitrogen (Calc)	mg/L	-	0.675	0.901	0.78	0.78	1.04	0.89	0.75	0.84	0.81	0.81	0.8	0.66	0.79	0.96	0.8
Nitrate plus Nitrite (N)	mg/L	-	<0.020 (1)	<0.020 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)	<0.20 (1)
Total Nitrogen (N)	mg/L	-	0.675	0.901	0.777	0.785	1.04	0.89	0.745	0.84	0.807	0.81	0.803	0.66	0.792	0.956	0.796
Total Phosphorus (P)	mg/L	0.01	0.0108	0.018	0.006	0.0091	0.0088	0.0068	<0.0050	0.0106	0.0068	0.0064	0.0071	<0.0050	0.0061	0.0073	0.0072
Physical Properties																	
Conductivity	uS/cm	-	27.4	28.9	80.4	92.9	64	19.7	19.8	14.5	19.1	18.9	18.5	16.6	18	19.3	22.4
pH	pH Units	6.5-8.5	6.8	7	7.35	7.58	6.75	6.44	5.93	6.01	5.64	6.02	5.87	5.74	6.03	6.33	6.63
Total Suspended Solids	mg/L	-	<1.0	7.2	2.4	4.9 (2)	1.2	<1.0	1.2	1.5	12.2 (2)	7.2 (2)	<2.0 (2)	2.4 (2)	<2.0 (2)	<2.0 (2)	2.4 (2)
Total Dissolved Solids	mg/L	-	48	48	84	82	102	46	50	52	50	40	44	42	30	36	34
Demand Parameters																	
Chemical Oxygen Demand	mg/L	-	57	67													
Radionuclides																	
Radium 226 (Ra 226)	Bq/L	1															

RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
(1) Sample arrived to laboratory past recommended hold time.
(2) RDL raised due to limited initial sample amount.
(3) RDL raised due to sample matrix interference.
(4) Variable - pH and temperature dependant.
- No guideline

Shaded cells indicate exceedence of PWQOs

Table 5-10: Surface Water Quality, Unnamed Tributary and Muskeg Ponds - General Chemistry
(Data Provided By Neegan Naynowan Stantec LP)
continued

EO8649	EO8635	EO8633	EO8634	EO8636	EO8637	EO8638	EO8645	EO8646	EO8631	EO8632	EO8629	EN1058	EN1057	EO8630	EN1082	EN1083	EO8650	EP6490
23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	23/09/2012	22/09/2012	16/09/2012	16/09/2012	22/09/2012	16/09/2012	16/09/2012	23/09/2012	
36969204	36969203	36969203	36969203	36969203	36969203	36969203	36969204	36969204	36969203	36969203	36969203	36969201	36969201	36969203	36969202	36969202	36969204	36969203
MIDDLE POND	**NW 0200**	**NE 0203**	**NE0203 DUP**	**NW 0267**	**NW 0277**	**NW 0288**	**NW 0327**	**NW0327 DUP**	**NB1**	**NB1 DUP**	**NB2**	**NB3**	**NB6**	**TA1**	**W-0925**	**W-0720**	**WEST POND**	**TBLK**
<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.0050 (1)	<0.050 (1)	<0.050 (1)	<0.0050 (1)	<0.050 (1)	<0.050 (1)	<0.0050 (1)	<0.0050
13.4	15.4	4.02	4.13	16	26.5	19.2	23.3	24.1	28.1	27.6	24.1	20.6	16.9	51.6	7.47	7.49	23.3	
<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.027	0.028	<0.020	<0.020	<0.020	<0.20	<0.20	<0.020	<0.20	<0.20	<0.020	<0.020
0.00126	<0.00050	<0.00050	<0.00050	<0.00050	0.00091	<0.00050	<0.00050	0.00077	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	0.00067	<0.00050
0.013	0.013	0.011	0.018	0.014	0.02	0.016	0.022	0.017	0.021	0.017	0.017	0.014	0.013	0.021	0.013	0.01	0.02	<0.010
11.3	12.1	3.42	3.46	12.9	22.2	16.3	20.5	20	23.1	23.1	20.3	20.3	16.8	43.7	7.29	7.72	20.6	<0.50
17.8	20.3	11.1	11.6	18.8	17.6	14.5	12.8	11.6	19	18.9	19.3	23.2	21.2	15.8	20.2	21	13.2	
												<0.10	<0.10		<0.10	<0.10		0.66
7.54	7.12	0.82	1.09	8.75	22	15.5	24.5	21.7	21.6	21.1	20.4	13.4	10.5	42.1	2.42	1.01	20.2	<0.50
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
9.2	8.69	1	1.33	10.7	26.9	18.9	29.9	26.5	26.4	25.7	24.9	16.4	12.8	51.4	2.95	1.23	24.7	0.81
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0 (2)	<5.0 (2)	<0.50	<5.0 (2)	12.9 (2)	<0.50	<0.50
1.3	1.6	1.1	0.89	1.5	2.3	1.3	1.3	1.3	1.9	1.8	1.8	<5.0 (2)	<5.0 (2)	5	<5.0 (2)	<5.0 (2)	1.3	<0.50
0.073	0.086	0.088	0.079	0.098	0.13	0.1	0.16	0.15	0.11	0.1	0.079	0.046	0.047	0.062	0.044	0.043	0.1	<0.0050
0.688	0.752	0.528	0.606	0.668	0.997	0.707	0.757	0.747	0.586	0.593	1.42	0.67	0.63	0.536	0.64	0.73	0.573	0.066
<0.020 (1)	<0.020 (1)	<0.020 (1)	<0.020 (1)	<0.020 (1)	<0.020 (1)	<0.020 (1)	0.027 (1)	0.028 (1)	<0.020 (1)	<0.020 (1)	<0.020 (1)	<0.20 (1)	<0.20 (1)	<0.020 (1)	<0.20 (1)	<0.20 (1)	<0.020 (1)	<0.020
0.688	0.752	0.528	0.606	0.668	0.997	0.707	0.784	0.775	0.586	0.593	1.42 (2)	0.674	0.627	0.536	0.645	0.73	0.573	0.066
0.0081	0.0079	0.0145	0.0188	0.0078	0.0122	0.0087	0.0082	0.0099	0.0089	0.0099	0.0081	0.0064	<0.0050	0.0073	0.005	<0.0050	0.0121	
25.2	25.8	12.1	12.1	29.1	56.7	38.5	51	49.7	48.8	48.7	43.9	38.8	31.2	101	16.3	17.5	45	1.4
6.91	6.77	5.56	5.79	7.04	7.52	7.34	7.6	7.47	7.3	7.37	7.32	6.94	6.82	7.59	5.84	5.3	7.52	6.2
<1.0	1.6	5.0 (2)	5.8 (2)	<2.0 (2)	2.8 (2)	<1.0	<1.0	<1.0	2.4 (3)	3	1.5	1.7	<1.0	1.1	<2.0 (2)	<2.0 (2)	2.9 (2)	
38	34	12	12	26	46	32	40	36	46	50	40	56	62	62	42	42	40	<10
54	64	40	43	60	59	43	42	40	52	52	58			46			40	10

RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
(1) Sample arrived to laboratory past recommended hold time.
(2) RDL raised due to limited initial sample amount.
(3) RDL raised due to sample matrix interference.
(4) Variable - pH and temperature dependant.
- No guideline
Shaded cells indicate exceedence of PWQOs

Table 5-11: VMEP Area Surface Water Quality

	parameter	pH-L	Temp-Field	TSS-Lab	TDS	Cond-Lab	Alk-M	Hard-T	Chloride-Lab	SO4	C-DOC	Be-T	Ca-T	Cd-T	Cr-T	Co-T	Cu-T	Fe-T	Mg-T	Mn-T	Mo-T	Na-T	Ni-T	Pb-T	Ti-T	Sr-T	V-T	Zn-T	Ag-T	Total Hg Fi	Total Hg UnFi	Methyl Hg Fi	Methyl Hg UnFi
	units	pH	oC	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ng/L	ng/L	ng/L	ng/L
Station	**PWQO***	6.5 - 8.5										1.1 mg/L or 0.011 mg/L**		0.0001 mg/L	0.00089 mg/L	0.0009 mg/L	0.005 mg/L	0.3 mg/L			0.04 mg/L		0.025 mg/L	0.03 mg/L			0.006 mg/L	0.02 mg/L	0.0001 mg/L	0.0002 mg/L			
NGC US NWF	Avg	7.2	8.5	<2.22	98	98	39.4	42.2	3.02	1.7	18.2	0.001	10.9	0.0002	0.0009	0.0002	0.001	**0.4**	2.09	0.0584	<0.001	4.23	0.001	<0.001	0.0034	0.0219	<0.0010	0.0033	0.0001	1.58	2.25	0.0543	0.0771
	Min	6.5	-9.0	<0.40	<25	35	12.8	13.6	0.81	<1.0	12.0	<0.001	2.7	0.0001	0.0008	0.0001	0.001	0.0	0.47	0.0029	<0.001	0.68	<0.001	<0.001	<0.0010	<0.0053	<0.001	<0.0010	<0.0001	0.69	0.92	0.0270	0.0506
	Max	8.1	22.5	11.80	200	247	110.0	58.1	8.43	10.1	32.0	0.002	33.2	0.0008	0.0017	0.0005	0.003	**1.8**	5.87	0.3200	<0.001	15.80	0.002	<0.001	0.0106	0.0587	<0.001	0.0074	**0.0002**	2.96	4.36	0.0901	0.1133
	75 Percentile	7.6	16.9	2.60	163	127	51.9	55.7	4.14	1.7	20.9	<0.001	16.0	0.0001	0.0008	0.0002	0.001	**0.5**	3.29	0.0607	<0.001	4.97	0.001	<0.001	0.0042	0.0295	<0.001	0.0043	<0.0001	2.39	3.06	0.0652	0.0892
NGC DS NWF	Avg	7.4	8.5	3.68	116	135	52.2	—	4.41	3.8	17.8	0.001	12.2	0.0001	0.0009	0.0002	0.001	**0.4**	2.91	0.0371	<0.001	8.08	0.001	<0.001	0.0028	0.0337	0.001	0.0042	0.0001	1.55	2.30	0.1923	0.2008
	Min	6.8	-2.0	<0.40	<25	63	18.6	—	1.60	<1.0	12.1	<0.001	3.6	0.0001	0.0008	<0.0001	0.001	0.0	0.77	0.0036	<0.001	0.92	<0.001	<0.001	0.0010	0.0132	<0.001	<0.0010	<0.0001	0.66	1.04	0.0538	0.0738
	Max	8.0	20.9	86.50	270	204	85.4	—	10.80	17.0	24.9	0.002	27.6	0.0001	0.0024	0.0005	0.003	**1.8**	5.97	0.1900	<0.001	29.40	0.004	<0.001	0.0058	0.0620	0.004	0.0135	0.0001	2.59	4.59	0.4648	0.5556
	75 Percentile	7.7	17.3	<2.00	153	182	69.9	—	5.96	3.5	20.7	<0.001	17.6	0.0001	0.0008	0.0002	0.001	**0.5**	4.36	0.0406	<0.001	8.19	0.002	<0.001	0.0033	0.0482	<0.001	0.0050	<0.0001	2.31	3.06	0.2485	0.2073
NGC DS NEF	Avg	7.5	6.3	1.75	199	140	55.8	52.6	5.64	3.9	16.9	0.001	16.3	0.0001	0.0008	0.0002	0.001	**0.5**	3.21	0.0314	<0.001	8.30	0.001	<0.001	0.0025	0.0334	0.001	0.0035	0.0001	1.52	2.29	0.2815	0.3080
	Min	6.9	-1.4	<0.40	<25	51	15.2	15.0	1.90	<1.0	9.6	<0.001	3.9	0.0001	0.0008	<0.0001	0.001	0.0	0.79	0.0024	<0.001	1.34	<0.001	<0.001	<0.0010	0.0080	<0.001	<0.0010	<0.0001	0.70	1.04	0.2084	0.0913
	Max	8.1	21.3	6.50	4430	218	88.0	94.8	27.90	16.1	25.5	0.002	55.5	0.0001	0.0010	0.0004	0.003	**2.1**	13.40	0.1350	<0.001	32.30	0.003	<0.001	0.0053	0.0614	0.002	0.0096	**0.0005**	2.45	4.11	0.3864	0.5281
	75 Percentile	7.7	12.7	2.00	160	181	73.6	75.0	6.84	4.2	18.8	<0.001	22.3	0.0001	0.0008	0.0002	0.001	**0.8**	4.16	0.0402	<0.001	8.58	0.001	<0.001	0.0029	0.0489	<0.001	0.0043	<0.0001	2.16	3.05	0.3180	0.3911
NGC DS	Avg	7.7	6.1	<1.80	—	144	59.7	—	4.30	2.8	16.1	<0.001	17.5	0.0001	0.0008	<0.0002	0.001	**0.6**	3.41	0.0218	<0.001	6.39	<0.001	<0.001	0.0038	0.0339	<0.001	<0.0018	<0.0001	1.64	2.19	0.2127	0.2985
	Min	7.3	-0.8	<1.00	—	95	32.0	—	3.18	1.5	13.4	<0.001	8.8	0.0001	0.0008	<0.0001	0.001	**0.4**	2.32	0.0135	<0.001	4.51	<0.001	<0.001	0.0018	0.0245	<0.001	<0.0010	<0.0001	0.76	0.93	0.0448	0.1103
	Max	7.9	18.8	3.20	—	214	87.6	—	5.21	5.9	21.0	<0.001	30.2	0.0001	0.0008	0.0004	0.001	**0.8**	5.65	0.0343	<0.001	9.77	0.002	<0.001	0.0074	0.0493	0.001	0.0031	<0.0001	3.19	4.12	0.3247	0.4823
	75 Percentile	7.8	10.0	1.93	—	160	69.3	—	5.16	2.9	16.6	<0.001	19.3	0.0001	0.0008	0.0002	0.001	**0.6**	3.62	0.0236	<0.001	7.06	0.001	<0.001	0.0045	0.0363	<0.001	0.0024	<0.0001	2.07	2.88	0.2967	0.3926
SGC US SWF	Avg	6.7	5.8	<10.15	65	52	16.5	—	2.32	<1.0	18.8	<0.001	5.6	0.0001	0.0009	0.0002	0.002	**0.8**	0.81	0.0668	<0.001	2.51	<0.001	<0.001	0.0020	0.0102	0.001	0.0045	<0.0001	1.62	2.45	0.1718	0.0505
	Min	**6.2**	-1.4	<0.40	<25	35	8.3	—	1.00	<1.0	12.0	<0.001	1.9	0.0001	0.0008	<0.0001	0.001	0.2	0.37	0.0024	<0.001	1.24	<0.001	<0.001	<0.0010	0.0039	<0.001	<0.0010	<0.0001	0.75	1.50	0.0331	0.0345
	Max	7.6	19.6	61.10	160	87	29.6	—	4.21	<1.0	24.3	<0.001	11.1	0.0001	0.0013	0.0004	0.006	**2.3**	1.94	0.3190	<0.001	6.73	0.002	<0.002	0.0081	0.0208	0.002	0.0103	**0.0002**	2.71	3.67	0.4037	0.0745
	75 Percentile	6.8	11.9	3.93	100	54	20.6	—	3.11	<1.0	19.9	<0.001	7.1	0.0001	0.0008	0.0001	0.001	**0.9**	0.88	0.0816	<0.001	2.71	<0.001	<0.001	0.0018	0.0122	<0.001	0.0066	<0.0001	1.99	2.77	0.2412	0.0584
SGC DS SWF	Avg	7.4	6.2	4.47	84	102	41.0	—	3.66	1.8	16.0	<0.001	11.2	0.0001	0.0010	<0.0002	0.002	**0.5**	2.08	0.0305	<0.001	3.64	<0.003	<0.001	0.0041	0.0204	<0.001	0.0033	0.0001	1.38	2.16	0.2238	0.2997
	Min	6.7	-1.4	<0.40	<25	89	23.4	—	1.30	<1.0	4.2	<0.001	2.7	0.0001	0.0008	<0.0001	0.001	0.3	0.79	0.0045	<0.001	1.07	<0.001	<0.001	<0.0010	0.0073	<0.001	<0.0010	<0.0001	0.69	1.11	0.0837	0.1402
	Max	7.8	20.2	13.00	160	109	52.0	—	9.13	4.90	23.2	<0.001	21.8	0.0001	0.0024	0.0007	0.007	**1.0**	3.83	0.1110	<0.001	5.54	0.017	<0.001	0.0157	0.0396	0.003	0.0116	**0.0002**	2.30	3.57	0.5709	0.6548
	75 Percentile	7.6	12.0	6.38	130	107	49.4	—	4.41	2.0	17.9	<0.00	16.0	0.0001	0.0008	0.0002	0.001	**0.7**	2.99	0.0373	<0.001	4.12	0.003	<0.001	0.0052	0.0281	<0.001	0.0035	<0.0001	1.89	2.54	0.2398	0.3375
SCG DS	Avg	7.6	6.2	<3.00	—	138	57.8	—	3.54	3.1	15.9	0.001	19.3	0.0001	0.0008	<0.0003	0.001	**0.7**	3.23	0.0245	<0.001	5.07	<0.002	<0.001	0.0057	0.0308	<0.001	0.0025	**0.0003**	1.63	2.29	0.2259	0.1988
	Min	7.3	-2.7	<1.00	—	76	26.5	—	2.64	1.5	12.6	<0.001	9.8	0.0001	0.0008	<0.0001	0.001	**0.6**	1.78	0.0113	<0.001	4.18	<0.001	<0.001	0.0025	0.0173	<0.001	0.0016	<0.0001	0.96	1.18	0.0854	0.0340
	Max	7.8	20.8	4.20	—	214	87.6	—	5.39	5.3	21.5	0.001	31.2	0.0001	0.0008	0.0005	0.001	**0.8**	5.14	0.0364	<0.001	6.00	0.003	<0.001	0.0105	0.0467	<0.001	0.0034	**0.0007**	2.71	4.14	0.3477	0.4570
	75 Percentile	7.8	10.8	4.20	—	158	67.1	—	3.85	4.18	16.93	0.001	21.8	0.0001	0.0008	0.0003	0.001	**0.7**	3.97	0.0338	<0.001	5.86	0.002	<0.001	0.0071	0.0347	<0.001	0.0029	**0.0003**	2.04	2.76	0.2962	0.2813
GC CONF	Avg	7.7	7.2	3.98	150	166	68.5	70.6	4.91	2.7	14.4	<0.001	22.5	0.0001	0.0009	0.0003	0.001	**0.7**	3.94	0.0202	<0.001	8.46	0.002	<0.001	0.0064	0.0381	<0.001	0.0028	<0.0001	1.24	1.69	0.0612	0.2718
	Min	7.4	-0.9	2.40	100	122	57.0	56.2	3.64	1.2	13.1	<0.001	18.5	0.0001	0.0008	0.0001	0.001	**0.4**	2.40	0.0166	<0.001	5.22	<0.001	<0.001	0.0030	0.0280	<0.001	<0.0010	<0.0001	0.89	1.28	0.0480	0.1570
	Max	7.9	18.6	6.00	230	221	89.4	94.9	5.67	5.4	15.1	<0.001	30.7	0.0001	0.0010	0.0007	0.001	**1.2**	5.26	0.0246	<0.001	14.40	0.003	<0.001	0.0095	0.0483	<0.001	0.0056	<0.0001	1.63	2.34	0.0783	0.3865
	75 Percentile	7.8	12.9	4.88	163	187	74.3	74.8	5.39	3.4	15.0	<0.001	23.1	0.0001	0.0009	0.0003	0.001	**1.0**	5.19	0.0216	<0.001	10.09	0.003	<0.001	0.0091	0.0461	<0.001	0.0039	<0.0001	1.34	1.90	0.0678	0.3291
NR US SITE	Avg	7.8	6.9	3.18	143	253	97.3	96.6	16.77	4.2	12.8	<0.001	31.0	0.0001	0.0009	0.0004	0.001	**0.6**	4.84	0.0248	<0.001	15.56	0.003	<0.001	<0.0038	0.0595	<0.001	<0.0141	<0.0001	0.95	1.15	0.0532	0.1213
	Min	7.7	-0.7	1.40	90	150	83.7	61.4	5.99	1.7	10.3	<0.001	18.1	0.0001	0.0008	0.0001	0.001	0.3	2.84	0.0184	<0.001	5.08	0.001	<0.001	<0.0010	0.0297	<0.001	<0.0010	<0.0001	0.62	0.69	0.0450	0.0291
	Max	7.9	16.9	6.50	200	401	129.0	125.0	34.30	8.5	15.6	<0.001	40.4	0.0001	0.0010	**0.0011**	0.002	**1.2**	8.70	0.0321	<0.001	26.90	0.005	<0.001	0.0084	0.0939	0.001	0.0500	0.0001	1.35	1.90	0.0613	0.2674
	75 Percentile	7.9	12.6	3.73	178	274	100.0	110.8	18.78	4.6	14.6	<0.001	35.0	0.0001	0.0009	0.0004	0.001	**0.9**	5.72	0.0267	<0.001	20.80	0.004	<0.001	0.0049	0.0665	0.001	0.0159	0.0001	1.20	1.35	0.0572	0.1674
NS DS SITE	Avg	7.8	5.8	1.60	180	285	102.8	117.7	19.07	4.8	12.0	<0.001	34.5	0.0001	0.0009	0.0004	0.001	**0.7**	5.58	0.0156	<0.001	19.20	0.003	<0.001	0.0041	0.0676	<0.001	<0.0019	<0.0001	0.93	1.53	0.0577	0.0536
	Min	7.5	-0.7	1.20	110	225	86.5	98.2	11.60	3.1	10.8	<0.001	30.3	0.0001	0.0008	0.0001	0.001	0.2	3.21	0.0135	<0.001	13.60	0.001	<0.001	0.0020	0.0530	<0.001	<0.0010	<0.0001	0.46	0.66	0.0523	0.0330
	Max	7.9	16.9	2.40	300	402	131.0	145.0	32.10	7.8	13.5	<0.001	42.5	0.0001	0.0010	**0.0010**	0.001	**1.1**	8.54	0.0178	<0.001	24.80	0.006	<0.001	0.0079	0.0943	<0.001	0.0036	0.0001	1.53	2.53	0.0631	0.0760
	75 Percentile	7.9	9.1	1.80	215	316	111.0	127.5	22.80	5.7	12.6	<0.001	36.6	0.0001	0.0009	0.0005	0.001	**0.9**	6.77	0.0166	<0.001	22.00	0.004	<0.001	0.0051	0.0749	<0.001	0.0023	<0.0001	1.25	2.12	0.0604	0.0603
NR US ATTAW	Avg	7.7	6.8	2.28	140	257	93.4	102.3	16.48	3.9	12.9	<0.001	30.6	0.0001	0.0009	0.0004	0.001	**0.5**	4.72	0.0144	<0.001	15.82	0.003	<0.001	0.0038	0.0597	<0.001	<0.0018	<0.0001	1.13	1.51	0.0535	0.0767
	Min	7.5	-0.6	<0.40	100	146	57.6	58.6	5.53	1.5	10.7	<0.001	17.9	0.0001	0.0008	0.0001	0.001	0.2	2.71	0.0107	<0.001	4.95	0.001	<0.001	0.0019	0.0292	<0.001	<0.0010	<0.0001	0.62	0.98	0.0333	0.0765
	Max	7.9	17.1	5.50	170	413	135.0	136.0	33.30	7.4	16.2	<0.001	37.6	0.0001	0.0010	**0.0013**	0.001	**0.9**	8.06	0.0209	<0.001	25.60	0.007	<0.001	0.0087	0.0912	<0.001	0.0042	<0.0001	1.51	2.09	0.0737	0.0769
	75 Percentile	7.8	12.2	3.03	163	283	103.4	124.0	19.65	4.9	14.0	<0.001	35.1	0.0001	0.0009	0.0004	0.001	**0.7**	5.78	0.0162	<0.001	21.25	0.003	<0.001	0.0041	0.0706	<0.001	0.0018	<0.0001	1.34	1.78	0.0636	0.0768
AR US #2	Avg	7.7	7.1	2.25	98	147	69.4	74.5	2.05	<1.1	12.5	<0.001	21.5	0.0001	0.0008	0.0002	0.001	0.2	4.01	0.0141	<0.001	2.69	0.002	<0.001	0.0038	0.0321	<0.001	<0.0079	<0.0001	1.06	1.04	0.0348	0.0459
	Min	7.6	-1.2	<0.40	80	126	55.8	54.3	1.30	<1.0	10.3	<0.001	16.6	0.0001	0.0008	<0.0001	0.001	0.2	3.28	0.0051	<0.001	1.87	0.001	<0.001	0.0011	0.0241	<0.001	<0.0010	<0.0001	0.67	0.70	0.0239	0.0370
	Max	7.9	16.2	4.40	120	198	92.6	97.0	3.70	1.5	15.5	<0.001	27.2	0.0001	0.0008	0.0006	0.001	**0.3**	5.33	0.0293	<0.001	4.53	0.004	<0.001	0.0103	0.0475	<0.001	0.0263	<0.0001	1.35	1.36	0.0457	0.0547
	75 Percentile	7.8	14.5	3.35	113	150	73.2	79.8	2.28	1.1	13.0	<0.001	24.3	0.0001	0.0008	0.0003	0.001	0.3	4.28	0.0193	<0.001	2.78	0.003	<0.001	0.0041	0.0343	<0.001	0.0091	<0.0001	1.30	1.22	0.0403	0.0503
AR US SITE	Avg	7.7	6.8	8.73	128	136	65.7	132.8	1.32	<1.0	13.0	<0.001	21.5	0.0001	0.0011	<0.0002	0.021	**0.5**	3.69	0.0237	<0.001	1.91	<0.003	<0.001	0.0077	0.0291	0.001	0.0029	0.0001	1.18	2.12	0.0435	0.0572
	Min	7.3	-1.2	<0.42	40	76	40.5	40.8	0.38	<1.0	10.0	<0.001	8.9	0.0001	0.0008	<0.0001	0.001	0.1	2.25	<0.0010	<0.001	0.92	<0.001	<0.001	<0.0010	0.0181	<0.001	<0.0010	<0.0001	0.78	1.12	0.0220	0.0285
	Max	8.1	19.2	34.10	330	202	95.0	814.0	2.73	1.4	17.2	<0.001	36.2	0.0001	0.0029	0.0007	0.243	**1.7**	6.21	0.0902	<0.001	3.66	0.025	<0.001	0.0362	0.0466	0.002	0.0118	**0.0006**	1.99	3.51	0.0685	0.0976
	75 Percentile	7.8	15.2	12.60	143	151	73.7	95.5	1.73	<1.0	14.5	<0.001	26.1	0.0001	0.0008	0.0003	0.001	**0.4**	3.67	0.0246	<0.001	2.16	0.002	<0.001	0.0073	0.0344	0.001	0.0036	<0.0001	1.26	2.76	0.0583	0.0713
AR DS DISCH	Avg	7.8	6.5	4.77	135	165	67.0	73.6	6.62	3.0	13.0	<0.001	21.2	0.0001	0.0009	<0.0002	0.001	**0.3**	4.47	0.0160	<0.001	5.30	<0.002	<0.001	0.0049	0.0434	<0.001	<0.0052	<0.0001	1.10	1.70	0.0367	0.0505
	Min	7.5	-1.2	<0.40	80	80	38.9	40.2	1.30	1.0	10.4	<0.001	12.4	0.0001	0.0008	<0.0001	0.001	0.1	2.58	0.0033	<0.001	1.97	<0.001	<0.001	<0.0010	0.0162	<0.001	<0.0010	<0.0001	0.73	0.93	0.0209	0.0252
	Max	8.0	17.6	21.30	240	256	93.3	115.0	13.40	5.8	15.0	<0.001	32.0	0.0001	0.0014	0.0005	0.001	**0.6**	6.87	0.0382	<0.001	9.17	0.004	<0.001	0.0152	0.0760	0.001	0.0265	<0.0001	2.06	3.83	0.0719	0.0743
	75 Percentile	7.8	13.7	5.82	153	184	76.4	81.9	7.96	3.8	14.2	<0.001	23.8	0.0001	0.0008	0.0001	0.001	0.3	4.83	0.0219	<0.001	6.16	0.003	<0.001	0.0075	0.0538	<0.001	0.0067	<0.0001	1.22	1.95	0.0418	0.0641
AR DS OF NR	Avg	7.8	7.1	2.75	143	195	75.3	83.7	9.01	3.2	12.0	0.001	22.6	0.0001	0.0008	0.0003	0.001	0.3	4.96	0.0154	<0.001	9.16	0.002	<0.001	0.0042	0.0533	<0.001	<0.0034	<0.0001	1.04	1.30	0.0333	0.0377
	Min	7.7	-1.1	0.81	130	150	56.5	60.1	4.31	2.2	9.6	<0.001	14.1	0.0001	0.0008	<0.0001	0.001	0.1	4.04	0.0045	<0.001	4.33	0.001	<0.001	0.0016	0.0321	<0.001	<0.0010	<0.0001	0.90	0.77	0.0302	0.0345
	Max	7.9	17.8	4.60	160	315	109.0	125.0	20.70	6.0	15.2	0.001	35.6	0.0001	0.0008	0.0006	0.001	**0.5**	6.92	0.0281	<0.001	21.20	0.003	<0.001	0.0089	0.0834	<0.001	0.0059	<0.0001	1.33	1.95	0.0363	0.0414
	75 Percentile	7.8	13.4	4.15	153	202	80.7	90.3	9.53	3.4	12.7	0.001	24.8	0.0001	0.0008	0.0003	0.001	**0.4**	5.33	0.0217	<0.001	9.64	0.002	<0.001	0.0052	0.0575	<0.001	0.0057	<0.0001	1.08	1.57	0.0348	0.0394

NOTES:
Data summarized above respresent samples collected in 2011.
*PWQO: Provincial Water Quality Objectives (Water Management Policies Guidelines Provincial Water Quality Objectives of the Ministry of Environment and Energy, July 1995, reprinted February 1999)
** hardness <75 mg/L,PWQO = 0.011mg/L, hardness > 75 mg/L,PWQO= 1.1 mg/L

Table 5-12: Sediment Quality, VMEP Area
(provided by Neegan Naynowan Stantec LP)

CSR/CCME METALS IN SOIL (SEDIMENT)																							
Maxxam ID			PSQO	EO8669	EO8670	EO8673	EO8691	EQ5721	EQ5720	EQ5719	EO8671	EQ5718	EO8692	EO8676	EO8674	EO8653	EO8654	EO8675	EO8652	EO8651	EO8667	EQ5722	EO8696	EO8722	EO8694
Sampling Date			MOEE	22/09/2012	21/09/2012	18/09/2012	18/09/2012	25/09/2012	25/09/2012	25/09/2012	21/09/2012	25/09/2012	15/09/2012	15/09/2012	18/09/2012	20/09/2012	20/09/2012	18/09/2012	19/09/2012	19/09/2012	20/09/2012	25/09/2012	15/09/2012	15/09/2012	15/09/2012
COC Number			1993	36969205	36969205	36969205	36969208	36969206	36969206	36969206	36969205	36969206	36969208	36969205	36969205	36969204	36969204	36969205	36969204	36969204	36969205	36969206	36969208	36969209	36969208
	UNITS	RDL	LEL	IP0397	IP0465	M0535	M0575	M0578	M0711	M0713	W0720	M0725	M0727	M0771	M0811	W0925	W0925D	M0927	M0954	M0974	M1038	MIDDLE POND	NB3-1	NB3-2	NB3-3
Total Metals by ICPMS																									
Total Aluminum (Al)	mg/kg	100	-	915	799	1440	2710	1120	996	885	1390	918	981	843	695	1400	1140	1060	832	1280	1350	2500	4540	5970	6120
Total Antimony (Sb)	mg/kg	0.1	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Arsenic (As)	mg/kg	0.5	6	1.56	2.04	1.49	2.66	2.5	1.78	1.17	1.51	1.67	2.03	1.28	0.81	1.46	1.51	1.02	0.72	1.34	1.15	2.18	1.24	1.75	1.59
Total Barium (Ba)	mg/kg	0.1		27	27	35.8	38.5	26.9	15.2	17.4	14.7	22.5	26.6	27.5	16.1	20.6	17.5	21	17.4	21.9	20.4	25.2	10.1	18.6	19.6
Total Beryllium (Be)	mg/kg	0.4		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Total Bismuth (Bi)	mg/kg	0.1		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Boron (B)	mg/kg	1		5.6	4	7.2	12.4	4.2	4.3	3.3	3.3	2.4	3.8	4.3	4.5	3.8	3.7	3.5	2.3	5.1	4	4.2	3.3	3.6	4.1
Total Cadmium (Cd)	mg/kg	0.05	0.6	0.245	0.348	0.323	0.59	0.408	0.37	0.282	0.497	0.336	0.306	0.324	0.086	0.377	0.483	0.074	0.272	0.452	0.422	0.514	0.165	0.217	0.228
Total Calcium (Ca)	mg/kg	100		8090	9740	11200	16400	9610	12600	8660	9460	8510	11100	11400	4870	9120	9420	3820	8020	10800	8960	14800	16900	11000	9560
Total Chromium (Cr)	mg/kg	1	26	1.7	1.8	3.2	19.9	2.5	1.4	1.3	3.1	1.6	3	1.9	1.7	3.4	2.2	2.3	1.4	2.7	3.1	5.9	13.4	16.8	16.4
Total Cobalt (Co)	mg/kg	0.3		0.34	0.46	0.7	4.7	0.58	0.44	0.35	0.63	0.41	0.51	0.35	<0.30	0.62	0.53	<0.30	0.37	0.65	0.55	1	2.97	3.75	3.44
Total Copper (Cu)	mg/kg	0.5	16	1.16	1.16	3.94	5.35	1.73	1.65	1.36	2.06	2.28	1.65	1.39	1.14	7.58	1.64	1.25	1.6	1.87	1.91	3.06	2.55	3.57	3.41
Total Iron (Fe)	mg/kg	100	20000	6670	5340	5600	9550	7370	6010	4480	3300	3750	6340	5060	2990	4090	3660	3930	3820	5770	3840	6610	9770	12700	11100
Total Lead (Pb)	mg/kg	0.1	31	1.64	2.33	1.98	8.94	5.28	4.44	3.64	4.79	6.11	4.75	4.68	1.33	4.06	4.34	1.09	4	4.25	3.83	7.75	2.59	3.73	3.78
Total Lithium (Li)	mg/kg	5		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.9	8.8	9
Total Magnesium (Mg)	mg/kg	100		527	498	1060	8770	936	544	502	549	424	623	514	526	651	570	573	441	627	666	863	4990	4780	3820
Total Manganese (Mn)	mg/kg	0.2	460	41.1	47.3	65.4	166	56.8	60.7	39.8	48.6	40.2	54.8	52.6	28.1	56.4	52.5	31.4	47.7	62.6	56.1	73.1	123	238	118
Total Mercury (Hg)	mg/kg	0.05	0.2	0.059	0.057	0.065	0.09	0.051	<0.050	<0.050	0.075	<0.050	0.063	0.069	<0.050	0.076	0.072	0.057	<0.050	0.07	0.066	0.052	<0.050	<0.050	<0.050
Total Molybdenum (Mo)	mg/kg	0.1		0.25	0.25	0.3	0.57	0.23	0.17	0.17	0.18	0.2	0.2	0.17	0.11	0.27	0.18	0.17	0.11	0.23	0.16	0.23	<0.10	<0.10	0.1
Total Nickel (Ni)	mg/kg	0.8	16	<0.80	<0.80	1.93	48.6	1.53	1.08	0.87	1.65	1.29	1.21	<0.80	<0.80	2.1	1.05	<0.80	0.94	1.39	1.51	2.99	6.55	7.6	7.6
Total Phosphorus (P)	mg/kg	10		242	232	273	419	368	284	271	271	253	290	321	237	390	268	233	203	310	253	328	374	450	371
Total Potassium (K)	mg/kg	100		<100	<100	<100	395	121	<100	<100	110	101	<100	<100	<100	<100	<100	<100	<100	<100	118	242	408	502	552
Total Selenium (Se)	mg/kg	0.5		1.08	1.06	1.24	1.23	0.91	0.91	0.75	1.38	0.71	1.58	1	0.85	1.21	1	0.87	0.9	1.32	1.26	1.15	<0.50	<0.50	0.53
Total Silver (Ag)	mg/kg	0.05		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Sodium (Na)	mg/kg	100		<100	<100	140	469	146	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total Strontium (Sr)	mg/kg	0.1		26	22.9	52.9	225	27.1	26.9	22.2	19.9	19.9	36.6	34.1	20.6	29.9	28.1	21.2	22.1	34.1	28.6	26.2	16.5	13.2	12.8
Total Thallium (Tl)	mg/kg	0.05		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.064	0.059
Total Tin (Sn)	mg/kg	0.1		0.3	0.12	0.13	0.24	1.06	1.07	0.85	0.21	0.76	<0.10	<0.10	<0.10	0.89	0.26	<0.10	0.15	0.32	0.23	1.26	0.22	0.28	0.28
Total Titanium (Ti)	mg/kg	1		12	13.6	31.3	132	27.8	21.5	16.7	37.6	25.2	20.1	16.9	12.8	23.5	22.4	18.4	21.2	27.4	37.2	114	544	490	524
Total Uranium (U)	mg/kg	0.05		<0.050	<0.050	0.094	0.262	0.092	0.053	<0.050	0.096	0.055	0.066	0.052	<0.050	0.081	0.064	0.056	0.055	0.105	0.077	0.191	0.3	0.389	0.37
Total Vanadium (V)	mg/kg	2		<2.0	<2.0	2	6.2	3.2	<2.0	<2.0	<2.0	2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	4.9	17.1	18.6	17.9
Total Zinc (Zn)	mg/kg	1	120	29.4	31.7	37.5	69.6	36.4	33.2	29.6	45.1	31.4	40.7	31	16.1	50.7	41.2	20.3	27	43.5	38.2	46.7	25.4	36.6	36.4
Total Zirconium (Zr)	mg/kg	0.5		<0.50	<0.50	0.87	3.08	1.03	0.61	0.87	0.96	0.55	0.66	<0.50	<0.50	0.89	0.58	<0.50	0.56	0.96	0.96	2.77	3.34	3.74	4.02
Physical Properties																									
Soluble (2:1) pH	pH Units	0.01	-	5.72 (3)	5.68 (3)	28.1		51 (4)	62 (4)	61 (4)	5.53 (2)	62 (4)	51.4	89.6	55.8	5.55 (2)	5.54 (3)		5.34	4.69 (1)	5.59 (1)	56 (4)	78.7	39.1	43.4
200 mesh (>.075 mm)	%	2	-			5.72 (1)	6.54 (6)						5.21 (6)	5.12	5.04 (1)			5.23 (5)					7.9	7.02	7.35
200 mesh (<.075 mm)	%	2	-			72							48.6	10.4	44.2								21.4	60.9	56.6
% sand by hydrometer	%	2	-					5.40 (3)	5.56 (3)	5.65 (2)		5.18 (1)										5.69 (3)			
% silt by hydrometer	%	2	-					39 (4)	35 (4)	34 (4)		31 (4)										37 (4)			
Clay Content	%	2	-					5.3 (4)	<2.0 (4)	4.7 (4)		3.2 (4)										6.1 (4)			
Gravel	%	2	-					4.6 (4)	2.7 (4)	<2.0 (4)		4.6 (4)										<2.0 (4)			

Data summarized above respresent samples collected in 2012.
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
(1) Due to insufficient sample, water:soil extration ratio has changed from 2:1 to 5:1 in order to analyse sample.
(2) Due to insufficient sample, water:soil extration ratio has changed from 2:1 to 3:1 in order to analyse sample.
(3) Due to insufficient sample, water:soil extration ratio has changed from 2:1 to 4:1 in order to analyse sample.
(4) Due to high absorbtivity of the sample, the water soil extraction ratio has changed from 2:1 to 4:1.
(5) Due to insufficient sample, water:soil extration ratio has changed from 2:1 to 10:1 in order to analyse sample.
(6) Due to high absorbtivity of the sample, the water soil extraction ratio has changed from 2:1 to 3:1.
Shaded cells exceed PSQOs

Table 5-12: Sediment Quality, VMEP Area
(provided by Neegan Naynowan Stantec LP)

CSR/CCME METALS IN SOIL (SEDIMENT)																	
Maxxam ID			PSQO	EO8695	EO8699	EO8698	EO8693	EO8700	EO8723	EO8697	EO8668	EQ5725	EQ5727	EQ5726	EQ5723	EQ5724	EO8672
Sampling Date			MOEE	15/09/2012	15/09/2012	15/09/2012	15/09/2012	15/09/2012	15/09/2012	15/09/2012	22/09/2012	26/09/2012	25/09/2012	26/09/2012	26/09/2012	26/09/2012	23/09/2012
COC Number			1993	36969208	36969208	36969208	36969208	36969208	36969209	36969208	36969205	36969206	36969206	36969206	36969206	36969206	36969205
	UNITS	RDL	LEL	NB3-4	NB3-5	NB6-1	NB6-2	NB6-3	NB6-4	NB6-5	NE0203	NW-0200	NW-0267	NW-0277	NW-0288	NW-0327	WEST POND
Total Metals by ICPMS																	
Total Aluminum (Al)	mg/kg	100	-	7660	7040	4830	3970	6120	4430	4540	2120	2780	2820	2900	2820	1320	1300
Total Antimony (Sb)	mg/kg	0.1	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Arsenic (As)	mg/kg	0.5	6	1.97	2.38	1.18	1.14	1.36	1.82	1.12	1.76	2.42	2.46	2.38	2.6	2.69	4.45
Total Barium (Ba)	mg/kg	0.1		24.1	27.2	16.3	13.9	14.8	16.9	14.6	14.8	20.2	24.4	26.7	22.2	16.6	20.1
Total Beryllium (Be)	mg/kg	0.4		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Total Bismuth (Bi)	mg/kg	0.1		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Boron (B)	mg/kg	1		4.1	4	3.3	1.7	4	2.8	2.6	4.3	5.2	4.3	5.9	3.6	5.3	4.7
Total Cadmium (Cd)	mg/kg	0.05	0.6	0.278	0.312	0.233	0.152	0.202	0.193	0.227	0.066	0.732	0.595	0.448	0.713	0.366	0.556
Total Calcium (Ca)	mg/kg	100		7300	6840	4200	10500	20200	4690	4240	2000	14500	9820	7920	13800	11600	12900
Total Chromium (Cr)	mg/kg	1	26	20	18.2	12.3	11.1	18.5	11	12.5	3	6.2	6	5.7	5.8	2.4	2.5
Total Cobalt (Co)	mg/kg	0.3		4.07	4.13	2.33	0.96	4.03	2.12	2.46	0.43	1.4	2.13	2.37	1.51	1.6	1.08
Total Copper (Cu)	mg/kg	0.5	16	3.63	3.75	2.45	3.03	2.97	2.21	1.97	1.41	2.77	2.62	2.44	2.39	1.67	2.05
Total Iron (Fe)	mg/kg	100	20000	14600	13600	8220	3990	12700	9280	9020	4150	8800	10300	10600	9690	8430	11100
Total Lead (Pb)	mg/kg	0.1	31	4.72	4.78	3.84	3.21	3.64	4.83	3.93	0.26	3.66	5.47	4.21	6.88	2.1	5.2
Total Lithium (Li)	mg/kg	5		10.1	9.7	6.7	<5.0	9.2	5.2	6.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Magnesium (Mg)	mg/kg	100		3720	3280	2020	631	6580	1550	2070	608	883	904	956	890	445	515
Total Manganese (Mn)	mg/kg	0.2	460	234	272	139	174	184	200	150	55.7	81.6	66.5	78.5	79	62	117
Total Mercury (Hg)	mg/kg	0.05	0.2	<0.050	<0.050	<0.050	0.068	<0.050	<0.050	<0.050	<0.050	0.054	<0.050	<0.050	<0.050	<0.050	<0.050
Total Molybdenum (Mo)	mg/kg	0.1		0.11	0.11	<0.10	0.15	<0.10	<0.10	<0.10	0.38	0.27	0.24	0.25	0.19	0.23	0.28
Total Nickel (Ni)	mg/kg	0.8	16	8.4	8.07	5.42	3.29	8.84	4.33	5.36	0.83	3.36	4.08	3.57	3.72	1.93	1.51
Total Phosphorus (P)	mg/kg	10		500	455	326	402	361	318	335	150	309	301	263	333	235	264
Total Potassium (K)	mg/kg	100		683	619	438	202	567	383	355	<100	264	301	333	245	124	121
Total Selenium (Se)	mg/kg	0.5		<0.50	<0.50	<0.50	0.75	<0.50	0.54	<0.50	1.17	1.17	0.85	0.8	1.09	0.84	1.08
Total Silver (Ag)	mg/kg	0.05		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Sodium (Na)	mg/kg	100		<100	<100	<100	148	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total Strontium (Sr)	mg/kg	0.1		14.8	12.8	11.3	16.2	19	11.1	9.97	15.5	20.6	15.9	15.4	21	17.6	16.6
Total Thallium (Tl)	mg/kg	0.05		0.08	0.072	0.05	<0.050	0.054	0.052	0.054	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Tin (Sn)	mg/kg	0.1		0.31	0.33	0.22	0.16	0.22	0.23	0.24	0.25	0.57	0.31	0.18	0.36	0.37	0.38
Total Titanium (Ti)	mg/kg	1		545	500	414	214	555	317	445	24.1	115	111	126	105	41.9	35
Total Uranium (U)	mg/kg	0.05		0.434	0.396	0.328	0.387	0.371	0.303	0.288	0.124	0.181	0.167	0.15	0.152	0.072	0.117
Total Vanadium (V)	mg/kg	2		21.5	19.7	14	8.6	19.1	12.6	14.5	2.6	5.4	6.4	6.8	5.5	2.2	3.5
Total Zinc (Zn)	mg/kg	1	120	54.3	50.5	30.4	6.6	32	32.3	30.1	27.2	79.6	91.8	76.6	74.8	76.6	58
Total Zirconium (Zr)	mg/kg	0.5		4.05	3.38	2.61	2.72	3.95	1.98	2.6	0.74	3.3	3.03	2.71	2.91	1.12	1.22
Physical Properties																	
Soluble (2:1) pH	pH Units	0.01	-	31.7	27.6	42.6	8.2	72.3	45.1	64.1	5.54 (4)	61 (4)	56 (4)	77 (4)	50 (4)	66 (4)	5.94
200 mesh (>.075 mm)	%	2	-	6.22	6.3	6.01	6.28 (3)	7.68	5.48	5.83							
200 mesh (<.075 mm)	%	2	-	68.3	72.4	57.5	91.8	27.7	54.9	35.9							
% sand by hydrometer	%	2	-									5.79 (3)	5.80 (3)	5.98 (3)	5.63 (3)	6.01 (3)	
% silt by hydrometer	%	2	-									34 (4)	37 (4)	19 (4)	41 (4)	31 (4)	
Clay Content	%	2	-									4.9 (4)	4.8 (4)	2.8 (4)	8.5 (4)	2.7 (4)	
Gravel	%	2	-									<2.0 (4)	<2.0 (4)	<2.0 (4)	<2.0 (4)	<2.0 (4)	

Data summarized above respresent samples collected i
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
(1) Due to insufficient sample, water:soil extration rat
(2) Due to insufficient sample, water:soil extration rat
(3) Due to insufficient sample, water:soil extration rat
(4) Due to high absorbtivity of the sample, the water
(5) Due to insufficient sample, water:soil extration rat
(6) Due to high absorbtivity of the sample, the water
Shaded cells exceed PSQOs

Table 5-13: Terrestrial Species at Risk Known or Potentially Present in the VMEP Area

MAMMALS	Federal (SARA)	Provincial (ESA)
Wolverine	SC	THR
Caribou	THR	THR
Little Brown Bat	NAR	E
Northern Long-eared Bat	NAR	E
BIRDS		
Bald Eagle	NAR	SC
Short-eared Owl	SC	SC
Yellow Rail	SC	SC
Short-eared Owl	SC	SC
Common Nighthawk	THR	SC
Olive-sided Flycatcher	THR	SC
Barn Swallow	THR	THR
Rusty Blackbird	SC	NAR

Notes: E – Endangered, NAR – Not at Risk, SC – Special Concern, THR– Threatened
ESA: *Endangered Species Act*
SARA: *Species at Risk Act*

Table 5-14: Preliminary Summary of Potential Environmental Effects

Environmental Component	Potential Effect (Preliminary)
Air Quality, Noise and Greenhouse Gasses	Air emissions from the VMEP site have the potential to generate dust or products of petroleum hydrocarbon combustion that could potentially affect human health, and plant and animal health. Noise emissions from the VMEP site have limited potential to disturb other area users, as the site is remote from other land users. Greenhouse gasses associated with Project construction and operation has a minor potential to contribute to global carbon dioxide emissions and the associated phenomenon of climate change.
Unnamed Tributary	Open pit development has the potential to overprint muskeg ponds. Pit dewatering has the potential to reduce downstream flow in the existing stream channel (but is returned to the environment elsewhere).
North Granny Creek	Stockpile development may overprint small areas of the headwaters (and therefore potentially modify flows in the channel remaining) depending on water management practices.
Attawapiskat River	Groundwater from pit dewatering operations will be discharged to the Attawapiskat River, and may affect have a very localized effect on water quality.
Groundwater System	Open pit dewatering has the potential to drawdown local aquifers. The minor creeks appear to be perched and may not be affected. Groundwater quality is not expected to be affected.
Large Predators	Limited effect if any due to general lack of presence.
Furbearers	Minimal impact (on Marten etc.) as there is minimal terrestrial habitat present. Potential local effect on aquatic furbearers (beaver, otter) due to potential effects on unnamed tributary.
Migratory Birds	Mine site development will displace existing terrestrial habitat and muskeg ponds which are otherwise very common in the immediate project footprint. Impacts are anticipated to be minimal.
SAR	Mine site development will displace existing habitat which is otherwise very common in the immediate project footprint. Impacts are anticipated to be minimal.
Hunting, Fishing and Tourism	No effect on tourism is expected as the VMEP is located on private lands where access is controlled. The VMEP is located within the existing no hunting buffer zone (defined within the Impact Benefit Agreement for safety reasons).
Commercial Operations (Mining, Aggregates and Forestry)	The VMEP will improve industrial pursuits in the region by extending the life of the winter road between the VMEP and the coast, which is used by the community and other commercial ventures.
Aboriginal / Public Health and Safety (air emissions, water quality, socio-economics)	Minimal effect based on results of existing monitoring programs at the Victor Mine. There will be continued release of air contaminants associated with processing operations, fuel combustion and fugitive dust; release of contaminants in plant and mine water effluents less than or equal to that of the Victor Mine (based on the proposed scale of operations and mine life). Health effects due to use of the winter road include potential accidents. Road safety policies will continue be implemented and enforced on roads under De Beers control. The VMEP will provide a positive socio-economic effect, providing continued employment and commercial opportunities in an economically depressed area.
Physical and cultural heritage	No effect expected. An archaeological study will be undertaken to supplement the existing information from the Victor Mine Federal EA.
Current traditional use of lands and resources	Limited to no effect expected. A trapline overlaps the VMEP footprint, but no active trapping has been observed in recent years. Hunting will be limited within the project footprint and a 3 km radius. Impact Benefit Agreement provides for harvester compensation.
Identified structures or sites *	No effect expected. Site is remote and adjacent lands are undeveloped.

Note: *Structures or sites of historical, archaeological, paleontological or architectural significance

6.0 ENGAGEMENT OF ABORIGINAL GROUPS

6.1 Potentially Affected and Interested Aboriginal Groups

The Aboriginal groups to be engaged in relation to the Project were identified using the following criteria:

- Proximity to the Project; if the stakeholders or Aboriginal groups are resident in and/or have jurisdiction over the area in which the project is proposed or has the potential to affect;

- Past or current interest in similar projects or developments in the region; if the stakeholders or Aboriginal groups have been involved in consultation processes in current or past projects in the region that are anticipated to have a similar interest in the Project;

- Demonstrated previous interest in potential biophysical and socio-economic environmental effects of the Project; or

- Aboriginal groups with traditional lands encompassing the Project site and its related proposed infrastructure.

Based on the above criteria, the identified potentially affected and interested aboriginal groups, their respective locations and contact information are provided in Table 6-1.

De Beers requested advice from the Federal Government (CEA Agency) in 2012 as to which Aboriginal groups should be engaged regarding the Project with respect to potential impacts of exploration and mine development on Aboriginal or Treaty rights. The list is yet to be confirmed. Accordingly, the list provided in Table 6-1 may change in the future.

6.2 Overview of Aboriginal Engagement Activities to Date

An important part of the mine permitting and planning process is proactive engagement with area Aboriginal communities and their membership. For the Project this engagement included ensuring potentially affected Aboriginal communities are informed and engaged in the development of the Project, responding to their interests and concerns, and continuing to build and maintain positive relationships. This has been and is currently being achieved by creating a forum for dialogue and information exchange (verbal and written) and fostering an ongoing relationship between the potentially affected Aboriginal communities and De Beers.

De Beers has maintained ongoing consultation with AttFN, the community closest to the proposed project, since the late 1990's. During the Federal EA process for the now operating

Victor Mine, the AttFN was identified as the primary First Nation, in terms of consultation and potential impacts.

Currently, the AttFN and De Beers serve on a number of joint committees, the most relevant of which is the Environmental Management Committee, which is scheduled to meet approximately every two months. The purpose of the committee is to inform parties and discuss environmental aspects of Victor Mine operation, such as permit applications, operational performance, environmental monitoring programs and environmental incidents. In addition to Environmental Management Committee meetings, De Beers holds periodic meetings with the community of Attawapiskat.

De Beers also participates in ongoing joint committee meetings with other First Nations on the James Bay coast under the provisions of the respective IBAs. Although these have a less direct environmental component than is the case with Attawapiskat, the meetings provide a forum for periodic updates on the Victor Mine operation and company exploration activities in the area.

Specific to the VMEP, the AttFN, KFN, MCFN and FAFN have been engaged to date. Recently, several attempts have been made to meet with AttFN to present details of the Project, but the AttFN have not been amenable to those discussions for various reasons. Aboriginal groups that have been engaged as of the time of preparation of this document are summarized in Table 6-2. Included in the summary are the names of respective Aboriginal groups, dates and means of engagement. The following activities and initiatives have been used to involve and consult with Aboriginal groups in the Project.

Community Meetings / Presentations

The purpose of these presentations was to provide Project status updates, gather comments, elicit verbal and written feedback on communication efforts with membership, and continue dialogue. Meetings have been scheduled with the community of Attawapiskat, but to date, the meeting has not taken place.

Community Newsletter Inserts

A newsletter is planned to be issued to the coastal First Nation communities before the end of 2012. The newsletter will also be accessible to the general public via the De Beers website.

Presentations to Chief and Council

De Beers met with the AttFN Elders and council members on June 15, 2012, to provide an update on the proposed development of the Tango Extension kimberlite. A slide presentation took place (with translation) and discussion was held regarding the proposed activities in relation to the anticipated mine life of the Victor ore body.

De Beers senior management met with the Chiefs and councils of FAFN, KFN and MCFN in August of 2012. The presentations included imagery of the site, and discussions about the economics of the project. The Chiefs and Councils of the respective First Nations are aware that De Beers is initiating mine planning and approvals, and is planning to undertake some test drilling to establish the water flows.

These presentations and associated question and answer sessions, provided opportunities for De Beers to engage in group and/or one-on-one settings and to gather verbal feedback.

A presentation by De Beers about the VMEP took place during recent site visits and briefings for MCFN on November 13, 2012 and FAFN, November 6, 2012. Questions posed by these First Nations and answers provided are summarized in Table 6-2.

Traditional Knowledge and Traditional Land Use Studies

De Beers plans to engage AttFN in the collection and documentation of TK / TLU in the Project area to supplement the information previously collected during the Victor Mine EA. This information will assist in the assessment of the potential effects associated with the Project and provide input about how potential effects can be avoided, mitigated or managed.

While much of the Project area has been addressed through previous studies related to the Victor Mine EA, De Beers aims to satisfy data gaps (if any) related to the area proposed for development (immediately north of the Victor Mine).

De Beers feels that it is important that any oral history be properly documented and respected. Therefore, suitable approaches for gathering TK / TLU related to the Project site will be discussed with First Nation groups as appropriate with the goal to involve, as much as possible, local Aboriginal community members in these studies.

Site Tours

Site visits and briefings on proposed VMEP development recently took place for MCFN (November 13, 2012) and FAFN (November 6, 2012). A subset of these visitors were taken on a fly-over to view the VMEP site area, in addition to visiting the Victor Mine site.

Interaction with Elders

De Beers met with Elders and Chief and Council of the AttFN on June 15, 2012 in Attawapiskat, to give a preliminary presentation on the proposed project. De Beers intends to hold more meetings with the elders and community members of the AttFN, if the AttFN are willing.

Participation Agreements

De Beers maintains IBAs with AttFN, MCFN, KFN and FAFN.

The IBA with the AttFN commits De Beers to informing the AttFN in advance about exploration proposals, permits and schedules, and conducting exploration activities in an environmentally responsible manner.

This IBA includes consideration for future mine developments within the agreement area as well as provisions for consultation protocols, respect for Traditional lands, training, employment, and contracting opportunities, among other aspects. A “Pre-Advanced Development Notification” (ADN) letter was delivered on October 19, 2012 to AttFN. De Beers, per their IBA with AttFN, is required to give notice of proposed advanced development. As De Beers is not yet at the stage where all of the agreed upon documentation that should accompany that letter, is available, a pre-ADN letter was provided.

The IBAs with the other coastal James Bay communities contain similar provisions, although more focussed on their traditional lands and potential infringements.

6.3 Key Comments and Concerns by Aboriginal Groups

During early consultation activities, minimal comments have been received from the First Nations discussed in Section 6.1. As meetings and engagement progress, more comments are expected to be received. Accordingly, De Beers will be addressing all interests and issues expressed during the consultation processes in the Federal EA process.

Two comments were logged (June 2011 and June 2012) regarding the IBA De Beers holds with the AttFN. Concerns were raised as to whether the current IBA is effective in addressing the additional area and activities associated with the VMEP project. There was a perception of minimal benefits to the community with the current IBA. De Beers is committed to maintaining a good working relationship with the AttFN, and will work to progress a mutually beneficial and agreed upon IBA in this regard. This is an ongoing process.

Kashechewan First Nation requested that the entire EA for the VMEP be translated into Cree. Although it was explained that it was very technical and that there are not Cree words for many areas, they insisted, as they feel that the extended summary is not sufficient for them to understand.

6.4 Current Aboriginal Traditional Land Use

Historical Context

The James Bay Lowlands have been inhabited by the people referred to as the Swampy Cree, or in Cree, “Athinuwick”, for generations. Limited information is currently available on their pre-European distribution. While archaeological information provides some insight, the nature of the landscape is such that the entire history will likely remain incomplete. The few archaeological studies that have been conducted, however, clearly demonstrate that First Nations people have occupied and used the muskeg country between James Bay and Hudson Bay and the edge of the Canadian Shield for thousands of years:

> *More recent studies (Julig 1982, 1988; Pilon 1987, 1988; and Lister 1988) have provided clear evidence that in prehistoric times, the lowlands were not simply an area through which one passed in order to gain access to more environmentally favourable areas, but a viable homeland range offering a variety of year-round, sustaining resources. (Adams Heritage Consultants 1999)*

Several centuries of European contact have been documented through the Hudson Bay Company:

> *First contacts between the Europeans and Cree people probably occurred early in the seventeenth century when Henry Hudson’s expedition entered the bay in 1610/11 (Bishop 1984: 25), although it is possible and even likely that items of European manufacture had entered the hands of inhabitants of the region along pre-existing native trading networks…. (Adams Heritage Consultants 1999)*

The current village of Attawapiskat is based on a trading post established near the mouth of the Attawapiskat River in 1901. However, people resident within the Attawapiskat area traded at Fort Albany 100 km to the south for nearly 200 years prior to this.

Traditional Pursuits

Through the completed Federal EA process for the currently operating Victor Mine, De Beers has obtained TK / TLU information which was shared by local Aboriginal people. This knowledge related to populations of fish, wildlife and plants in the area, and to helped to determine the extent of the use of the area, at that time.

Traditional activities (hunting, fishing, trapping, and gathering) are widely practiced by a proportion of the AttFN population. Hunting and fishing provide food to households, both those of the people who hunt and fish and the households with which they share the harvest. Hunting and trapping also generate income from hides and furs, although in recent years this been

strongly influenced by very low fur prices which minimize the financial returns from trapping. These activities are also very important from a cultural and recreational perspective.

Most traditional activities are practiced along the James Bay Coast and along or near the major rivers and creeks, where resources such as fish, waterfowl, moose and fur bearing animals are more abundant and accessible. The Attawapiskat River is the primary travel artery to the interior when the ground is not frozen. The one notable exception to the above is hunting for caribou, which takes place in more open country removed from the rivers, especially in winter when better inland access is available by snowmobile.

Waterfowl hunting, particularly for geese, is concentrated along or near the James Bay coast, and along lower reaches of the Attawapiskat River. Goose hunting is a major activity for the community during both the spring and fall migration periods. Furbearers are harvested within trapline boundaries. Traplines were formerly established and administered by MNR, but are now administered by the First Nations, in this case AttFN. In general, the rights to individual traplines are held by specific individuals or families, but there is some sharing of resources. The principal furbearers are beaver and marten. Fox, otter, mink, lynx, wolf, and muskrat are of secondary importance. Hunting is less structured, as hunting is viewed as a basic right of survival, and less as a commercial activity. Hunting is most heavily focused on caribou, moose, and waterfowl, with the latter group consisting of Canada geese and snow geese, as well as a number of duck species.

The potential area of affected land for the Project includes a 6.2 km^2 area (VMEP pit development and associated infrastructure in the vicinity of the proposed pit; Figure 4).

It is suggested that compensation for potential adverse impacts to Aboriginal and treaty rights regarding hunting, trapping and fishing (as part of the IBA) be based on the above areas, taking into consideration the seasonal aspects of winter road use, and the temporary use of the existing south winter road and the west winter road, with such use to be restricted to the construction period. This aspect notwithstanding, it should be recognized that hunting, trapping and fishing by members of the AttFN would be expected to continue through much of this area. However, for safety reasons, hunting would be restricted in areas adjacent to winter roads as per existing agreements.

The VMEP will be supported by existing infrastructure from the Victor Mine, the areas for which have already been assessed and compensated for through an approved EA process and existing IBAs. These areas include:

- A 140 km^2 area encompassing the Victor Mine site, which is disrupted on a year round basis and will continue to be disrupted for the duration of the VMEP;

- A continued 200 km^2 zone associated with the existing south winter road, which is disrupted on a seasonal basis (winter) during the construction period; and

- A continued 30 km^2 zone associated with the existing west winter road, which was mainly used during the Victor Mine construction period.

Aboriginal or Treaty Rights

The Supreme Court of Canada defines Aboriginal rights as "an integral practice, custom, or tradition of the Aboriginal culture of the concerned Aboriginal community". This right is defined within the context of the individual community and its historic (pre-contact) traditions (Mainville 2001). Treaty rights, in contrast, are defined by contract between the First Nation and the Crown. Treaty rights usually involve some form of surrender of land in return for obligations placed on the Crown, whereas Aboriginal rights are inherent. Treaty rights therefore differ from Aboriginal rights, but may confirm the right to hunt, fish, and trap on traditional lands.

Aboriginal and treaty rights normally require a land base sufficient to ensure their proper exercise (e.g., lands required for hunting, fishing and trapping). The taking of lands for other, incompatible purposes diminishes these rights. Consequently, when Aboriginal or treaty rights are infringed or impaired, Aboriginal peoples have a right to just and adequate compensation.

Justification for infringement of Aboriginal and treaty rights devolves from the Sparrow decision, and is generally interpreted by the Supreme Court of Canada to include three principal factors (Mainville 2001), as per the following:

- There should be as little infringement of the right as practicable and reasonable, taking into consideration alternatives and mitigation;

- There must be meaningful consultation with the affected Aboriginal peoples, including informing the First Nation of all pertinent aspects of the proposed legislation, regulation, action, or decision that may infringe on their Aboriginal or treaty rights, including considerations of reasonable alternatives, mitigation and compensation; and,

- The issue of adequate and fair compensation must be addressed.

In considering compensation for lawful and justifiable infringements on Aboriginal and treaty rights, the Supreme Court of Canada has determined that it is not sufficient to consider only compensation, as would normally be considered in the case of private property law, but that aspects of spiritual, cultural and social values also have to be taken into account (e.g., lost fishing rights cannot simply be replaced by providing fish from commercial sources). Also,

compensation should consider present and future losses, and the ability to restore displaced or altered lands to a form that would support traditional activities.

Aboriginal and treaty rights are enshrined in *Section 35(1) of the 1982 [Canadian] Constitution*, and treaty rights are defined in the James Bay Treaty – Treaty No. 9 and its adhesions. With specific reference to mining, Treaty No. 9 states:

> *And His Majesty the King hereby agrees with the said Indians that they shall have the right to pursue their usual vocations of hunting, trapping and fishing throughout the tract surrendered as heretofore described, subject to such regulations as may from time to time be made by the government of the country, acting under the authority of His Majesty, and saving and excepting such tracts as may be required or taken up from time to time for settlement, mining, lumbering, trading or other purposes.*

Limitations within Treaty No. 9 regarding the "saving and excepting such tracts as may be required or taken up from time to time for ...mining..." notwithstanding, De Beers recognizes that its activities have had and will continue to have an impact on the AttFN's traditional activities of hunting, trapping and fishing, and that fair and reasonable compensation for the unavoidable infringement of these activities is appropriate as part of the IBA.

6.5 Aboriginal Engagement Plan

A key component of the Federal EA processes is the engagement and consultation with Aboriginal people and other interested parties who may potentially be impacted by or have an interest in the Project. To guide consultation with both Aboriginal peoples and others with an interest in the project area, De Beers has prepared a Consultation and Engagement Plan. The Plan is attached as Appendix C.

The Plan includes the procedural aspects as delegated by the CEA Agency and includes the specific steps that will be undertaken to ensure the consultation requirements are fulfilled, specific to the scope as determined by the CEA Agency. Through regular meetings and correspondence, De Beers will align engagement efforts to the Federal Aboriginal consultation work plan as it is developed.

De Beers and the government agencies recognize that there are opportunities to collaborate on planning and implementing Aboriginal consultation and engagement for the EA process. De Beers intends to prepare one body of knowledge about the current environment and the effects of the Project on various aspects of the environment. This body of knowledge will be used to populate the EA(s) required by the federal and potentially provincial government agencies. Combining and coordinating engagement and consultation efforts on the EA(s) ensures that as practical, Aboriginal groups are engaged in dialogue about the current

environment, potential effects, and mitigation measures at the same time for all the EA processes rather than in multiple meetings on the same subject for a different EA process (if applicable).

Table 6-1: Potentially Affected and/or Interested Aboriginal Groups

Potentially Interested / Affected Aboriginal Group	Contact Name	Address (First Nation Office)
AttFN	Chief Theresa Spence	P.O. Box 248, Attawapiskat, Ontario, POL 1A0 T:(705)-997-2166 F:(705)-997-2116
FAFN	Chief Rex Knapaysweet	P.O. Box 1, Fort Albany, Ontario, POL 1H0 T:(705)-278-1044 F:(705)-278-1193
KFN	Chief Derek Stephen	P.O. Box 240, Kashechewan, Ontario, POL 1S0 T:(705)-275-4044 and (705)-275-1054 F:(705)-275-1023
MCFN	Chief Norm Hardisty Jr.	22 Jonathan Cheechoo Drive, P.O. Box 190, Moose Factory, Ontario, P0L 1W0 T:(705)-658-4619 F:(705)-658-4734
MoCreebec Council of the Cree Nation	Acting Chief Allan Jolly	62 Hospital Drive, P.O. Box 4, Moose Factory, Ontario, P0L 1W0 T: (705)-658-4769

The following bodies are deemed to be potentially interested either by their own proclamation or by De Beers, but as their associated communities are not as near to the project as those listed in Table 6-1, engagement will consist of provision of information.

- Weenusk FN (Peawanuk);
- Taykwa Tagamou FN (New Post);
- Marten Falls FN (Ogoki Post);
- Neskantanga FN (Lansdowne House); and
- Webequie FN;

The political organizations which represent First Nations at the regional scale will similarly be provided with information, and more detailed briefings on request, including:

- Nishnawbe Aski Nation; and
- Mushkegowuk Council of the James Bay Cree.

Table 6-2: Record of Consultation

Activity Date	Activity Type	Purpose of Consultation Activity	Organization	Participant(s)	Summary of Activity/Issue Reference #	Summary of Comment	Primary Comment ID	Secondary Comment ID	Project Phase	Project Component	Potential Environmental Effects	Proposed Action	Proponent's Response	Addressed (Yes/No)	
	(i.e. Letter, meeting, email, phone call, other		Drop down to be used from from Contact List	Add a list of all participants, only list once per activity	Provide a summary of the consultation activity and list any issue previous identified by the group or individual	a) Describe comment as expressed by the organization	Pick from dropdown list (e.g.. Wildlife)	Pick from dropdown list. This column is used to provide further detail specific to the project (e.g.. Caribou)	This refers to the phase of the project (construction, Operation, Modification and/or Decommissioning)	This box identifies which project activities the comment is related too (e.g.. Mine site, Milling, Tailings...). It should be customized for each project	Describe the rationale - a) potential environment effect of the project; b) is it a cumulative effect or new; c) directionality (adverse, positive, neutral). If not provide by the commenter, add the appropriate description	Describe any mitigation measures proposed, and/or any action recommended by the organization	a) measures undertaken by proponent to address issues (e.g. mitigation) b) negotiation of IBAs or other compensation agreements); c) commitments	Yes	No
October-18-11	Meeting	Attawapiskat FN Environmental Management Committee	Attawapiskat First Nation	Attawapiskat First Nation: John B. Nakogee (JBN)(Chair), Peter Paul Martin (PPM) Cindy Tookate (Mining Monitor), Danny Metatawabin IBA Coordinator De Beers: Doug Brown (DB Co-chair), Brian Steinback (BJS), Terry Ternes (TT). Guest – Sarah Minnery (SM) MERC Technical Advisor to AttFN	Reviewed Tango Extension clean up and planned Tango work program for winter months 2011/12 as part of advanced exploration program. Permit applications have been sent to C&C & EMC. Program includes 12 x 23 inch holes and 30 HQ holes for geotechnical and hydro-geological data. - A family burial ground exists in the area of Tango extension; JBN to obtain coordinates and confirm via Cindy Tookate and BJS that the project does not impact this site.	Question proximity of burial site near a creek on the south shore of the Attawapiskat River.	Physical and Cultural Heritage (CEAA 2010)	Physical and Cultural Heritage	Construction	Mine Operations	New potential negative effect.	Verify location of site with respect to this concern.	7 Feb 2012 - JBN obtained coordinates and photos from BJS and confirmed via Cindy Tookate that the project does not impact this burial site. Confirmed there is no issue on this matter at subsequent EMC meeting.	Yes	
June-23-11	Meeting	Regular AttFN Senior IBA Implementation Committee (SIMC)	Attawapiskat First Nation	AttFN - Theresa Spence (Chief), Steve Hookimaw; DBC - J. Fowler, A. Metatawabin, S. Metatawabin	Exploration update sent April 18. Since last Nov. small ground survey completed on Tango extension and electrical survey of tango, being evaluated. No other work since. Airborne gravity survey will be done this summer as we have talked about for the last year. From there will review results to determine next steps. TS – John B Nakogee I talked to him to advise the company about not pursuing this work, because she wants to discuss the items in the letter first. We need to meet with the CEO, the IBA is not working for us. As chief I need to listen to my community, it's not working because committees are not effective. Need a team to review the IBA and a lot of follow up. At the stage where I want to close the mine down. If we don't sit down now, someone will close the mine. The committees that sit there, they are not making that commitment. The new CEO has asked to visit the communities, maybe in August. A lot of issues could be resolved if we could meet regularly. People are not attending the public meetings but maybe we can make a video to view at their leisure. Exploration on Tango and Tango extension – Chapter 12 includes work on kimberlites within the IBA area, as we realized that a short timeframe exists and would not be enough time to negotiate for every program	Concern about effectiveness of the current IBA, how it relates to further exploration at Tango extension, perception of minimal benefits by the community .	Economic benefits to community	Socioeconomic	Operation	Mine Operations	Concern with financial and other benefits of the existing and future mines.	Enhanced dialogue with community and leadership, factor into any new or revised IBAs for development of Tango Extension kimberlite.			
January 20, 2012	Meeting	Regular AttFN Senior IBA Implementation Committee (SIMC)	Attawapiskat First Nation	AttFN - Theresa Spence (Chief), Gerald Matthias (Deputy Chief), Danny Metatawabin (IBA Coord.); DBC - J. Fowler, A. Metatawabin, S. Metatawabin, Virginia Sutherland	Status update - EMC member Peter Paul Martin and Mining Monitor C. Tookate had been flown over the Tango Extension kimberlite by helicopter for an inspection. Mention of proposed core drilling there if time allows.	Asked if the Victor mine life will be extended	General - Consultation	Other - general interest	Operation	Victor Mine site operation - life extension	N/A	N/A	Response - need to reduce operating cost by 20% for Tango Extension to be feasible before we propose to AttFN.	yes	
May 17, 2012	Meeting	AttFN Environmental Management Committee	Attawapiskat First Nation	Attawapiskat First Nation: John B. Nakogee (JBN), Peter Paul Martin (PPM), Gabriel Fireman (GF), Cindy Tookate (CT - Mining Monitor – *part time*) De Beers: Brian Steinback (BJS), Terry Ternes (TT), Brad Wood (BW – part time), John Delgaty (JD - DBCI Exploration – part time)	The proposed core drilling in The limestone near Tango Extension could not be completed before The drill crews were demobilized from site. • Upcoming Permits for Tango-Extension Advanced Exploration: o Dewatering pump test well in 2013; PTTW and revised Victor discharge certificate of approval; o Dewatering pump test monitoring wells in 2013; Land Use Permits/MNR Work Permits is off lease, possible PTTW for drilling. • It is anticipated that in the near future that representatives from De Beers will be in Attawapiskat to discuss any specific TEK, Heritage Resources and Areas of Cultural Significance related to the Tango-Extension Project. Francois Tomagatick was recommended as a knowledgable person for that area, but JBN and GF did not expect that there was much use of that area due to conditions there.									
June 15, 2012	Meeting in Attawapiskat	Provide preliminary outline of the proposed project to the Elders and members of Chief & Council	Attawapiskat First Nation	AttFN - Greg Koostachin, Sophie Spence, Moses Hookimaw, Marius Kataquapit, Benoit Okitigo, Theresa Hookimaw, Annabella Iahtail, Louie Sutherland, Louis Shisheesh Sr., John Metat, Theresa Spence,(Chief) DBC - Brad Wood, Brian Steinback, Angela Shisheesh (translator), Shannin Metatawabin , Virginia Sutherland	Presentations by Brian Steinback and Brad Wood, with translation, of the Tango Extension site and proposed timelines for investigation and development, as they relate to the life of the Victor ore body.	1) Need for prior adjustment to the IBA and benefits.	Economic benefits to community	Socioeconomic	Operation	Development and operation of the VMEP pit on the Tango Extension kimberlite			IBA includes provision to renegotiate terms for any subsequent development such as this, and presumably will need to be ratified by the community.	yes	

Activity Date	Activity Type	Purpose of Consultation Activity	Organization	Participant(s)	Summary of Activity/Issue Reference #	Summary of Comment	Primary Comment ID	Secondary Comment ID	Project Phase	Project Component	Potential Environmental Effects	Proposed Action	Proponent's Response	Addressed (Yes/No)	
August 10, 2012	Meeting - Thunder Bay MOE office	Preconsultation on hydrogeological study scope and timing for EA and permitting of VREP at Tango Extension kimberlite	Ministry of Environment	MOE - Alisdair Brown, Todd Kondrat, Ghulam Sarwar; DBC - Leo Fusciardi, Brian Steinback, Peter Williamson (t/c), Patrick Rummel (t/c); AMEC - David Simms, Simon Gautrey, Lesley Lorrimer (t/c); ITASCA - Houmau Liu	Preconsultation on project scope and timing, and discussion of timing and level of detail of hydrogeological studies and modelling that will be necessary at the environmental assessment and permitting stages.	MOE felt that the updated hydrogeological models based on Victor operational monitoring are adequate for the EA, but site-specific data / models will be requried for MOE permiting after the EA is complete. Do more with the overburden, because the main concern of MOE will be affects to surface water systems (Unnamed Creek, muskeg ponds); Be prepared to look at springs in the Attawapiskat River near shore area (may be difficult to address, but need to make the effort); Alisdair also has to answer to comments from the public so may request things that might not always appear necessary; Be prepared for delays in approvals, because there are typically requests for further information with all complex approval applications.; MOE believe the main PTTW issues would be impacts to surface water. Both are happy with the plan to use the existing discharge location on Attawapiskat River.									
August-22-12	Meeting	Discussion of project scope, timing of Project Description and CEAA processes	Canadian Environmental Assessment Agency and Ontario Norhtern Development and Mines	CEA Agency – Darla Cameron; De Beers – Brian Steinback; Leo Fusciardi; Peter Williamson; MoE – Carroll Leith; Larry Lefebvre; Solange DeSautels; AMEC – Lesley Lorrimer; Sheila Daniel	Information sharing and determination of next steps/timing. Participants to understand: i. proposed project based on information currently available; ii. information required and process steps for determining federal EA requirements; iii. provincial requirements that may apply, based on information currently available about the proposed project.	None - discussion of timing and processes.									
August-24-12	Teleconference	Discussion of project scope, timing of Project Description and CEAA processes	Canadian Environmental Assessment Agency	CEA Agency – Anjala Puvananathan, Darla Cameron, Corey Dekker; MNDM – Glenn Seim; De Beers – Brian Steinback; AMEC – Lesley Lorrimer	Follow-up from August 22 meeting focussed on Aboriginal engagement on draft project description	None - discussion of engagement processes and communities of interest									
August-29-12	Meeting	Senior Management meeting with Chief & Council to introduce and open communications, including proposed life extension to the mine.	Kashechewan First Nation	Kashechewan FN - Edward Sutherland, Hosea Wesley (Council), David JB Wesley (IBA Coord), George Reuben (Council), Sheryl Koosees (IBA Assistant) DBC - Tony Guthrie (CEO), James Kirby (Mine Gen Mgr), Jonathan Fowler, Tom Ormsby, Ingrid Hahn, Steve Thomas, Shannin Metatawabin	Brief meet and greet session. Mr Guthrie mentioned Tango Extension, that currently is not economic and negative $55M, and that we are working to make it economic. He showed three figures showing where the pipe is, the general layout and the oblique air photo of Tango X site with water intake in the background. The leadership is now aware that we are initiating mine planning and approvals and will undertake some test drilling to establish the water flows.	Kash requested the entire EA for victor be translated into Cree. When told that it was very technical and that there are not Cree words for many areas, they insisted. The extended summary is not sufficient for them to understand.	Aboriginal Interest	Details on the EA Conduct	Construction	Project development					
August-29-12	Fort Albany First Nation	Senior Management meeting with Chief & Council to introduce and open communications, including proposed life extension to the mine.	Fort Albany FN	Fort Albany FN - Thomas Scott, Jasmine Koostachin, Rex Knapaysweet (Chief), Robert Nakogee (Council), Brent Edwards (IBA Coord) DBC - Tony Guthrie (CEO), James Kirby (Mine Gen Mgr), Jonathan Fowler, Tom Ormsby, Ingrid Hahn, Steve Thomas, Shannin Metatawabin ….	Brief meet and greet session. Mr Guthrie mentioned Tango Extension, that currently is not economic and negative $55M, and that we are working to make it economic. He showed three figures showing where the pipe is, the general layout and the oblique air photo of Tango X site with water intake in the background. The leadership is now aware that we are initiating mine planning and approvals and will undertake some test drilling to establish the water flows.	None									
August-29-12	Moose Factory	Senior Management meeting with Chief & Council to introduce and open communications, including proposed life extension to the mine.	Moose Cree First Nation	Moose Cree FN - Norm Hardisty Jr. (Chief), Elaine Jeffries (Council), Joe Cheechoo (Elder Council), Earl Cheechoo (Dep Chief), BJ Sutherland (Exec Dir), Samantha Wesley (Council), Peter Wesley (Exec Dir), Nellie Trapper (Council), Paul Linklater (Council), Frances Sutherland (Council), Gilbert Cheechoo Jr. (Council) DBC - Tony Guthrie (CEO), James Kirby (Mine Gen Mgr), Jonathan Fowler, Tom Ormsby, Ingrid Hahn, Steve Thomas, Shannin Metatawabin	Brief meet and greet session. Mr Guthrie mentioned Tango Extension, that currently is not economic and negative $55M, and that we are working to make it economic. He showed three figures showing where the pipe is, the general layout and the oblique air photo of Tango X site with water intake in the background. The leadership is now aware that we are initiating mine planning and approvals and will undertake some test drilling to establish the water flows.	None									
September-26-12	Teleconference	Progress update	Canadian Environmental Assessment Agency	CEA Agency – Darla Cameron; De Beers – Brian Steinback; AMEC – Sheila Daniel	Update on timing of draft project description document being circulated, now likely min November. Brief discussion of political issues between Attawapiskat FN and DBC that is	None									
November-06-12	Site Visit	Site familiarization	Fort Albany First Nation	FAFN: Deputy Chief Thomas Scott, Joseph Wheesk, Gabriel Sutherland Sr., Lucy Sutherland, Mary Sutherland. DBC Team: James Kirby, Brad Wood, Shannin Metatawabin, Terry Ternes, Albalina Metatawabin, Virginia Sutherland	Presentations on Victor mine environmental programs and an overview of the VMEP proposal, including a helicopter tour of the project site for part of the group.	1. Will there be a new IBA? 2. Will the infrastructure/buildings be removed once victor mine is complete?	General - EA Type				No specific items identified - general understanding questions.	None	1. Yes a new or revised IBA. 2. Yes however we will first utilize this facility to process the ore from tango.	Yes	

Activity Date	Activity Type	Purpose of Consultation Activity	Organization	Participant(s)	Summary of Activity/Issue Reference #	Summary of Comment	Primary Comment ID	Secondary Comment ID	Project Phase	Project Component	Potential Environmental Effects	Proposed Action	Proponent's Response	Addressed (Yes/No)	
November-13-12	Site Visit	Site familiarization	Moose Cree First Nation	Moose Cree FN: Chief Norman Hardisty, Joe Cheechoo, Nellie Trapper, Bobby Echum, Mary Stella Schimmens, Elaine Jeffries, Frances Sutherland, Samantha Wesley and Guy Ginter. DBC Team: James Kirby, Brad Wood, Shannin Metatawabin, Terry Ternes, Albalina Metatawabin, Virginia Sutherland, Ron Corston, Beverley Corston, Joyce Small	Presentations on Victor mine environmental programs and an overview of the VMEP proposal, including a helicopter tour of the project site for part of the group.	1. Why the value of diamonds ½ at Tango, diamond is a diamond? Would that impact DBC finances and why would DBC do that or is it worth it? 2. Traplines – are trappers allowed to trap in the area and what is the perimeter they can go (or cannot go) trapping? 3. On Environmental Assessment since 1990 – does DBC work with Attawapiskat group – or how does DBC work with Attawapiskat to keep informed how the mine progressing. 4. Moose Cree point of view – impact starts at the Moosonee Yard. Environmental work? 5. Per Ring of Fire – does DBC keep track of the river up/down stream of victor? Chief – if there is an accident upstream DBC will get blamed – base line monitoring. 6. Tango - What is the biggest cost? 7. Community Consultation process – who is involved? Is it with the Youth, Elders or what groups? 8. What are the specific measures to get Tango started? 9. When Victor project is complete – will reclamation take place and how long? 10. What is the transition/timing between Victor into Tango? 11. Would reclamation process commence end of Victor or the end of the whole project? 12. Is there monitoring along the James Bay?	General - EA Type				No specific items identified - general understanding questions.	None	1. Quality and size of diamonds varies, major impact on economics of the mine. 2. We have an agreed no-hunting zone around themine for safety reasons. 3. Regular EMC committee meetings (~quarterly) and annual FUPA summary report. FUPA captures all environmental / water results. 4. Study is conducted at Moosonee Yard. 5. DBC has asked the Gov't to add the monitoring, If there is a change gov't will be informed. 6. Electricity and labor. 7. Schools with kids (kids bring it back to their parents), small group with Elders and larger public meetings with different businesses. It's based on community need. Also engaging with community IBA Coordinators and community presentations. 8. Put both Tango/Victor project together to create a longer sustainability and need to compete with DBC mines. Cost optimization to get Victor down by 15%. Both electricity and labour are major cost items. 9. Plan 2 or 3 years of reclamation and 3 or 4 years of monitoring so see if the reclamation process is working effectively. 10. Cost would be high if there is a gap between Victor into Tango. 11. We have a bond of $47 million with the gov't for reclamation – reclamation commence next year 2013. 12. This is part of the Winter Road Monitoring Management Committee for water monitoring – not as much as Victor.	Yes	
January-16-13	Emailed	Response to executive summary fo draft project description	Attawapiskat First Nation	Charles Hookimaw (former De Beers Environmental Monitor)	Concerns with existing relationship between proponent and Attawapiskat First Nation	I understand DeBeers Victor Mine issued draft Project Description for the proposed Tango Extension to the Canadian Environmental Assessment Agency (CEAA) Ministry of Environment (MOE) and to the Chiefs of the coastal First Nations communities. My understanding is before anything could happen is to address all current Attawapiskat IBA internal and external issues such as ; Hiring process, Discrimination, Environment etc. This request was made by Attawapiskat and DeBeers is going against our wishes. Right now you DeBeers don't have my support whatsoever to go ahead with this Project. Is time to reopen the IBA, i want Attawapiskat and DeBeers to have genuine partnership. I look at this current IBA only benefits the Company not Attawapiskat or other First Nations, we need re-look for better sustainable opportunities for Attawapiskat and First Nation. Yes, its nice to see my people work on the winter to me that's not sustainable. I am also concerned about the Environment such as De-Watering, i know the effects on the land that i seen first hand. There are lots of stuff to address, i know what i'm talking about i use to work 7+ years at Victor Mine. I hope to get the Draft Project Description soon so i can review it.	Aboriginal Interest	Current use of Lands and Resources for Traditional Purposes by Aboriginal peoples	Operation	Entire project	Not specified		Working group in place to resolve relationship issues, which are not directly relevant to the environmental assessment process. The project will not proceed without First Nations support, as was the case with the Victor Mine. Request for copies of the draft Project Description forwarded to AttFN for action, responded that final complete version will be more widely available.	Yes	
March-13-13	Email	Request for info on the EA process	Attawapiskat First Nation	Jackie Hookimaw-Witt	Requested Environment Commissioner of Ontario for information on what stage the EA is at for the Tango Extension project	Status update, requested translation into Cree for the Elders							Responded 19 March 2013 by email to the Environment Commissioner with information on the EA preconsultation status and provided contacts within MNDM who are involved. Key materials and presentations will be translated into Cree during community consultations, though not necessarily every document.		
March-13-13	Emailed letter	Response to executive summary fo draft project description	Attawapiskat First Nation	Charles Hookimaw (former De Beers Environmental Monitor)	General questions and concerns about environmental implications of VMEP development at Tango Extension	1) Is there a closure plan for Tango under the Ontario Mining Act? 2) does the cost change from the current closure plan for Victor Mine with Tango added? 3) Current closure plan should be revisited. 4) There is not mention of revisiting the Victor Mine Environmental Assessment despite using infrastructure on site to process. 5) There's no mention of doing cumulative effects of existing and future impacts on the environment and people's health which should be done. 6) On environmental effects there's no mention of mercury, sinkholes, dry ponds and dry muskeg. 7) I am concern DeBeers is planning a really scoped down EA Federally and nothing Provincially. 8) I think DeBeers should re-visit Delta and X-Ray sites to consider and start reclamation process on these sites before going ahead with anything... 9) I also think FPK slurry should not be considered pumping to the Victor Mine Pit.			Decommissioning		Priarily mine closure concerns and cumulative effects.	Incorporate into environmental assessment evaluation process.	1) - 3) Closure planning including financial security is in place a regulated by Ontario. Existing exploration closure plan must be amended whenver material changes occur on the site(s). 4) no need to re-asssess victor process plant except if it changes. 5) Cumulative effects will be considered in the EA. 6) Mercury was addressed in the main body of the project description, and it as well as these oteher factors will be addressed in the EA. 7) Sdcoping of the EA will be comprehensive at teh federal level, provincial process as prescribed by Ontario government. 8) Implementation of the exploration closure plans for these kimberlites will proceed in parallel as those resources are either abandonned as uneconomic or progressed further. 9) FPK deposit into the mine pit will be carried forward as one option to be assessed due to environmental benefits - will consult on reasons for this concern.	Yes	
March-18-13	Meeting - Timmins	Regular Moose Cree FN Senior IBA Implementation Committee (SIMC)	Moose Cree First Nation	MCFN - Guy Ginter; Ernest Rickert; Gilbert Cheechoo Jr.; Pam Hunter (teleconferenced); De Beers - Shannin Metaatwabin, Albalina Metatwabin, Brian Steinback	Overview of proposed project and the EA process	Chief has designated Guy Ginter as the primary point of contact for VREP consultation. Requested periodic updates to the SIMC as the Chief does not always pass on information promptly. Question if old buried channels of the Attawapiskat River may lie under the project site. Interested in water quality from pump test.									
March-19-13	Meeting - Timmins	Project overview	Mushkegowuk Environmental Research Centre (MERC)	MERC - Miriam Fleming, Executive Director; Alex Litvinov, Aquatic Biologist; De Beers - Brian Steinback	Overview of proposed project and the EA process, discussion of environmental research programs and potential issues (requested publication list from NSERC research partnership); Requested copy of baseline fish and aquatic study; Do we see chromium upstream re Ring of Fire? - want baseline contaminants data (organic &	Requested publication list from NSERC research partnership; Requested copy of baseline fish and aquatic study for Tango Extension; Do we see chromium upstream re Ring of Fire? - want baseline contaminants data (organic & inorganic in water and fish)									
March-21-13	Meeting - Cochrane	Project overview and alignment of EA with provincial regulatory processes	Ontario Government - MNDM, MOE, MNR Government of Canada - CEAA	MNDM - Robert Calhoun, Steve Beneteau, Dawn-Ann Metsaranta; MNR - Garry Funnell, Martha Heidenheim (t/c); Robin Stewart, Chris Marr (Far North Planning), Chris Chenier, Ken Corston, Peter Kapasheshit; MOE - Carroll Leith (t/c), Larry Lefebvre, Patrick ?? (t/c); CEAA - Darla Cameron (t/c), Ellen Cam[pbell (t/c); De Beers - Brian Steinback, Lesley Lorrimer (AMEC), Mike Johns (NNS)	Overview of proposed project and the EA process, Overview and discussion of aquatic baseline studies, itegration with Ontario environmental assessment and permitting processes; application of Far North Planning Act.	MNDM closure planning; Introductory discussion of what if any project components might trigger a provinical EA (only MNR land use for power line or MOE for diesel generation of electricity might apply) and how CEAA might coordinate those processes. Newly released MNDM may require an EA for bulk ore sampling - to be discussed further. Question whether any road freight would use the new Wetum winter road from Otter Rapids to Moosonee instead of the ONR rail? Question about how overlapping effects of dewatering in hte aquifers woud be determined?									

Activity Date	Activity Type	Purpose of Consultation Activity	Organization	Participant(s)	Summary of Activity/Issue Reference #	Summary of Comment	Primary Comment ID	Secondary Comment ID	Project Phase	Project Component	Potential Environmental Effects	Proposed Action	Proponent's Response	Addressed (Yes/No)	
March-21-13	Meeting - Moose Factory	Project overview requested by regular meeting of Chief and Council	Moose Cree First Nation	MCFN - Chief Norman Hardisty, Bobby Echum, Joe Cheechoo, Stella Schimmens, Mildred Alisappi, Elaine Jeffries, Samantha Wesley, Nancy Cheechoo, Peter Wesley, Brenda Sutherland, Victor Linklater, Earl Cheechoo, Kathy Quachegan, Tina Wynne, Bertha Sutherland De Beers - Terry Ternes, Albalina Metatawabin	Overview of proposed project and the EA process	Questions about; What stage of EA consultation we are at; What stages of exploration and development are covered in the existing IBA; Size of test trench for ore sampling; Potential effects from Ring of Fire development upstream; Will there be a new IBA negotiation if the project proceeds; Future prospects for other kimberlites in the area being developed; Will the EA be federal or provincial?	Aboriginal Interest				General		Expect to do a federal EA; If the mine proceeds a new IBA negotiation will occur; Do not expect impact from Ring of Fire; Test trench will be about 300 m wide due to overburden thickness.		
April-04-13	Community information meeting - Attawapiskat	Introduce project scope and EA process	Attawapiskat First Nation	AttFN - 5 to 15 people including Chief Theresa Spence, IBA coordinator Danny Metatawabin, Jackie Hookimaw-Witt, Sophie Spence, Louis Sutherland, Lindy Mudd, Juliette and William Sutherland, Rebecca Iahatail, Louis Noha (sp?), Louis Kamalatisist, Eli Matthews; De Beers - B Steinback, Shannin Metatawabin, Trevor Koostachin, Translator Angela Shisheesh.	Presentation with translation, outline project location, scope, physical setting and expected Environmental Assessment process. Videotaped to run later on community TV channel.	Jackie H-W requested copies of slides and of Draft Project Description (digital copies given to her); She was concerned that meeting was not teleised live with phone-in ability for Elders at home. A question not related to this proposal, about other exploration work in the Nawashi watershed and compensation wanted (this presumably is covered in the existing IBA); Others - Is Tango Extension part of the Victor Mine agreement (only exploration and trench sampling - mining requires IBA discussions); Danny M. - What stage are we at, have we filed exploration plans and received permits? He stated this was an information session only, not "duty to consult" session. Is this proposal 'grandfathered', or is it subject to the revised Ontario Mining Act 2013? Elder	Aboriginal Interest		All phases	All phases					
April-05-13	Dialogue with Trapline holder in Attawapiskat	Trapper wanted to discuss possible overlap with his traditional territory	Attawapiskat First Nation	John B. Tookate Sr. (705-997-9915), Juliette Sutherland (daughter 705-997-1243), Brian Steinback (DBC)	John brought in a map of his trapline area and a letter describing when his parents used it and the impact of the Victor Mine on his hunting activity. Need to get a more detailed map from the MNR as it may not be the same creek.	Looking for compensation if the proposed development is within his trapline area. Stated the name of the un-named creek is "Kowapagamik" (sp?) which means white water or muddy water.	Aboriginal Interest	Current use of Lands and Resources for Traditional Purposes by Aboriginal peoples		All phases	Displace traditional harvest activities	Follow up with MNR to get better maps; include in TEK update studies; Site visit this summer with John Tookate and family, and others knowledgeable.			

7.0 STAKEHOLDER CONSULTATION (NON-ABORIGINAL)

7.1 Stakeholders and Related Consultation Activities

7.1.1 Potentially Affected and Interested Stakeholders

Stakeholders anticipated to be involved in the VMEP will include those with a direct interest in the Project, or those who are able to provide data for baseline environmental reports. These are anticipated to include the following groups.

Businesses, organizations and non-governmental organizations:

- Ontario Federation of Anglers and Hunters;
- Attawapiskat Resources Inc.;
- Keewaytinok Askee Enterprises (Attawapiskat) ;
- Bradley Young Consulting (Attawapiskat);
- Roger Nakogee Rentals & Construction (Attawapiskat);
- Kattawapiskak Development Co. Inc. (Attawapiskat);
- Koostachin Group (Attawapiskat);
- K A Joint Venture (Attawapiskat);
- Shu-Pae Stayo Enterprises (Attawapiskat);
- Joseph Fireman Ontario 190552620 (Attawapiskat);
- Masowatch Partnership Ontario 1779522 (Attawapiskat);
- Koostachin-Cecconli Joint Venture (Attawapiskat);
- ASWM Contracting Inc. (Attawapiskat);
- Meenish Enterprises (Attawapiskat);
- Tundra Hawk Rentals (Attawapiskat);
- Neegan Naynowan Jacques Whitford LP (Attawapiskat);
- ORTECH Consulting Inc. (Attawapiskat);
- Northern College;
- Timmins and District Chamber of Commerce;
- Mining Watch Canada;
- Northwatch;
- Wildlife Conservation Society; and
- Other local small business owners;

Municipal Government:

- City of Timmins;
- Town of Cochrane; and

- Town of Moosonee;

Provincial (Ontario) Government:

- Ministry of Tourism, Culture and Sports;
- Ministry of Aboriginal Affairs;
- Ministry of Economic Development and Trade;
- Ministry of Energy;
- Ministry of Labour;
- Ministry of Natural Resources;
- Ministry of Northern Development and Mines;
- Ministry of the Environment;
- Ministry of Transportation;
- Ministry of Training, Colleges and Universities
- Hydro One Networks Inc.; and
- Ontario Provincial Police;

Federal Government:

- Aboriginal Affairs and Northern Development Canada;
- Canadian Environmental Assessment Agency;
- Environment Canada;
- Fisheries and Oceans Canada;
- Health Canada;
- Natural Resources Canada; and
- Transport Canada; and the

General Public.

Consultation related to Aboriginal groups is described in Section 6.

7.1.2 Overview of Stakeholder Consultation Activities to Date

De Beers informs and involves the public and stakeholders in a variety of ways. The focus of consultation is to inform citizens of the status of the exploration and mining-related activities and to provide information regarding future consultation opportunities. Consultation activities to date have been focused on gathering input for the VMEP and engaging stakeholders in the environmental baseline data collection as appropriate.

Consultation to date has included conference calls, and meetings to share information about the VMEP and obtain feedback from the CEA Agency, the MOE, MNR and the Ontario MNDM on regulatory aspects. Details regarding this consultation such as participants, dates, and methods

by which they were consulted and comments, are provided in Table 6-2.

7.2 Key Comments and Concerns by Stakeholders

The following list summarizes these issues and interests from (non-aboriginal) stakeholders related to the VMEP to date.

Socio-economic Effects:

- The CEA Agency presented the approach, timing and party responsibility of engaging First Nations (per CEAA, 2012, Table 6-2 and Appendix D).

Water Resources and Water Management:

- The MOE presented concerns about potential impacts of pit dewatering to surface water (unnamed tributary, muskeg ponds) and related monitoring (Table 7-1 and Appendix D).

7.3 Overview of Proposed Stakeholder Consultation Activities

De Beers will inform and involve the public and stakeholders in a variety of ways. The focus of the early consultation is to inform citizens of the status of the exploration and proposed mining-related activities and to provide information regarding future consultation opportunities. Consultation activities are now shifting toward gathering input in support of the VMEP design and development for the anticipated Federal EA. Should it be determined that Provincial EA will process(es) be required, consultation to satisfy that process will be sought as well.

De Beers and the Federal and provincial government agencies recognize that there are opportunities to collaborate on planning and implementing stakeholder engagement and consultation for their respective EA processes, and will attempt to align consultation activities as possible. At this time, planned stakeholder consultation activities associated with the VMEP federal EA will include:

- Distribution of notices of community information events in local communities (using methods such as posting in community offices, regional Aboriginal and non-Aboriginal newspapers, local radio advertising, and posting to the De Beers website);

- Updating the De Beers website to include information about the EA process(es) and provide a link for direct feedback;

- Hold ongoing discussions with stakeholder organizations (as requested) to provide updated information about the VMEP and gather feedback on the VMEP EA process; and

- Host public meetings or open houses in local communities and gather feedback regarding the VMEP.

7.4 Consultation with Other Jurisdictions

There are no other jurisdictions with EA or regulatory requirements with respect to the VMEP that have not already been identified in previous sections.

Table 7-1: Provincial Government Records

ROC	Event Type	Date	Event Summary	Stakeholder Type	Stakeholders
1	Teleconference / Meeting	August 16, 2012	1. The EA can be completed without the results of the 60-day pump test, but 60-day pump test results would be needed for permitting (see further comments below on possible permitting phases); 2. Do more with the overburden, because the main concern of MOE will be affects to surface water systems (unnamed tributary, muskeg ponds); 3. Be prepared to look at springs in the Attawapiskat River near shore area (may be difficult to address, but need to make the effort); 4. Alisdair also has to answer to comments from the public so may request things that might not always appear necessary; and 5. Be prepared for delays in approvals, because there are typically requests for further information with all complex approval applications. For Specific meeting minutes please see Appendix D.	Regulatory	Attendees in person: Alisdair Brown – MOE Todd Kondrat – MOE Ghulem Sarwar (sp) – MOE Leo Fusciardi – DBC Brian Steinback – DBC, Houmao Liu – Itasca David Simms AMEC Simon Gautrey – AMEC, (via teleconference) Peter Williamson – DBC Patrick Rummel –DBC Lesley Lorrimer – AMEC

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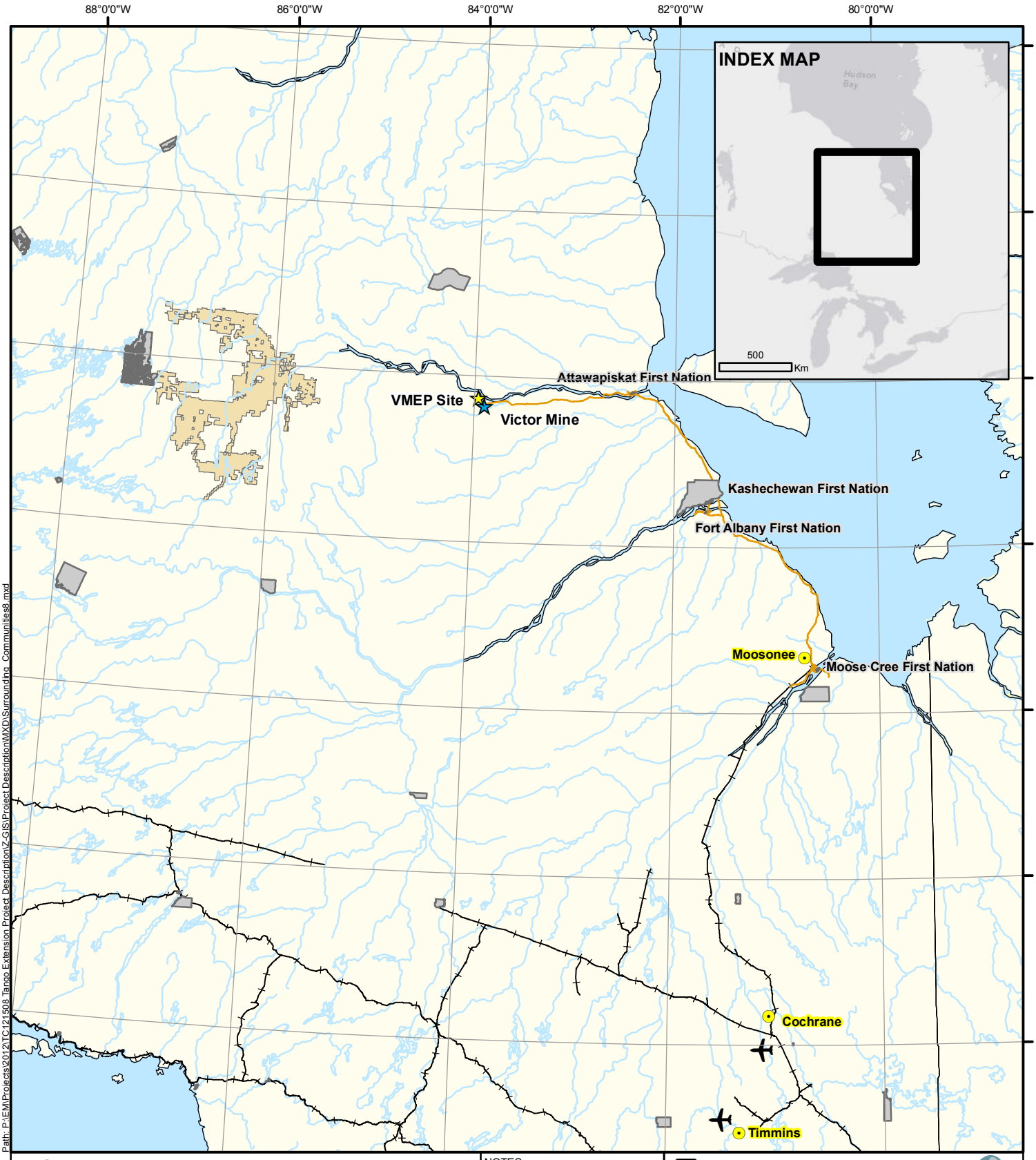


LEGEND

- Tango Extension Kimberlite
- Victor Mine
- Town
- Airports
- Road
- Winter Road
- Railway
- First Nation Reserve (Federal Land)
- Ring of Fire
- Watercourse

NOTES:
- Background data provide by the Ontario Ministry of Natural Resources
- Location and name of First Nation Communities provided by Aboriginal Affairs and Northern Development Canada

Datum: NAD83
Projection: UTM Zone 17N

0 25 50 100 150 200 250 Kilometres

N W E S

De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

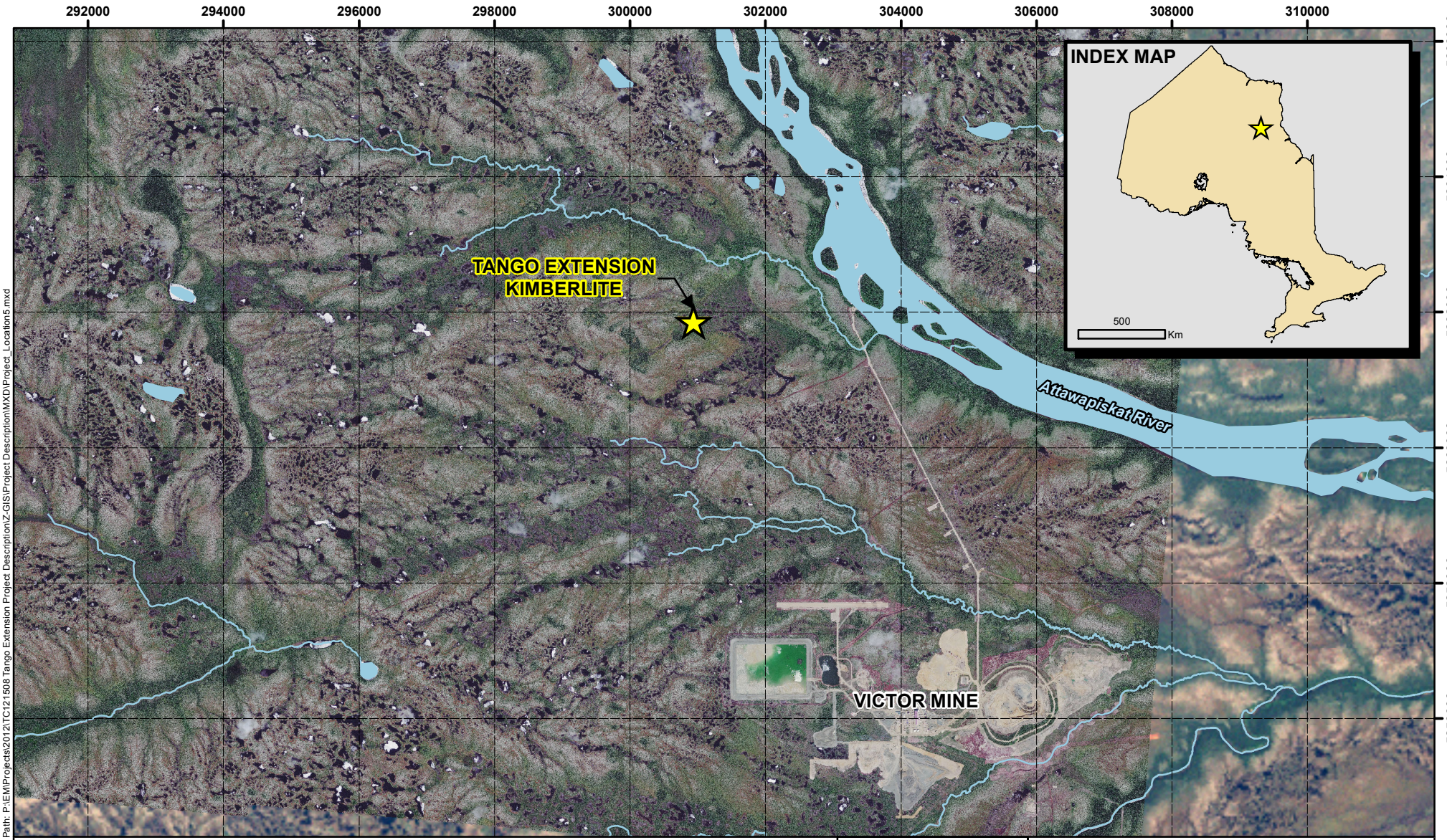
Site Location

PROJECT N°: TC121508

FIGURE: 1

SCALE: 1:3,500,000

DATE: April 2013



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LEGEND

- Tango Extension Kimberlite
- Watercourse
- Waterbody/Large River

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers
- Watercourse data provided by the Ontraio Ministry of Natural Resources and amened by AMEC

Datum: NAD83
Projection: UTM Zone 17N

0 1 2 4 6 8 10 Kilometres

N W E S

De Beers CANADA

amec

VICTOR MINE EXTENSION PROJECT

Project Location

PROJECT Nº: TC121509	**FIGURE: 2**
SCALE: 1:80,000	DATE: April 2013

300000 302000 304000 306000 308000

5864000 5862000 5860000 5858000 5856000 5854000 5852000 5850000

Unnamed Tributary
Attawapiskat River
North Granny Creek
South Granny Creek
NayshKootayaow River
VICTOR MINE
James Bay
Attawapiskat

1241227 1241228 1241229 1241231 4212583
CLM436 CLM445 CLM455 CLM435 CLM446 CLM437 1246006
P1052190

1 - Airstrip
2 - Central Quarry
3 - South Quarry
4 - Open Pit (Fine PK Cell)
5 - Accommodation Complex
6 - Milling Building
7 - Crusher
8 - Fuel Tank Storage
9 - Services (Potable Water, Sewage Treatment Plant, Incinerator)
10 - Landfill
11 - Muskeg/Peat Stockpile
12 - Overburden Stockpile
13 - Coarse Processed Kimberlite Stockpile
14 - Attawapiskat River Pumphouse
15 - Attawapiskat River Intake Road
16 - South Winter Road
17 - 115 kV Transmission Line
18 - Nayshootayaow River Flow Supplementation Pipeline
19 - Explosives Blending Plant (Location May Change)
20 - Mine Rock Stockpile
21 - Fine PK Cell 1
22 - Approved Fine PK Cell (Not Yet Built)
23 - North Granny Creek Supplementation Pipeline
24 - South Granny Creek Supplementation Pipeline

VMEP Site
Victor Mine
10 Km

Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Existing_Features4.mxd

LEGEND

- Tango Extension Kimberlite
- Victor Mine
- Town
- Winter Road Corridor
- Transmission Line Corridor
- Waterbody/Large River
- Watercourse
- Approved Fine PK Cell (Not Yet Built)
- Disposition (De Beers)
- Claim (De Beers)

Existing Victor Mine Features*

*Yellow highlighted numbers indicates existing Victor MIne facilities to be reused to support VMEP.

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers
- Watercourse data provided by the Ontario Ministry of Natural Resources and amended by AMEC
- Mine features extracted from 2011 FUPA Report

Coordinate System
NAD 1983 UTM Zone 17N

0 0.5 1 2 3 4 Kilometres

N W E S

De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

Victor Mine Existing Features

PROJECT Nº: TC121508 | FIGURE: 3

SCALE: 1:40,000 | DATE: April 2013

300000 302000 304000 306000 308000

5864000 5862000 5860000 5858000 5856000 5854000 5852000 5850000

VMEP
Unnamed Tributary
Peat Stockpile
Overburden Stockpile
VMEP Open Pit
Mine Rock Stockpile
Water Intake/ Discharge Pumphouse
Distribution Line Connector
Contingency Stockpile
Mine Services
Contingency Stockpile
Infrastructure Corridor
Attawapiskat River
Attawapiskat River Intake Road
North Granny Creek
South Granny Creek
Nayshkootayaow River
Potential Fine PK Storage
4212583
1241228
1241229
1241227
1241231
P1052190
CLM436
CLM455
CLM446
CLM445
CLM435
CLM437
1246006

Attawapiskat River
James Bay
Attawapiskat
VMEP Site
Victor Mine
10 Km

Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z_GIS\Project Description\MXD\Site Plan14.mxd

LEGEND

- Tango Extension Kimberlite
- Victor Mine
- Town
- Existing Access Trail
- Existing Winter Road Corridor
- Existing Transmission Line Corridor
- Disposition (De Beers)
- Claim (De Beers)
- Waterbody/Large River
- Watercourse

Proposed VMEP Feature
- Infastructure Corridor (Road, Conveyor, and Dewatering Pipeline)
- Mine Services
- Mine Rock
- Contingency Stockpile
- Overburden Stockpile
- Peat Stockpile
- Open Pit
- Distribution Line

0 0.5 1 2 3 4 Kilometres

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers, background image was collected in October 2010 and provided by De Beers
- Imagery in inset extracted from ESRI online
- Watercourse data provided by the Ontario Ministry of Natural Resources and amended by AMEC

Coordinate System
NAD 1983 UTM Zone 17N

N W E S

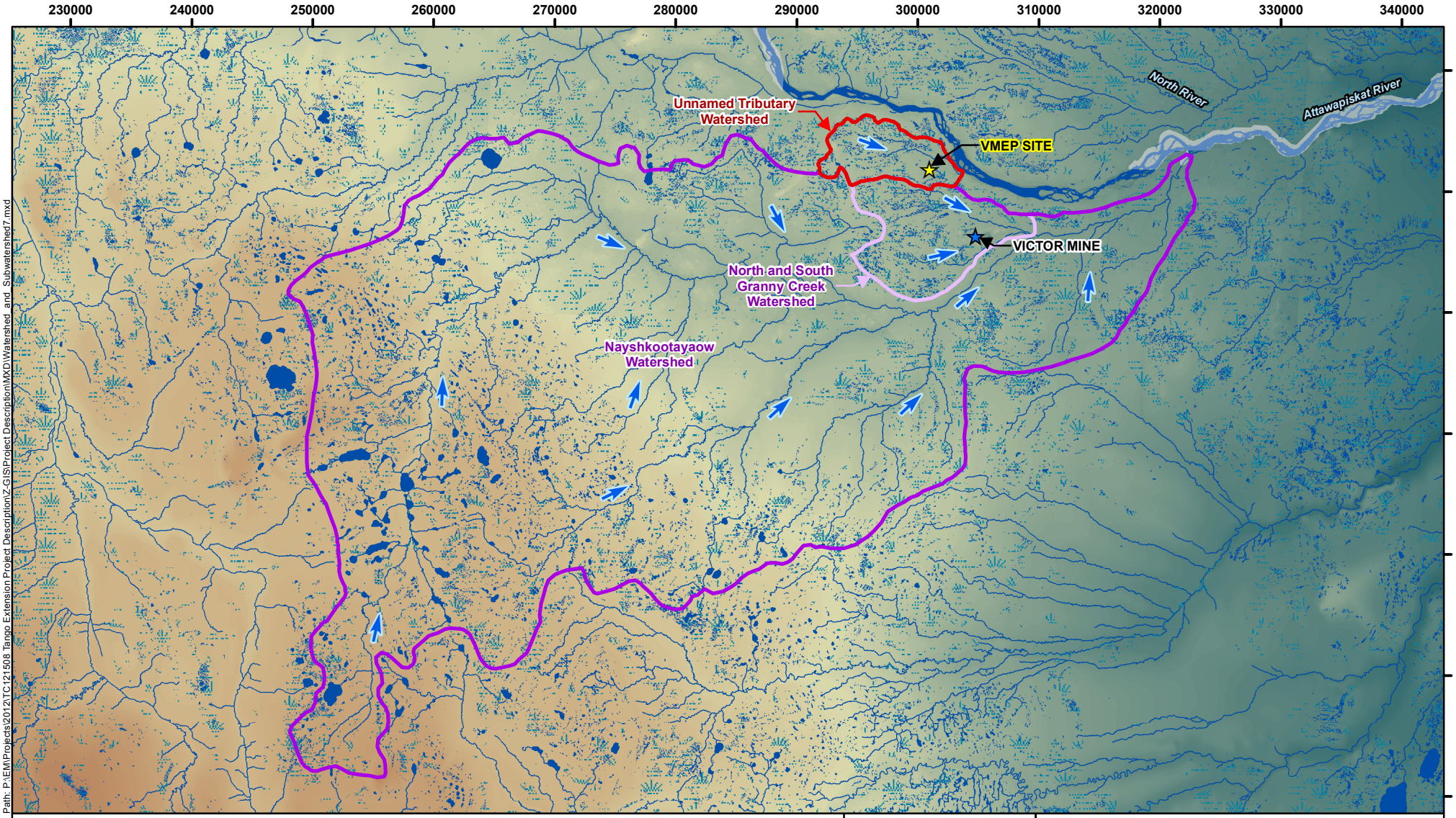
De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

VMEP Conceptual Layout

PROJECT N°: TC121508	**FIGURE: 4**
SCALE: 1:40,000	DATE: April 2013



Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Watershed and Subwatershed7.mxd

LEGEND

- VMEP Site
- Victor Mine
- General Surface Flow Direction
- Otoskwin/Attawapiskat River Provincial Park
- Wetland
- Watercourse
- Waterbody/Large River
- Unnamed Tributary Watershed (45.55 km^2)
- Nayshkootayaow Watershed (2102.61 km^2)
- North and South Granny Creek Watershed (92.01 km^2)

Elevation Key

High : 184 masl

Low : 38 masl

NOTES:
- Digital Elevation Model was provided by the Ontario Ministry of Natural Resources
- Watercourse data provided by the Ontario MInistry of Natural Resources and amended by AMEC

Datum: NAD83
Projection: UTM Zone 17N

0 5 10 20 30 40 50 Kilometres

N W E S

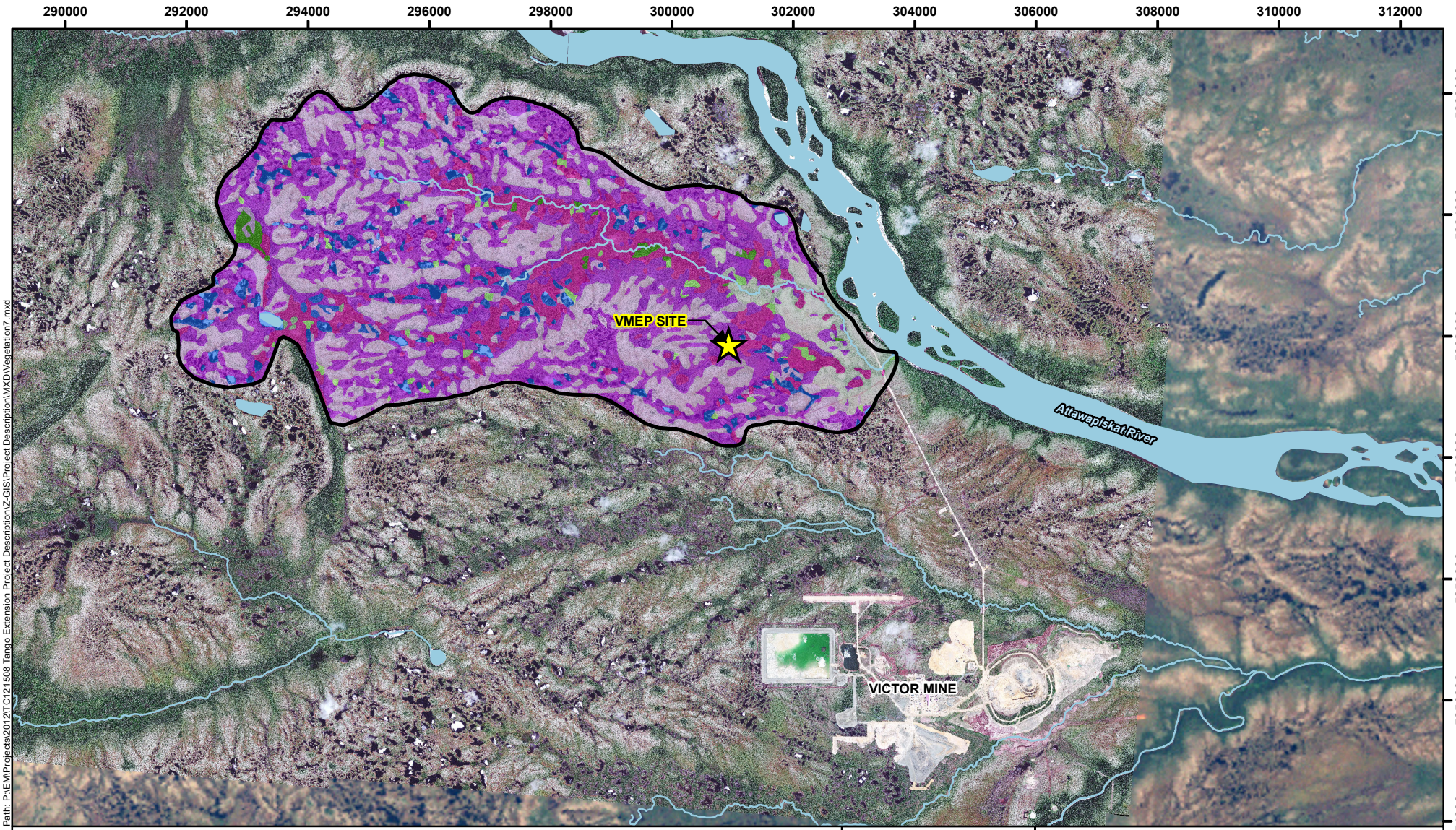
De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

Regional Topography and Watershed Boundaries

PROJECT N°: TC121508	**FIGURE: 5**
SCALE: 1:450,000	DATE: April 2013



Path: P:\EMProjects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Vegetation7.mxd

LEGEND

- VMEP Site
- Watercourse
- Waterbody/Large River
- Unnamed Tributary Watershed

Vegetation Classes

- Water - Deep Clear
- Forest Depletion - Burns
- Forest - Sparse
- Forest - Dense Mixed
- Forest - Dense Coniferous
- Fen - Open
- Fen - Treed
- Bog - Open
- Bog -Treed

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers
- Watercourse data provided by the Ontario Ministry of Natural Resources and amended by AMEC
- Vegetation classification provided by the Ontario Ministry of Natural Resources

Datum: NAD83
Projection: UTM Zone 17N

N W E S

0 1 2 4 6 8 10 Kilometres

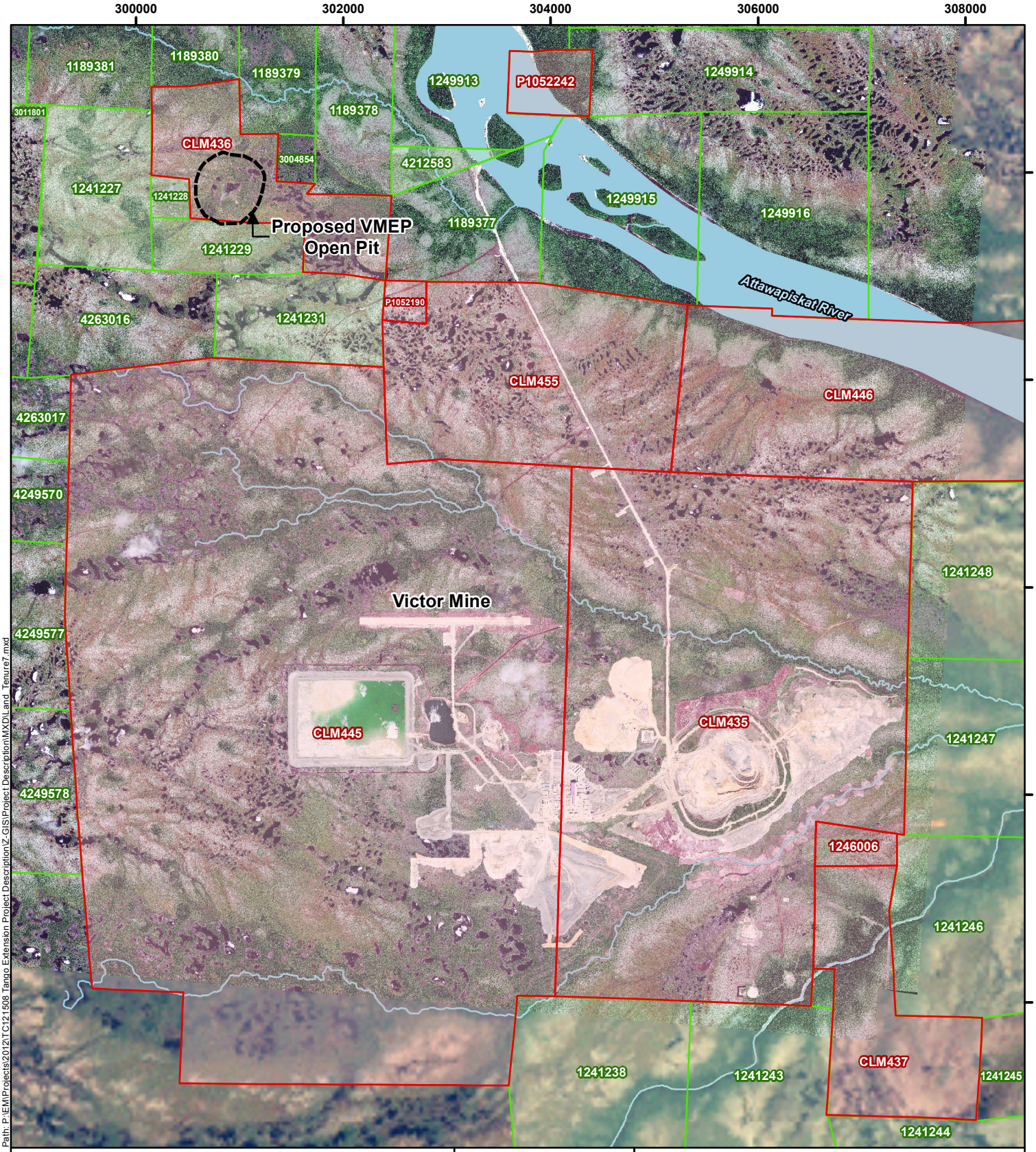
De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

Vegetation In The VMEP Area

PROJECT N°: TC121508	**FIGURE: 6**
SCALE: 1:90,000	DATE: April 2013



Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Land_Tenure7.mxd

LEGEND

- VMEP Proposed Open Pit
- Watercourse
- Waterbody/Large River
- Disposition (De Beers Canada Inc.)

Claim (by holder)

- De Beers Canada Inc.
- Other

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers
- Watercourse data provided by the Ontario Ministry of Natural Resources and amended by AMEC
- Land Tenure current as of 10 August 2012 and was extracted from the Ontario Ministry of Northern Development and Mines website

De Beers Canada

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VICTOR MINE EXTENSION PROJECT

Land Use and Tenure

Datum: NAD83
Projection: UTM Zone 17N

N
W E
S

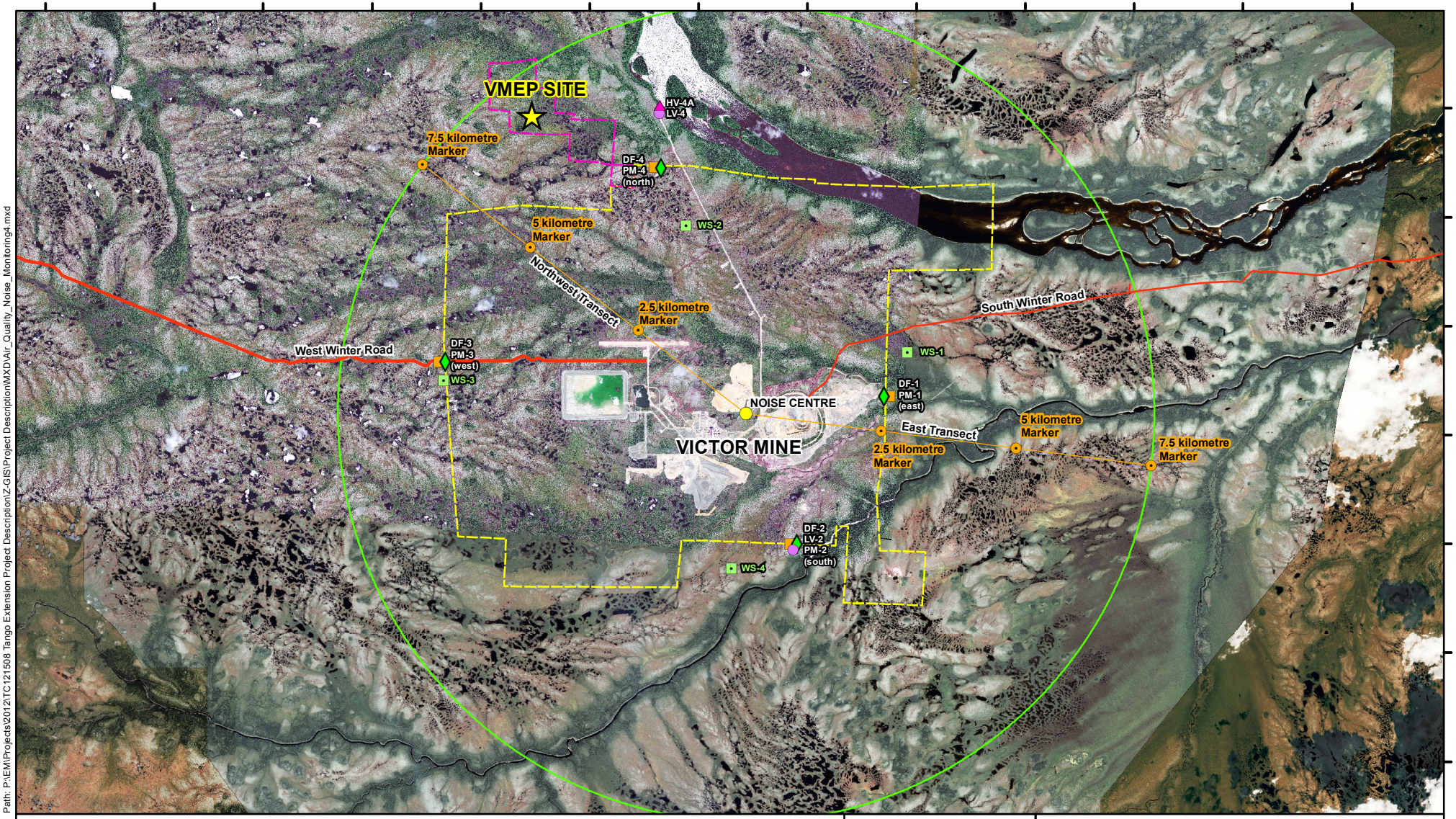
0 0.5 1 2 3 4 Kilometres

PROJECT N°: TC121508

FIGURE: 7

SCALE: 1:50,000

DATE: April 2013



Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Air_Quality_Noise_Monitoring4.mxd

LEGEND

- VMEP Site
- Passive (SO_X, NO_X) Sampling
- Dustfall Sampling
- High Volume Sampling
- Low Volume Sampling
- Air Quality Station (snowpack)
- Noise Central Point
- 2.5 km Incremental Noise Monitoring Sites (along transects)
- Noise Transect Lines
- Winter Roads
- 7.5 km Buffer Zone (from noise centre)
- VMEP Property Boundary
- Victor Mine Property Boundary

0 1 2 4 6 8 10 Kilometres

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers

Datum: NAD83
Projection: UTM Zone 17N

N W E S

De Beers CANADA

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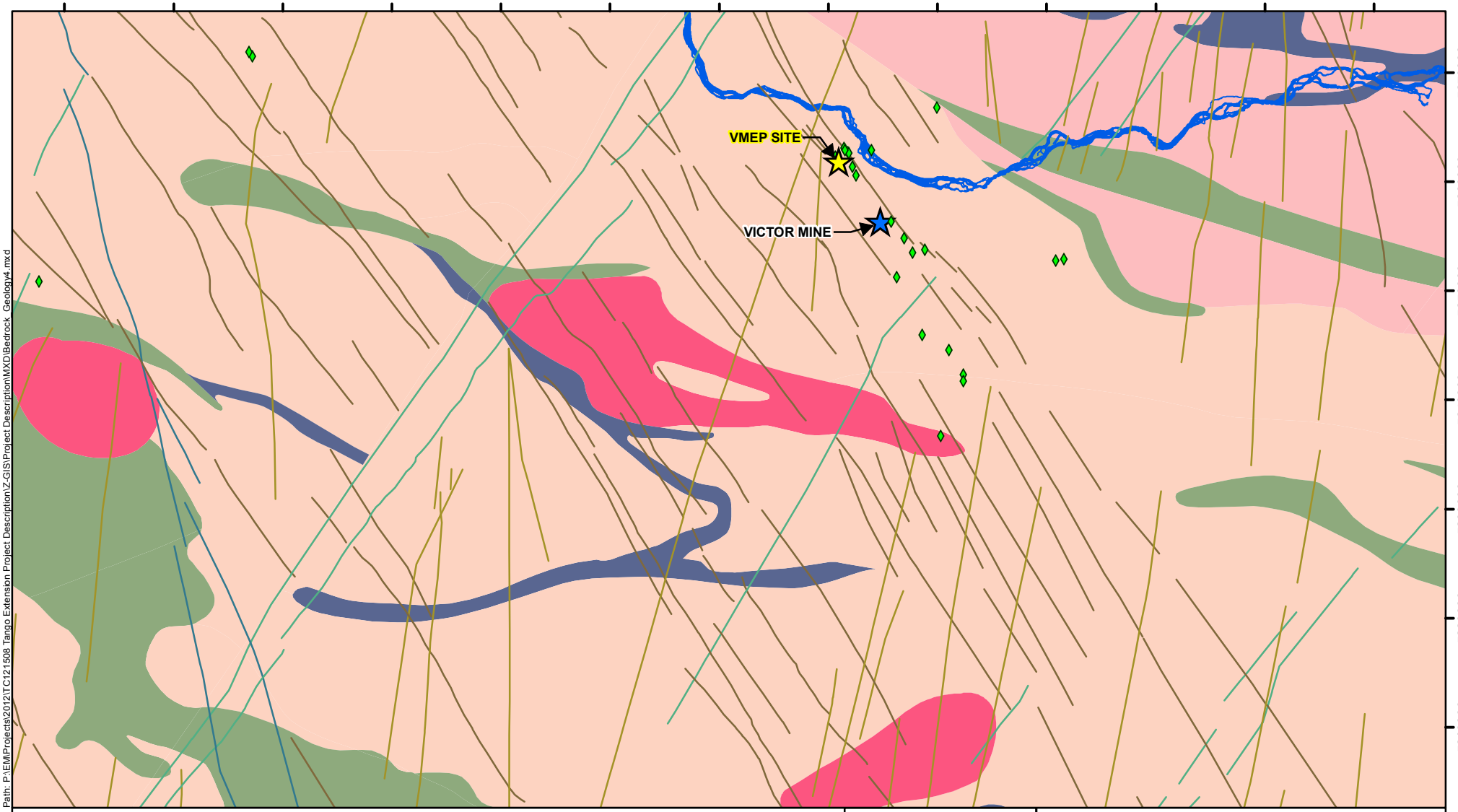
VICTOR MINE EXTENSION PROJECT

Air Quality and Noise Monitoring Sites Around Victor Mine

PROJECT N°: TC121508	**FIGURE: 8**
SCALE: 1:100,000	DATE: April 2013



Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Bedrock Geology4.mxd

LEGEND

- VMEP Site
- Victor Mine
- Kimberlite
- Attawapiskat River
- 17a Matachewan mafic dike swarm (circa 2454 Ma)
- 23a Marathon mafic dike
- 23c Marathon, Kapuskasing or Biscotasing mafic dike
- 26c Pickle Crow mafic dike
- 5 Mafic to intermediate metavolcanic rocks: basaltic and andesitic flows, tuffs and breccias, chert, iron formation, minor metasedimentary and intrusive rocks, related migmatites
- 8 Migmatized supracrustal rocks: metavolcanic rocks, minor metasedimentary rocks, mafic gneisses of uncertain protolith, granitic gneisses
- 11 Gneissic tonalite suite: tonalite to granodiorite - foliated to gneissic - with minor supracrustal inclusions
- 12 Foliated tonalite suite: tonalite to granodiorite - foliated to massive
- 15 Massive granodiorite to granite: massive to foliated granodiorite to granite

NOTES:
- Geological data provided by Ontario Ministry of Northern Development and Mines
- Waterbody data provided by the Ontario Ministry of Natural Resources

Datum: NAD83
Projection: UTM Zone 17N

N
W E
S

0 5 10 20 30 40 50 Kilometres

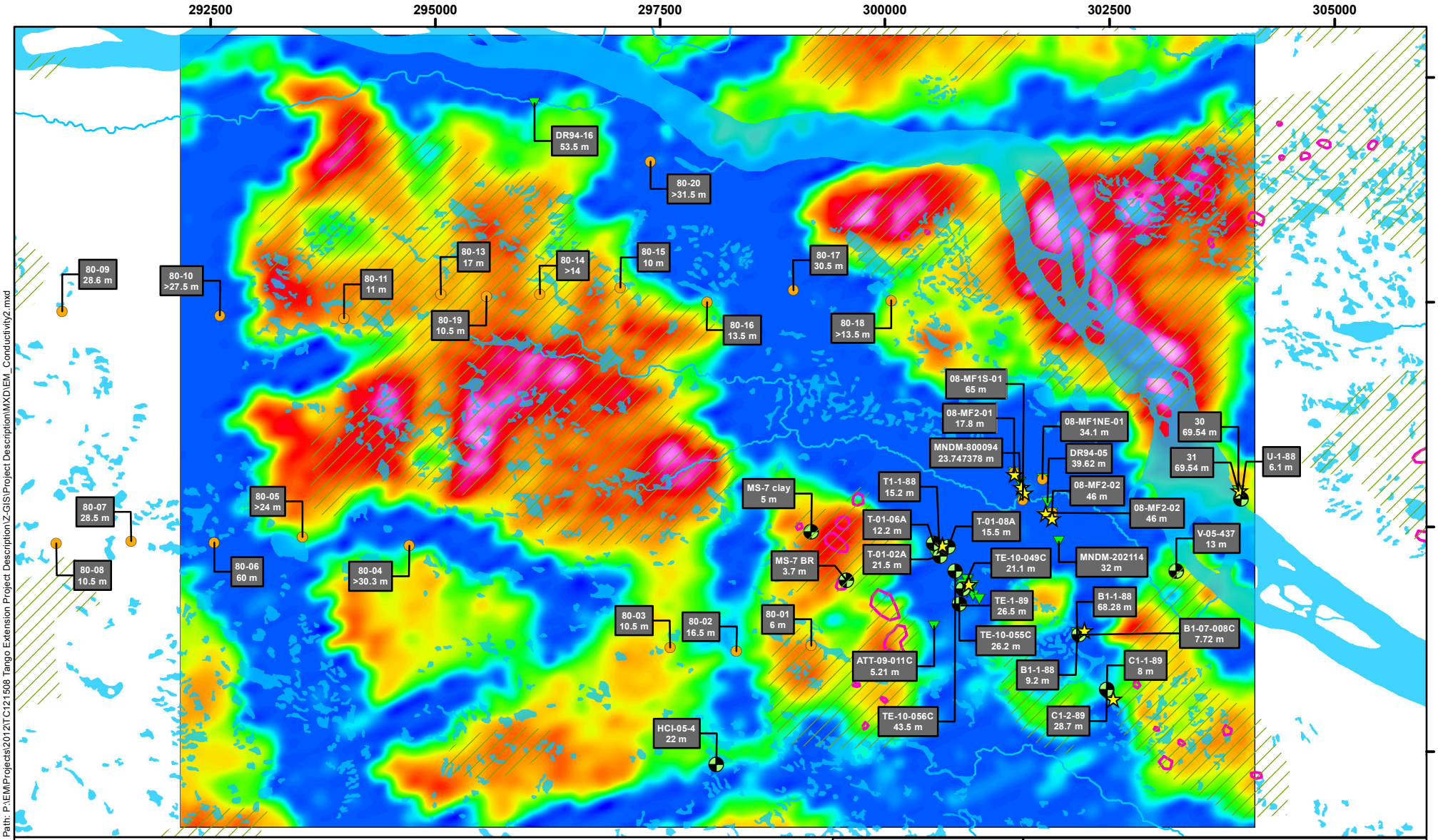
De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

Regional Bedrock Geology

PROJECT Nº: TC121508	**FIGURE: 9**
SCALE: 1:500,000	DATE: April 2013



Path: P:\EMProjects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\EM_Conductivity2.mxd

LEGEND

- Kimberlite Location
- MacFayden Drill Hole
- Shallow Overburden from EM (2006 Interpretation)
- Existing Monitoring Wells (by type)
- Other DH from Assessment
- Probable Bioherm (2006 Interpretation)
- Waterbody/Large River
- Watercourse

EM Conductivity

High : 72.08

Low : -2.70

Label Key: Existing Monitoring Wells and MacFayden Drill Holes

80-02
16.5 m
← Well/Drill Hole ID
← Overburden Thickness

NOTES:
- EM Conductivity from Attawapiskat Victor Survey (Spectrum, 2006)

0 0.5 1 2 3 4 5 Kilometres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

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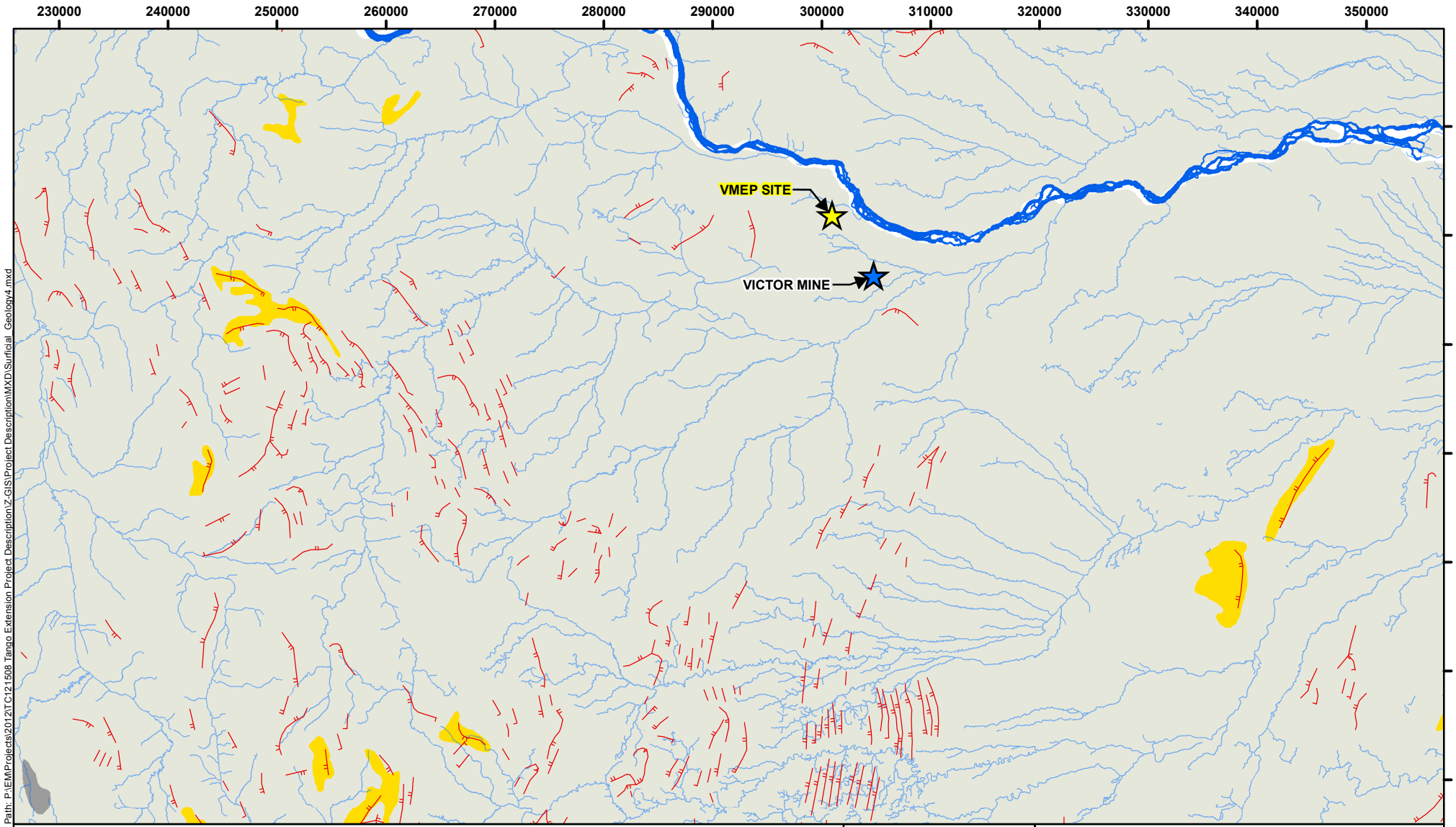
VICTOR MINE EXTENSION PROJECT

Inferred Overburden Thickness In The VMEP Area

PROJECT N°: TC121508	**FIGURE: 10**
SCALE: 1:60,000	DATE: April 2013



Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Surficial Geology4.mxd

LEGEND

- VMEP Site
- Victor Mine
- Watercourse
- Attawapiskat River
- Beach Bar or Spit

Precambrian

1 Bedrock: undifferentiated igneous and metamorphic rock, exposed at surface or covered by a discontinuous, thin layer of drift

Pleistocene

27 Glaciomarine and marine deposits: sand, gravelly sand and gravel nearshore and beach deposits

Recent

32 Organic deposits: peat, muck and marl

NOTES:
- Geological data provide by the Ontario Ministry of Nothern Development and Mines
- Watercourse and waterbody data provided by the Ontario Ministry of Natural Resources and amended by AMEC

Datum: NAD83
Projection: UTM Zone 17N

N W E S

0 5 10 20 30 40 50 Kilometres

De Beers Canada

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VICTOR MINE EXTENSION PROJECT

Regional Surficial Geology

PROJECT N°: TC121508	**FIGURE: 11**
SCALE: 1:500,000	DATE: April 2013

Figure 12 - Granny Creek Flow Station 04FC011 - Flows for 2006 to 2011

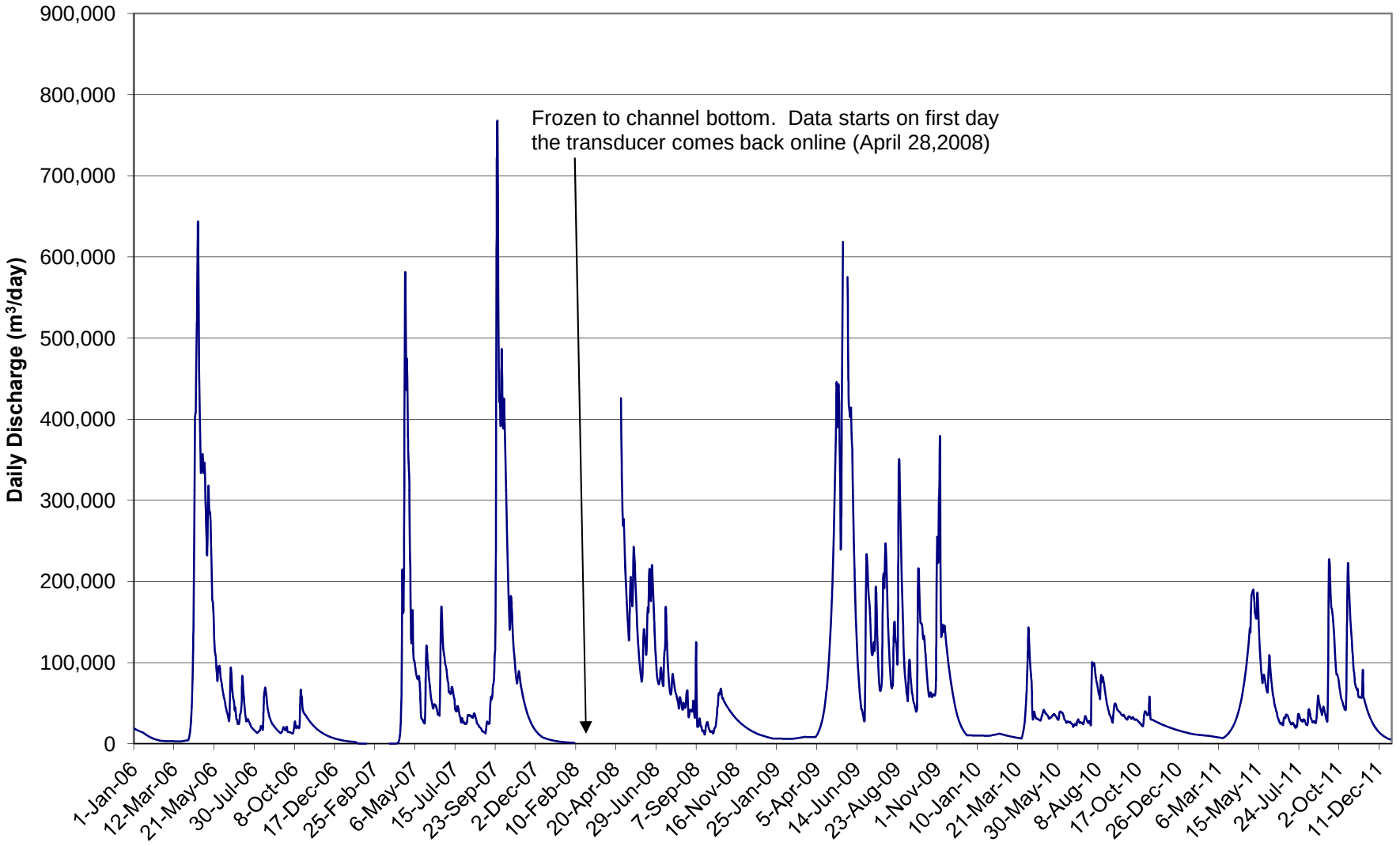
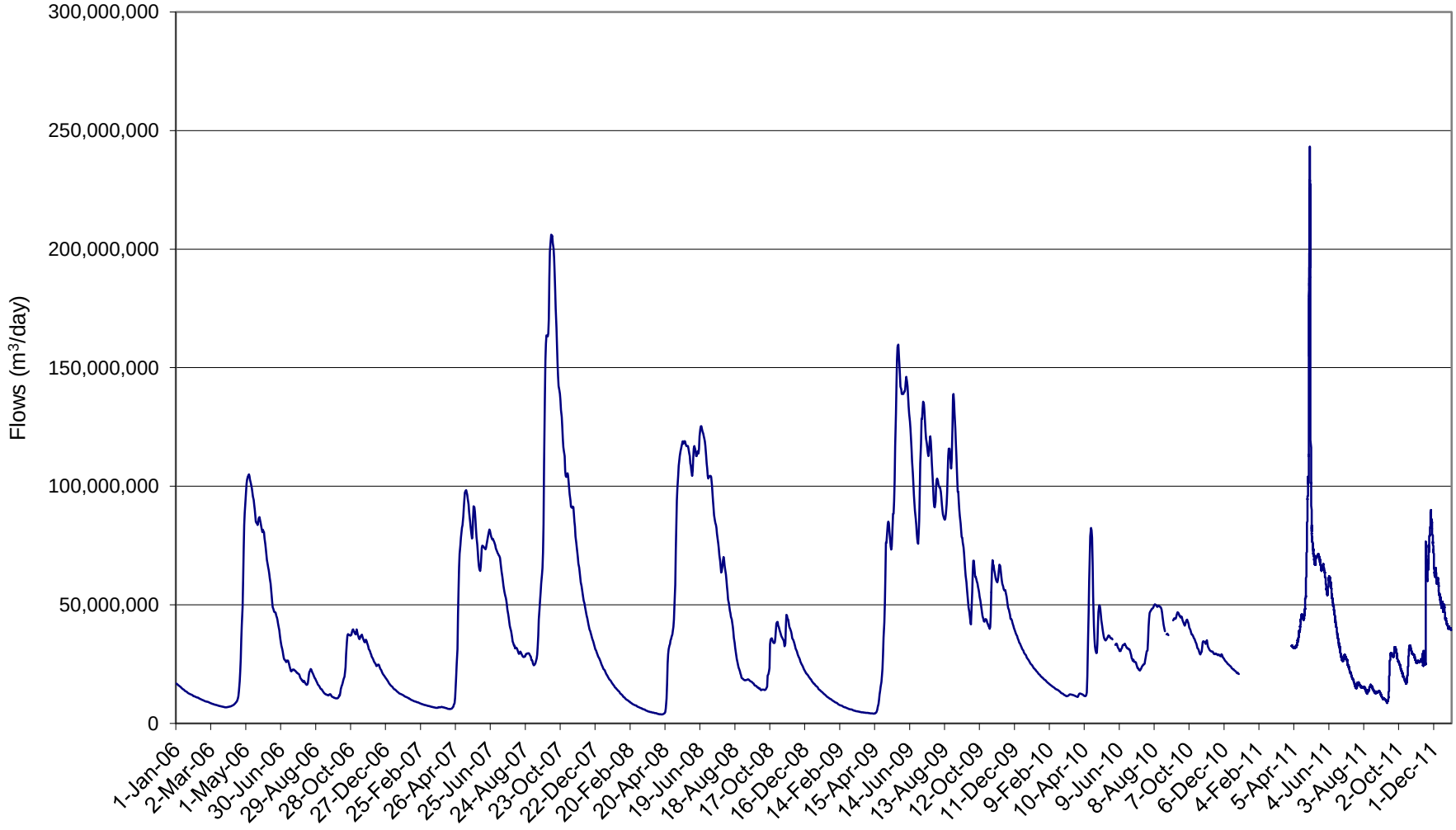
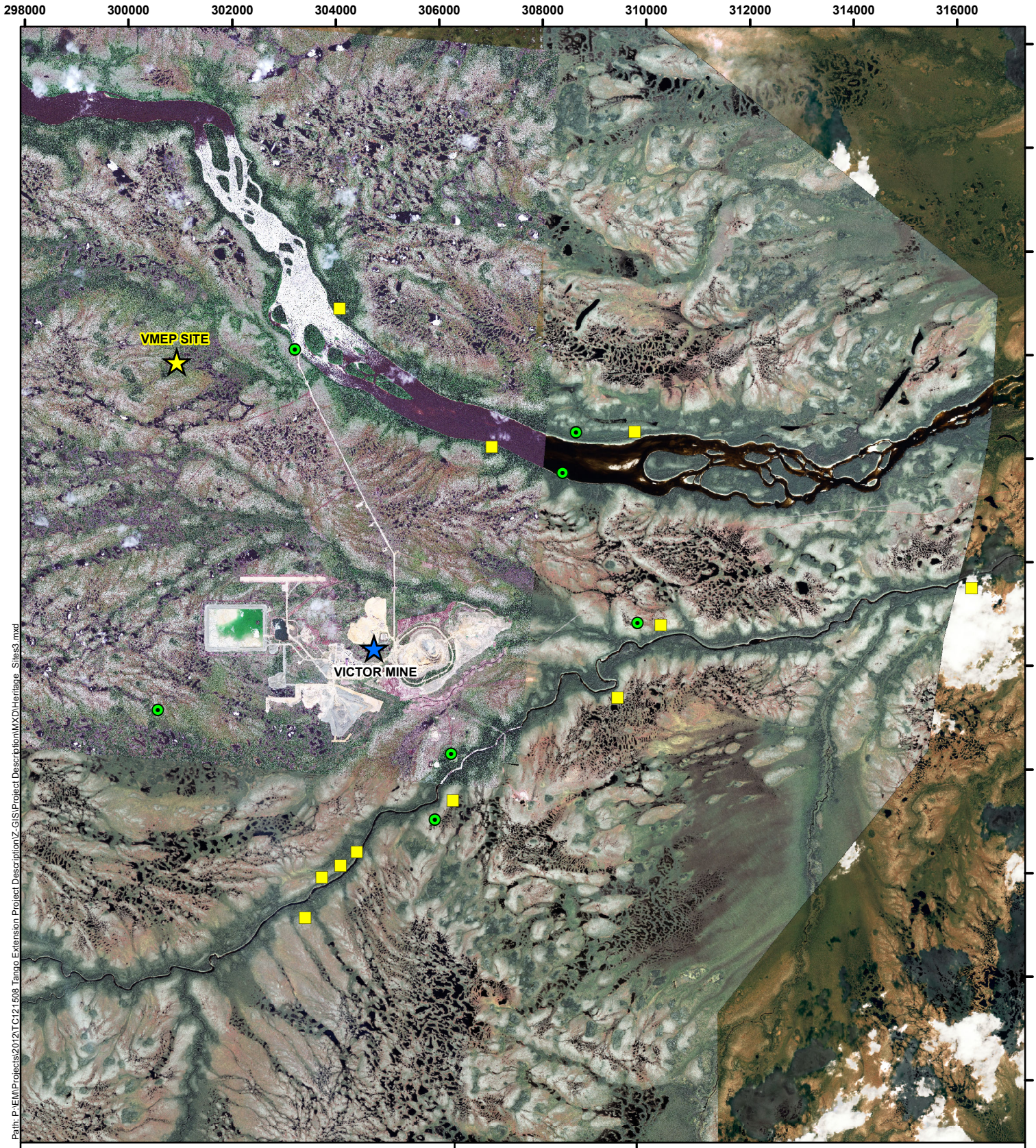


Figure 13 - Prorated Attawapiskat River Flows Calculated for the Victor Site (prorated from Station 04FC001, Attawapiskat River Below Muketei River)





Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Heritage_Sites3.mxd

LEGEND

- VMEP Site
- Victor Mine
- Archaeological Testing
- Existing Heritage Resources

NOTES:
- Central image scene was collected in July 2012 and provided by De Beers

De Beers CANADA

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VICTOR MINE EXTENSION PROJECT

Heritage Resources

Datum: NAD83
Projection: UTM Zone 17N

N W E S

0 0.5 1 2 3 4 5 Kilometres

PROJECT Nº: TC121508

FIGURE: 14

SCALE: 1:100,000

DATE: April 2013

292000 293000 294000 295000 296000 297000 298000 299000 300000 301000 302000 303000

586000 585000 584000 583000 582000 581000

Path: P:\EM\Projects\2012\TC121508 Tango Extension Project Description\Z-GIS\Project Description\MXD\Stantec_Watershed_and_Sample_Locations3.mxd

Attawapiskat River

TC1 NB8 NB7 NB6 NB5 NB4 NB3 NB2 NB1 TB1 TB2 TB3 TB4 TD1 TA1 TA2

Middle Pond West Pond TNG CRK MN TNG CRK NT

NE-0155 NE-0156 NE-0167 NE-0174 NE-0186 NE-0177 NE-0171 NE-0194 NE-0192 NE-0180 NE-0201 NE-0203

NW-0200 NW-0277 NW-0267 NW-0288 NW-0327 NW-0345 NW-0348 NW-0352

IP-0397 -0452 IP-0448 IP-0470 -0442 IP-0472 -0456 -0473 IP-0478 IP-0480 IP-0485 IP-0465 IP-0518 IP-0509 IP-0507 IP-0519

W-0449 W-0457 W-0453 W-0459 W-0475 W-0464 W-0476 W-0720 W-0907 W-0937 W-0951 W-0891 W-0925

M-0488 M-0461 M-0483 M-0451 M-0450 M-0511 M-0444 M-0466 M-0469 M-0463 M-0537 M-0535 M-0534 M-0514 M-0553 M-0575 M-0545 M-0578 M-0637 M-0632 M-0644 M-0649 M-0691 M-0680 M-0713 M-0672 M-0688 M-0809 M-0711 M-0707 M-0727 M-0725 M-0771 M-0831 M-0816 M-0789 M-0811 M-0798 M-0801 M-0834 M-0824 M-0872 M-0827 M-0954 M-0923 M-0793 M-0927 M-0828 M-0844 M-0949 M-0893 M-0894 M-0974 M-1038

SE-0896 SE-0913 SE-1115 SE-1151 SE-1111

LEGEND

- Bedrock Exposure
- Erosional Benthic Sample (Surber)
- Water Sample
- Beaver Lodge
- Beaver Dam (Active)
- Beaver Dam (Inactive)
- Reach Divide
- Reach
- Recommended Locations for Hydrological Monitoring
- Watershed
- Sub-watershed
- Small Muskeg Pond Surveyed < 1 m Depth
- Small Muskeg Pond Surveyed > 1 m Depth
- Large Muskeg Pond Surveyed
- Other Muskeg Pond Not Surveyed

NOTES:
- Orginal map created by Neegan Naynowan Stantec LP
- Field work conducted by Stantec Consulting Sept 2012.
- Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
- Original mapping Feb 2013
- Geo-Eye imagery provided by De Beers Canada Inc. Imagery date July 4, 2012.

Datum: NAD83
Projection: UTM Zone 17N

N W E S

0 0.5 1 2 3 4 5 Kilometres

De Beers Canada

amec

VICTOR MINE EXTENSION PROJECT

Unnamed Tributary Watershed Boundaries and Sampling Area Locations

PROJECT Nº: TC121508 | **FIGURE: 15**

SCALE: 1:30,000 | DATE: April 2013

APPENDIX A

Photo Record of the VMEP Area

Plate 1 – Existing Victor Mine

Plate 2 – Airstrip

Plate 3 – Process plant and fuel storage tanks

Plate 4 – Fine PCK facility and polishing pond (flooded central quarry)

Plate 5 – Victor Mine processing plant, view facing southwest

Plate 6 – Victor Mine accommodation facilities, view facing southeast

Plate 7 – Attawapiskat River pump house and intake pipeline

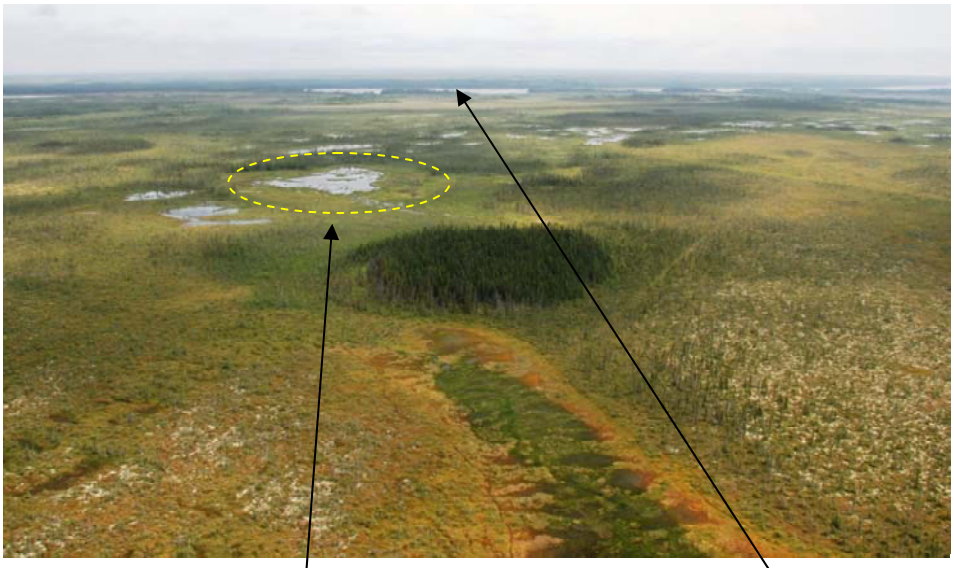

Plate 8 – Proposed VMEP Open Pit and Water Intake on Attawapiskat River

APPENDIX B

Geochemical Characterization of VMEP Rock

DE BEERS CANADA INC.
TANGO EXTENSION PROJECT

Geochemical Characterization of Mine Rock

Submitted to:
De Beers Canada Inc.
250 Ferrand Drive, Suite 900
Toronto, Ontario
M3C 3G8

Submitted by:

AMEC Environment & Infrastructure,
a division of AMEC Americas Limited
160 Traders Blvd., Suite 110
Mississauga, Ontario
L4Z 3K7

December 2012

TC121508.300

December 21, 2012

TC121508.300

De Beers Canada Inc.
250 Ferrand Drive, Suite 900
Toronto, Ontario
Canada, M3C 3G8

Attention: Mr. Brian Steinback Brian.Steinback@debeerscanada.com

RE: Tango Extension Geochemistry Characterization of Mine Rock

Dear Mr. Steinback,

AMEC Environment and Infrastructure, a Division of AMEC Americas Limited (AMEC) was retained by De Beers Canada (De Beers) to provide static metal leaching and acid rock drainage (ML/ARD) geochemical characterization in support of the Tango Extension Project. The following is a draft copy of our report entitled "Tango Extension Geochemical Characterization of Mine Rock". This report encompasses the results and findings of the ML/ARD characterization based on analyses of existing drill core including assessment of exploration data as surrogates for geochemical characterization.

If you have any questions or concerns regarding this document, please do not hesitate to contact our office.

Yours truly,

AMEC Environment & Infrastructure
a division of AMEC Americas Limited

DRAFT

Sheila Daniel, M.Sc., P.Geo.
Senior Associate Geoscientist

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Fax (905) 568-1686
www.amec.com

Canada's Top 100 Employers 2011

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Appendix A Modified Acid-Base Accounting Results
Appendix B Elemental Content Results
Appendix C MEND SFE Test Results

1.0 INTRODUCTION

AMEC Environment and Infrastructure, a Division of AMEC Americas Limited (AMEC) was retained by De Beers Canada (De Beers) to provide support for the execution and completion of a static metal leaching and acid rock drainage (ML/ARD) geochemical characterization study for the Tango Extension Project. The Tango Extension Project is part of the Victor Resource Extension Project, located approximately 90 km west of the community of Attawapiskat in the James Bay Lowlands proximal to the De Beers Victor Mine. The following is a summary of results for the geochemical testing of existing drill core to assess the metal leaching and acid rock drainage potential of materials for the Tango Extension Project.

2.0 GEOLOGICAL UNITS

The overburden at the Tango Extension site ranges from 14.5 to 30 m depth including muskeg, clays, country rock breccias and glacial till. The country rock surrounding the kimberlite pipe is comprised of Paleozoic limestone along the northern margin of the pipe, and Mesozoic mudstone formations surround the kimberlite pipe in all other directions. An older kimberlite formation (Tango Extension Deep) is located beneath the mudstones, and is not well characterized. The kimberlite formations resulted in slumping of the host (country) rock, resulting in some mixing of carbonate bearing rock with the kimberlitic rock.

The Tango Extension kimberlite ore zone has been classified according to geological formation and petrological significance. Each model code contains at least one lithological unit and is mixed to some degree with host rock. The Tango Extension code model identifiers are as follows:

Model Code	Description
OVB	Overburden material
TE1VK	Volcaniclastic kimberlite formation
TE2VK	Volcaniclastic kimberlite formation
TE3VK	Volcaniclastic kimberlite formation
TE4VK	Re-sedimented kimberlite w/ breccia
TELSX	Limestone
TEMST/TEDMST	Mudstone lake deposits
TED1VK	Carbonatized kimberlite

The TE1VK, TE2VK and TE3VK model codes are the principal ore zones, and TE4VK is a lower grade ore diluted with limestone or mudstone. The TELSX unit is mainly comprised of limestone, and TEMST/TEDMST units are comprised of mudstone. The TED1VK structure represents the older and deeper kimberlite pipe that is buried beneath mudstone.

A current mine plan for the Tango Extension pit was not yet developed; however, preliminary volume estimates were made available by De Beers. Overburden and mine rock (host rock) will be stored in adjacent stockpiles on the site. The displaced overburden material has an estimated volume of about two million cubic meters. The total volume of mine rock (host rock) to be excavated is unknown, as the pit dimensions were not available at this time. The processed ore grade material including all volcaniclastic units (i.e., TE1VK, TE2VK, TE3VK, TE4VK and

TED1VK model codes) has an estimated volume of 20 million cubic meters. Processed kimberlite may be stored in the Victor Mine open pit to assist with pit reclamation efforts.

3.0 AVAILABLE DATA

Geochemical data for exploration drill core material were made available for review. The existing database is comprised of samples obtained from drill core material that were collected from previous drilling programs, including:

- 12 drill cores from the 2002-2003 drilling program with 173 previously analyzed samples of the TE1VK (63), TE2VK (75), TE3VK (20), TE4VK (12) and TELSX (3) rock units; and,
- 15 drill cores from the June 2010 drilling program with 259 samples previously analyzed samples of the TE1VK (88), TE2VK (67), TE3VK (13), TE4VK (33), TEDMST (23), TED1VK (25) and TELSX (2) rock units.

The existing data provided to AMEC was analyzed in August 2011 by Acme Laboratories (Vancouver, Canada) and included analyses for metals content by digestion and analyses by ICP-MS, content of major elements as oxides by X-ray fluorescence (XRF) and content of both total sulphur and total carbon by LECO induction furnace. Nine (9) pulps from 2010 program analyzed by XRF for whole rock major element analysis did not included analyses for total sulphur and carbon. All samples from the existing geochemical database were not previously analyzed for acid-base accounting (ABA).

4.0 SAMPLE SELECTION AND ANALYSES

Samples were selected from existing drill core samples to correspond to whole rock elemental content data available in the existing geochemical database. Although 259 samples were analyzed from the 2010 drilling program, most bore holes appear to be completed within the kimberlite ore zone with very little drilling completed in the surrounding host rock. The available dataset was limited mostly to the extent of the ore zone, and likely does not represent the extent of the open pit boundary which will extend beyond the perimeter. Furthermore, no geochemical data were available for the overburden (OVB) material.

Given the available dataset, a total of 45 samples were selected for ML/ARD testing to cover the spatial extent of samples available from the 2010 drilling program. The intent was to use the analytical results to determine the suitability of the total sulphur and total carbon data (from the existing geochemical database) for use as surrogates to assess the ML/ARD potential.

As all samples in the existing geochemical database were submitted for analysis in 2011, samples from the 2002/2003 drilling program (i.e., stored for approximately nine years) may not be reliable for predicting acid leaching potential due to potential weathering of surface minerals. A total of six samples were selected from the 2002/2003 drill plan to spatially align with the 2010 samples and to assess the influence of sample aging on ML/ARD behaviour, if any.

Samples were collected by De Beers from the existing drill core stored material as directed by AMEC. Minimum sample masses (0.5 to 1.0 kg) were shipped to Maxxam Analytics ML/ARD laboratory for the following analyses:

- All 51 selected samples were analysed for acid-base accounting (ABA) parameters following the modified Sobek procedure including determination of sulphur and carbon species.
- A subset of 27 samples were subjected to shake flask extraction (SFE) analyses whereby ground samples were mixed with deionised water in a 3:1 liquid to solid ratio with gentle agitation for a 24 hour period. Supernatants were analyzed for pH, oxidation-reduction potential (ORP), conductivity (EC), alkalinity, concentration of sulphate (SO_4) and dissolved metals by ICP-MS.
- Four overburden samples were digested and analyzed by ICP-MS including major, minor and trace constituents.
- After assessment of the current results, up to nine samples will be selected for semi-quantitative mineralogical analysis by X-ray diffraction (XRD) with Rietveld refinement. The results of the XRD analyses will be submitted at a future date under separate cover.

5.0 Regulatory Context

The approach and methodology for the collection and characterization of materials disturbed by mining activity was based upon the requirements described under the Ontario *Mining Act*; namely guidance found within the document *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials* (MEND 2009). This document is the updated version of the document *DRAFT Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (Price 1997). The document also represents best practice and industry standard approaches and methodologies for ML/ARD sampling and characterization.

5.1 Acid-Base Accounting (ABA)

Samples for ABA analysis followed the modified Sobek procedure (MEND, 2009). The analyses included the determination of paste pH, total inorganic carbon, modified Sobek neutralization potential and sulphur species (total sulphur, sulphate-sulphur, and sulphide-sulphur by difference). Acid potential (AP) was determined based on calculated sulphide sulphur. The amount of neutrialization potential (NP) was determined using two methods; the Modified Sobek method which represents the NP as determined empirically in the prescribed acidification/titration test (hereafter NP) and carbonate NP (Carb NP) calculated based on total content of inorganic carbon. The neutralization potential ratio (NPR) as represented by NP/AP is a measure of the potential of a sample to generate acidity in the future. Similarly carbonate NPR (Carb NP/AP) is a measure of the potential to generate acidity based on the balance between carbonate and sulphide contents. Where necessary, the method detection limit (MDL) for sulphur (equivalent to AP values < 0.6 kg $CaCO_3$/tonne) were used to calculate NPR.

Testing of ABA is conducted to segregate non-potentially acid generating (non-PAG) and potentially acid generating (PAG) mine rock based on values for either NP or Carb NP vs. AP. Results for the ABA analyses based on NPR values were assessed on the following criteria indicated in MEND (2009).

ARD	Screening Criteria	Comments
PAG	NPR <1	Materials are Potentially Acid Generating.
Uncertain	1<NPR<2	Materials with uncertain acid generating potential.
Non-PAG	NPR>2	Materials are Not Potentially Acid Generating.

As an initial screening tool, the threshold NPR separating PAG rock from non-PAG rock is generally accepted as NPR = 2. This value is generally accepted as industry best practice (MEND 2009).

5.2 Total Elemental Content

The elemental compositions of the four overburden samples were determined by ultra trace ICP-MS metal analysis following *aqua regia* digestion. Elemental analysis is used to quantify the concentration of elements in solid-phases (i.e., minerals), but does not provide a direct assessment of metal leaching potential. *Aqua regia* digestion as applied here, to the overburden samples and previously analyzed exploration sample data sets, is considered a near total digestion since the majority of minerals in the rocks are dissolved. Though some resistant minerals such as certain silicates may only be partially decomposed, dissolution of most environmentally significant metal phases is usually adequate by this technique.

Metal content was compared to values for the average crustal abundance listed by Price (1997). This comparison is used as a screening procedure to identify metals of interest enriched in the materials; however, no regulatory standards apply directly to the metal content of mine rock. For comparison purposes, a value 10 times greater than the average crustal abundance was used to define samples with elevated elemental content.

5.3 Shake Flask Extraction (SFE)

Testing by SFE is used to assess the quantities of readily soluble metals in samples. The analysis provides a multi-elemental composition of the supernatant waters after mixing with a crushed sample. The analysis provides information on the pH, conductivity and alkalinity, as well as concentrations of sulphate (SO_4) and dissolved metals.

There are no criteria that are directly applicable to assess metal leaching data from SFE testing; however, SFE results were compared to environmental guidelines for Ontario Provincial Water Quality Objectives (PWQO) and Municipal Industrial Strategy Abatement (MISA, O.Reg. 560/94). The SFE test was used here as a screening tool and does not simulate site specific leaching conditions. In addition, the results cannot be used to directly predict leachate quality exiting the site as these guidelines are applicable at downstream compliance points and not directly to source materials. As such, comparisons are considered preliminary and used as a screening tool to identify parameters of potential concern that may be released from the rock at elevated concentrations.

6.0 RESULTS

6.1 Acid Base Accounting (ABA)

A statistical summary of the ABA data is presented in Table 1. Detailed ABA results are found in Appendix A.

Paste pH

All drill core samples had paste pH values between 7.9 and 9.1.

Forms of Sulphur and Acid Potential

Total content of sulphur ranged from less than the MDL (0.02%) to 1.6%, with a median of 0.1%. Sulphate sulphur was reported as HCl extractable sulphur, and ranged from less than the MDL (0.01%) to 0.29%, with a median value of 0.03%. Sulphide sulphur was calculated by difference and ranged from the MDL (0.02%) to 1.48%, with a median value of 0.13%.

Comparison of the total sulphur to sulphide sulphur indicated that sulphur in the drill core samples is primarily present as sulphide (Figure 1), with the exception of samples from the TE2VK and TE3VK units and some samples from the TED1VK unit which contained mostly sulphate sulphur. The four overburden (OVB) samples contained low total sulphur contents (<0.06%).

Acid potential (AP) was calculated using content of sulphide sulphur. The AP for all drill core samples ranged from less than the MDL (<0.6 kg $CaCO_3$/tonne) for samples with no detectable sulphide, to 46.3 kg $CaCO_3$/tonne. Median AP values were less than 1 kg $CaCO_3$/tonne) in samples classified as OVB, TE1VK, TE2VK, TE3VK and TED1VK, whereas TE4VK had a median AP value of 4.4 kg $CaCO_3$/tonne. Samples classified as containing mudstone (TEMST/TEDMST) and limestone (TELSX) had higher AP values compared to the other materials and ranged from 5.3 to 46.3 kg $CaCO_3$/tonne.

Forms of Neutralization Potential (NP)

Neutralization potential ranged from 337 to 1000 kg $CaCO_3$/tonne, with a median value of 659 kg $CaCO_3$/tonne. Carbonate NP values had a similar range from 262 to 991 kg $CaCO_3$/tonne and a median of 496 kg $CaCO_3$/tonne. These values reflect the overall high carbonate content of these materials. Comparison of NP to Carb NP (Figure 2) shows that the majority of NP is attributed to carbonate minerals. The higher values for Sobek NP compared to Carb NP indicates that some of the NP is attributable to non-carbonate minerals and that Carb NP is a more conservative estimate of the effective NP in these samples.

Neutralization Potential Ratios

As discussed previously above, the NPR and Carb NPR values were determined using the content of sulphide sulphur as the measure of AP. All samples had NPR values greater than 2 (Figure 3) and are classified as non-PAG. Values for NPR ranged from 18.5 to 1667 with an average of 121 for all samples, and Carb NPR values ranged from 14.9 to 1,652 with an average of 101 for all samples (Table 1). These NPR values indicate that all samples were non-PAG.

6.2 Elemental Content

Elemental concentrations for the four overburden samples are presented in Table 2. Elemental content was compared to average continental crust abundances. Concentrations of selenium are greater than 10 times the average crustal abundance in some samples; however, the MDL for selenium was greater than the average crustal abundance. The content of all other elements in the four overburden samples were less than 10 times the average crustal abundance. Notably the nickel content in the overburden samples ranged from 13.2 to 20.6 mg/kg.

The proportion of samples including current overburden and previous exploration data that exceeded the average crustal concentrations by a factor greater than 10 is summarized in Table 3. Detailed results for elemental content are found in Appendix B.

The total concentrations of chromium, magnesium, nickel, selenium and sulphur were greater than 10 times the crustal averages. Of the volcaniclastic kimberlite samples analyzed (TE1VK, TE2VK, TE3VK, TE4VK), 13% to 64% of samples exceeded 10 times the crustal average for chromium, and 18% to 65% of samples exceeded 10 times the crustal average for nickel. Elevated contents of sulphur were detected in 10% to 50% of samples from the TE4VK, TED1VK, TEDMST, TELSX and TEMST rock unit codes, with higher abundance rock units deeper within the deposit. Some exceedances were also noted for barium, strontium, tantalum and thorium.

Compared to the elemental content of carbonate sedimentary rocks, concentrations of selenium, strontium and sulphur in a few samples exceeded the average abundances by greater than 10 times. All other elements were less than 10 times the average abundance for carbonate sedimentary rocks.

The elemental content of the major subdivisions of materials (overburden, country rock and kimberlite) were compared with each other. Overburden samples had average content of arsenic, beryllium, lead, thorium, and zinc that were greater than average concentrations in the kimberlite-bearing samples. Most kimberlite-bearing mine rock samples (TE1VK, TE2VK, TE3VK, TE4VK, and TEDVK) contained elevated concentrations of calcium, copper, iron, magnesium, manganese, nickel, phosphorous and strontium relative to the average elemental content of the overburden and TEMST/TEDMST country rock. The average concentrations of aluminum, cerium, caesium, gallium, germanium, hafnium, potassium, rubidium, silicon,

thorium, vanadium, yttrium and zirconium were elevated in TEMST/TEDDMST mudstone samples relative to kimberlite-bearing samples.

6.3 Shake Flask Extraction (SFE)

A subset of 27 samples was selected for metal leachability testing using the SFE test. Results are presented in Appendix C.

Leachate pH values ranged from 7.7 to 9.0. Thirty-three percent of samples reported pH values that were greater than the PWQO upper value of 8.5; however, no samples had pH values greater than the O.Reg 560/94 value of 9.5.

In general, concentrations of dissolved metals in the leachate were low. Concentrations of dissolved aluminum were higher than the PWQO value (0.015 mg/L) for all of the overburden (OVB) and mudstone (TEDMS/TEMST) samples, and ranged from 0.07 to 1.8 mg/L and 0.06 to 1.3 mg/L, respectively. One sample from TE2VK and one sample from TE4VK also exceeded the PWQO value for aluminum (0.03 and 0.02 mg/L, respectively).

Dissolved concentrations of copper for two of the overburden samples exceeded the PWQO value of 0.005 mg/L. The same samples also exceeded the PWQO value for concentrations of phosphorous. Overall, 52% of all samples analyzed exceeded the phosphorous PWQO value of 0.01 mg/L.

Two mudstone samples (TEDMST) and one volcaniclastic kimberlite sample (TE4VK) exceeded the PWQO value for vanadium.

As discussed above, 18% to 65% of rock unit samples had total concentrations of nickel greater than 10 times the average crustal abundance; however concentrations of nickel in the SFE extracts were not greater than PWQO values. The release of Ni from TE1VK, TE2VK and TE3VK may be positively correlated with total nickel content

O.Reg 560/94 values were not exceeded in any of the SFE extracts.

7.0 ESTIMATION OF NPR FROM EXPLORATION SAMPLE SET

The ABA results from the 51 samples analyzed here were used to determine the adequacy of the total sulphur and total carbon data (from the existing geochemical database) for use as surrogates to assess the acid producing potential of the core sample material.

The LECO induction furnace method was used to determine the content of total sulphur and carbon for samples in the existing database as well as samples analyzed for ABA (Appendix A). Values were compared in Figure 4 and Figure 5, respectively. Strong positive correlations are observed for data collected in the 2010 drilling program. Some deviation was observed. For samples obtained from the 2002/2003 drilling program. This variability may be due to sample heterogeneity or may be due to oxidisation of sulphides and consumption of some carbonate minerals on the surface of the core samples during storage.

As presented in Figure 1, the total sulphur content in the drill core samples is primarily in the form of sulphide sulphur. Given that the total sulphur as measured previously is similar to values for total sulphur as measured for ABA in the current study (Figure 4), the values for total sulphur content from previous work were used as surrogate values to calculate AP. The surrogate AP represents a conservative estimate of AP as some samples were identified to contain significant non-sulphide sulphur content. The surrogate AP values calculated from total sulphur values in the existing geochemical database were compared to the AP values as determined in the ABA methodology (Figure 6). The trend supports the application of total sulphur as a surrogate for the estimation of AP.

As discussed above, all 51 samples analyzed for ABA had Carb NP values less than the Modified Sobek NP values (Figure 2), indicating that Carb NP is a conservative estimate of effective NP. The surrogate Carb NP was calculated based on total carbon, and was compared to Carb NP values as determined by ABA methodology for the same samples (Figure 7). In general, the surrogate carbonate NP values were greater than the Carb NP values (as determined by ABA). Consequently, the following regression equation was applied and used to correct for the observed difference:

$$Corrected\ Surrogate\ Carb\ NP = \frac{Surrogate\ Carb\ NP - 25.928}{1.0434}$$

Based on this correction, total carbon values available in the existing database were used as a surrogate to estimate Carb NP.

Surrogate estimates for AP and Carb NP were calculated based on total sulphur and total carbon content for all 263 samples in the 2010 geochemical database from prior studies. A comparison of the corrected surrogate Carb NP and surrogate AP is presented in Figure 8. The statistical representation of calculated AP and corrected surrogate Carb NP for all samples in the existing geochemical database that were obtained from 2010 drill core is presented in Table 4. The corrected surrogate Carb NPR values for the larger database ranged from 12 to 3330, with an average of 162 and a median value of 685. The application of surrogates to determine AP and NP indicate that all samples in the database have NPR values >2, and are classified as non-PAG material. Existing total sulphur and total carbon data for samples collected in the 2002/2003 drilling program were not used to calculate surrogate AP and NP.

8.0 SUMMARY AND RECOMMENDATIONS

Characterization of ML/ARD potential was completed on a subset of existing exploration drill core samples and surrogate relationships were successfully derived that allowed calculation of generally conservative values of NPR for the existing dataset.

Based on the current understanding of available drilling and sampling and the current mine plan, we infer that the bulk of sample results most closely represent process kimberlite rock. By the nature and objective of drilling programs to date, a relatively small amount of mine (host) rock has currently been intercepted by exploration drilling.

Based on the current results we provide the following conclusions:

ARD Potential

- All of the analysed samples are carbonate rich and sulphide poor and thus contain moderately high to very high NP and generally low AP. The presence of non-sulphide sulphur (that may or may not contribute to acid generating potential) has been identified in some samples (e.g., TE3VK) so the use of total sulphur in these cases will conservatively over estimate AP.

- Based on the current ABA analyses and estimated ABA parameters based on the use of surrogate values, all samples had NPR values much greater than 2, and classified as non-PAG.

- Based on these results, a selection of up to nine samples will be submitted for Rietveld XRD for due diligence, to semi-quantitatively identify the prominent mineral forms in the core samples including forms of carbonate and sulphur if present in sufficient quantities.

Metal Leaching Potential

- Concentrations of chromium, nickel, and sulphur in most core samples were greater than 10 times the average crustal abundances. Concentrations of barium, selenium, strontium, tantalum and thorium were greater than 10 times the average crustal abundance in some cases. Similarly, concentrations of selenium, strontium and sulphur were greater than 10 times the average elemental content of carbonate rocks.

- Based on SFE extracts, the concentrations of aluminum were greater than the PWQO value in 33% of the samples analyzed. The concentrations of copper, phosphorous and vanadium in SFE extracts were greater than the PWQO values in some samples Concentrations of arsenic, copper, lead, nickel and zinc in the SFE supernatants were less than any of the O. Reg. 560/94 or PWQO values.

- Overall, there is little evidence of concern for potential metal leaching based on available analyses.

Additional testing and characterization as it relates to the potential for metal leaching should be conducted as the mine plan and open pit design evolves, focusing on materials within the volume of the proposed open pit, but outside of the current drilling program. Experience at the Victor Mine site may be beneficial to assist in guiding requirements for any additional sampling, characterization and assessment of water quality.

9.0 CLOSING

This report has been prepared for the exclusive use of De Beers Canada for specific application to the Tango Extension Project by AMEC Environment and Infrastructure, a Division of AMEC Americas Limited (AMEC). The quality of information, conclusions and estimates contained herein are consistent with the level of effort involved in AMEC's services and based on: i) information available at the time of preparation, ii) data supplied by outside sources and iii) the assumptions, conditions and qualifications set forth in this document. This report is intended to be used by De Beers Canada only, and its nominated representatives, subject to the terms and conditions of its contract with AMEC. Any other use of, or reliance on, this report by any third party is at that party's sole risk. This report has been prepared in accordance with generally accepted industry-standard. No other warranty, expressed or implied, is made.

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TABLES

Table 1: Modified Acid-Base Accounting Statistics

		Paste pH	TIC	Total Sulphur	Sulphate Sulphur	Sulphide Sulphur	AP	Sobek NP	Carb NP	NPR	Carb NPR
			(wt.%)				(kg CaCO3/tonne)				
OVB	# Samples	4	4	4	4	4	4	4	4	4	4
	Minimum	8.2	16.50	0.02	0.01	0.02	0.60	389	376	243	235
	Maximum	8.4	19.80	0.06	0.01	0.05	1.60	478	449	775	741
	Average	8.3	18.65	0.04	0.01	0.03	1.00	448	424	448	424
	Median	8.3	19.15	0.04	0.01	0.03	0.90	463	435	522	486
	Standard Deviation	-	1.51	0.02	0.00	0.01	0.42	40	34	217	207
	10^{th} Percentile	8.21	17.16	0.03	0.01	0.02	0.69	411	391	324	306
	90^{th} Percentile	8.41	19.74	0.05	0.01	0.04	1.39	474	448	702	669
TE1VK	# Samples	12	12	12	12	12	12	12	12	12	12
	Minimum	7.9	15.80	0.02	0.01	0.02	0.60	525	359	86	59
	Maximum	9.1	28.30	0.28	0.05	0.23	7.20	754	644	1181	1074
	Average	8.4	21.28	0.08	0.03	0.06	1.75	613	484	350	276
	Median	8.6	19.95	0.05	0.03	0.03	0.75	613	453	776	575
	Standard Deviation	-	4.06	0.08	0.01	0.06	1.98	71	92	367	294
	10^{th} Percentile	8.21	17.62	0.02	0.02	0.02	0.60	543	400	198	163
	90^{th} Percentile	8.95	27.56	0.16	0.05	0.11	3.34	704	626	1023	736
TE2VK	# Samples	8	8	8	8	8	8	8	8	8	8
	Minimum	8.4	14.80	0.02	0.01	0.02	0.60	581	336	54	38
	Maximum	9.1	43.60	0.45	0.10	0.41	12.80	1000	991	1667	1652
	Average	8.7	22.34	0.10	0.04	0.07	2.13	664	507	313	239
	Median	8.7	19.85	0.02	0.02	0.02	0.60	609	451	1003	718
	Standard Deviation	-	8.93	0.15	0.04	0.14	4.31	140	203	437	444
	10^{th} Percentile	8.58	16.76	0.02	0.02	0.02	0.60	587	380	694	403
	90^{th} Percentile	8.98	28.90	0.22	0.09	0.14	4.26	781	657	1244	1095
TE3VK	# Samples	5	5	5	5	5	5	5	5	5	5
	Minimum	8.6	11.50	0.05	0.04	0.02	0.60	526	262	329	164
	Maximum	8.9	19.20	0.14	0.09	0.05	1.60	713	437	1188	728
	Average	8.7	15.90	0.09	0.07	0.03	0.80	602	362	752	452
	Median	8.7	16.00	0.09	0.08	0.02	0.60	585	363	975	605
	Standard Deviation	-	2.97	0.04	0.03	0.01	0.45	71	67	329	224
	10^{th} Percentile	8.61	12.86	0.05	0.04	0.02	0.60	541	293	573	324
	90^{th} Percentile	8.83	18.68	0.12	0.09	0.04	1.20	676	425	1126	708
TE4VK	# Samples	8	8	8	8	8	8	8	8	8	8
	Minimum	7.9	18.90	0.02	0.02	0.02	0.60	661	430	21	15
	Maximum	9.0	42.10	1.22	0.08	1.14	35.60	1000	956	1667	1593
	Average	8.2	29.88	0.36	0.04	0.33	10.18	779	679	77	67
	Median	8.3	30.40	0.18	0.04	0.14	4.35	756	691	182	138
	Standard Deviation	-	7.14	0.44	0.02	0.41	12.89	111	162	673	647
	10^{th} Percentile	7.98	21.98	0.03	0.02	0.02	0.60	668	499	31	27
	90^{th} Percentile	8.71	36.36	0.92	0.06	0.86	26.85	892	826	1400	1347
TED1VK	# Samples	6	6	6	6	6	6	6	6	6	6
	Minimum	8.0	25.50	0.03	0.03	0.02	0.60	723	580	28	27
	Maximum	8.7	40.50	1.17	0.29	1.11	34.70	964	920	1606	1533
	Average	8.2	35.97	0.31	0.09	0.22	6.87	893	817	130	119
	Median	8.3	38.35	0.15	0.07	0.02	0.60	943	872	1457	1341
	Standard Deviation	-	5.89	0.44	0.10	0.44	13.71	99	134	744	697
	10^{th} Percentile	8.06	29.05	0.04	0.03	0.02	0.60	773	660	102	84
	90^{th} Percentile	8.50	40.50	0.74	0.19	0.62	19.40	963	920	1605	1497
TEDMST	# Samples	7	7	7	7	7	7	7	7	7	7
	Minimum	8.4	13.80	0.19	0.02	0.17	5.30	338	313	27	22
	Maximum	8.7	39.50	0.54	0.03	0.51	15.90	948	897	162	154
	Average	8.5	26.57	0.34	0.02	0.32	9.91	652	604	66	61
	Median	8.5	27.80	0.30	0.02	0.28	8.80	675	633	98	92
	Standard Deviation	-	9.71	0.14	0.00	0.14	4.44	222	221	53	51
	10^{th} Percentile	8.40	14.22	0.20	0.02	0.17	5.30	374	323	27	24
	90^{th} Percentile	8.70	37.34	0.51	0.03	0.49	15.18	895	849	141	133
TELSX	# Samples	1	1	1	1	1	1	1	1	1	1
	Minimum	8.0	34.40	1.60	0.12	1.48	46.30	858	782	19	17
	Maximum	8.0	34.40	1.60	0.12	1.48	46.30	858	782	19	17
All	# Samples	51	51.00	51.00	51.00	51.00	51.00	51	51	51	51
	Minimum	7.9	11.50	0.02	0.01	0.02	0.60	338	262	19	15
	Maximum	9.1	43.60	1.60	0.29	1.48	46.30	1000	991	1667	1652
	Average	8.4	24.77	0.22	0.04	0.18	5.57	676	563	121	101
	Median	8.5	21.80	0.10	0.03	0.03	0.90	659	496	676	551
	Standard Deviation	-	8.59	0.33	0.04	0.31	9.83	164	195	533	475
	10^{th} Percentile	8.1	15.80	0.02	0.01	0.02	0.60	478	359	36	32
	90^{th} Percentile	8.9	38.50	0.49	0.09	0.47	14.70	948	876	1373	1242

Notes:
TIC = Total inorganic carbon
AP = Acid Potential calculated using Sulphide Sulphur
NP = Neutralization Potential
Carb NP = Carbonate Neutralization Potential calculated using TIC
Carb NPR = Neutralization Potential Ratio calculated by Carb NP/AP

Table 2: Aqua Regia Metals for Overburden Samples

Sample ID				TE-10-30C	TE-10-33C	TE-10-039C 3.7	TE-10-055C
Depth (m)				6	6	3.7	37
Borehole ID	Units	MDL	Avg Crustal				
Al	%	0.01	8.23	0.87	1.02	0.65	0.77
Ca	%	0.01	4.15	13.7	13.9	12	9.02
Fe	%	0.01	5.63	1.41	1.59	1.14	1.11
K	%	0.01	2.09	0.2	0.25	0.16	0.38
Mg	%	0.01	2.33	2.48	2.38	2.31	5.36
Na	%	0.001	2.36	0.052	0.048	0.029	0.019
P	%	0.001	0.11	0.041	0.043	0.04	0.04
S	%	0.05	0.04	<0.05	<0.05	0.05	<0.05
Ti	%	0.001	0.57	0.063	0.068	0.052	0.025
Ag*	ppm	0.1	0.08	<0.1	<0.1	<0.1	<0.1
As	ppm	0.5	1.8	3	2.4	2.8	1.1
Au	ppb	0.5	-	0.5	<0.5	<0.5	<0.5
B*	ppm	20	10	<20	<20	<20	<20
Ba	ppm	1	425	49	63	28	21
Bi*	ppm	0.100	0.17	<0.1	0.1	<0.1	<0.1
Cd	ppm	0.1	0.15	0.1	<0.1	<0.1	<0.1
Co	ppm	0.1	25	6.6	7.4	5.2	5.9
Cr	ppm	1	102	32	29	37	29
Cu	ppm	0.1	60	14	16	8.3	5.4
Ga	ppm	1	19	3	4	2	3
Hg	ppm	0.01	0.085	0.02	0.02	<0.01	<0.01
La	ppm	1	39	15	18	13	15
Mn	ppm	1	950	311	358	238	292
Mo	ppm	0.1	1.20	0.2	0.2	0.4	<0.1
Ni	ppm	0.1	84	20.6	19.5	13.2	17.3
Pb	ppm	0.1	14	5.3	6.9	4.7	1.1
Sb	ppm	0.1	0.2	<0.1	<0.1	<0.1	<0.1
Sc	ppm	0.1	22	3.1	3.2	2.2	3
Se*	ppm	0.5	0.05	<0.5	0.7	<0.5	<0.5
Sr	ppm	1	370	100	104	78	39
Te	ppm	*0.2*	-	<0.2	<0.2	<0.2	<0.2
Th	ppm	0.1	9.6	5	6.4	4.6	4.6
Tl	ppm	0.1	0.85	0.1	0.1	<0.1	0.1
U	ppm	0.1	2.7	0.6	0.8	0.6	0.5
V	ppm	2	120	26	26	20	14
W	ppm	0.1	1.25	<0.1	<0.1	<0.1	<0.1
Zn	ppm	1	70	29	38	24	22

Notes:
All samples analyzed by Acme Method 1DX
Bold values indicate greater than 10x the average crustal abundance
* Indicates constitituents where MDL > average crustal abundance

Table 3: Proportion of Samples Exceeding Average Crustal Concentrations for Environmentally Significant Elements

Parameter	Ba	Cr	Ni	Se**	Sr	Ta	Th	S
Unit	ppm	%	ppm	ppm	ppm	ppm	ppm	%
MDL	1	0.002	0.1	0.5	0.5	0.1	0.2	0.12
Average Crustal Abundance	425	0.0102	84	0.05	370	2	1.2	0.035
Unit Code	% of Samples > 10x Average Crustal Abundance							
OVB	0%	0%	0%	100%	0%	0%	0%	0%
TE1VK	0%	26%	41%	59%	0%	1%	0%	0%
TE2VK	0%	44%	65%	54%	1%	0%	0%	3%
TE3VK	0%	64%	61%	45%	6%	0%	0%	0%
TE4VK	2%	13%	18%	84%	0%	0%	2%	27%
TED1VK	0%	0%	0%	100%	0%	0%	0%	10%
TEDMST	0%	0%	0%	100%	0%	0%	0%	38%
TELSX	0%	0%	40%	60%	0%	0%	0%	20%
TEMST	0%	0%	0%	100%	0%	0%	0%	50%

Notes:

* Represents constitituents where MDL > average crustal abundance

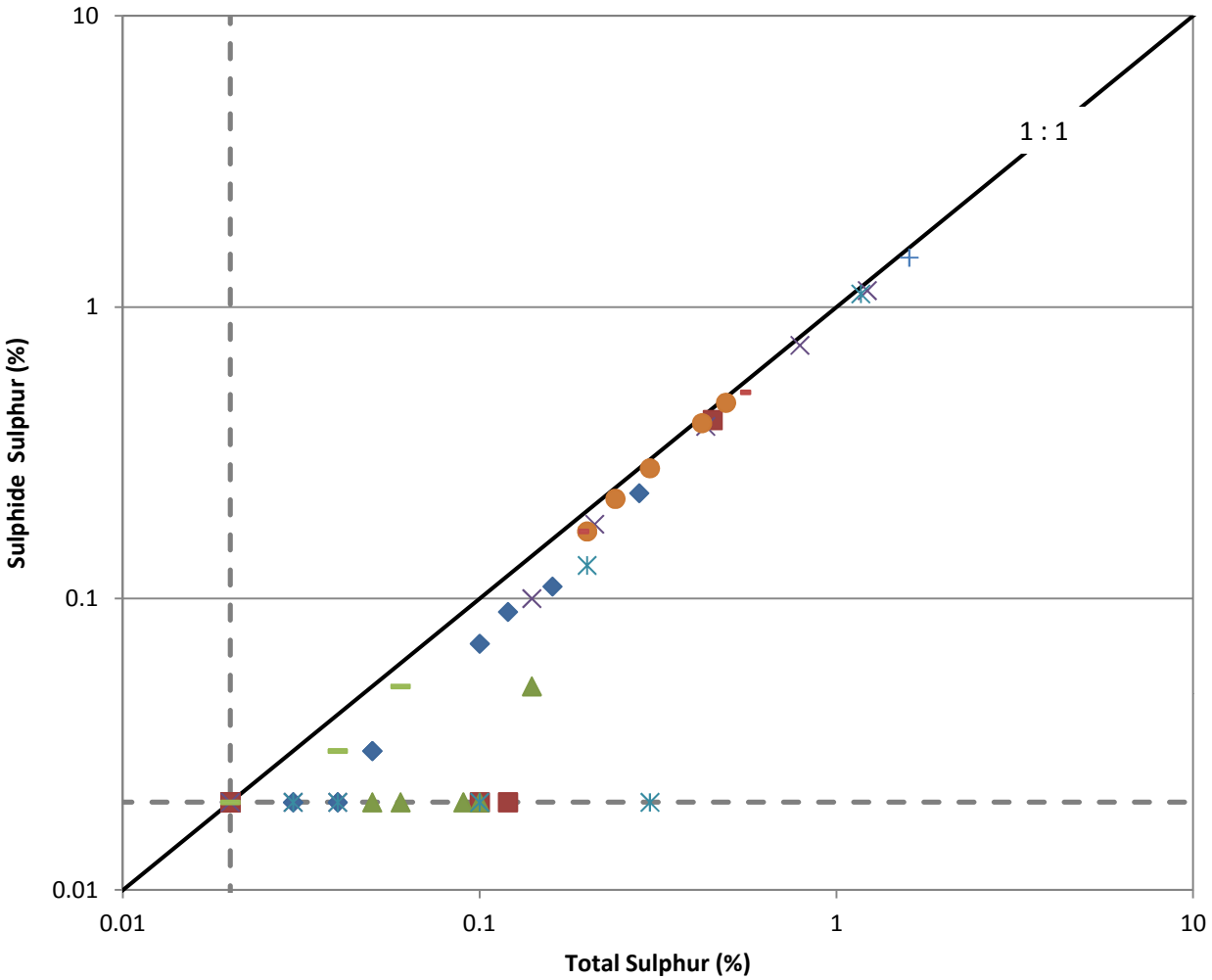
** MDL varies from 0.03 to 0.05 ppm for the dataset

Table 4: Calculated (Corrected) Carb NP and AP Statistics for Database

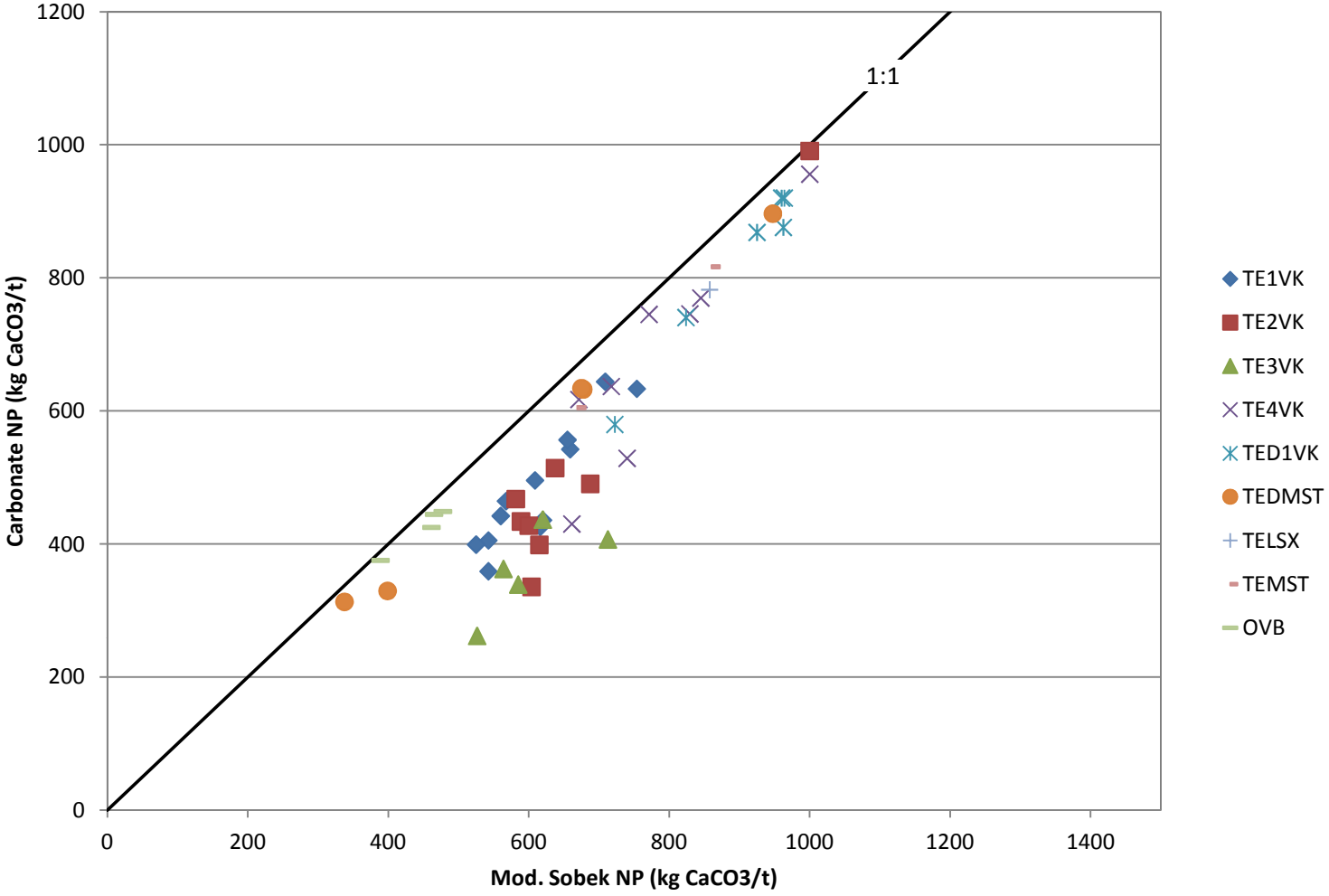
		C	S	Carb NP	AP	Carb NPR
		(wt.%)		(kg CaCO3/tonne)		
TE1VK	# Samples	74	74	74	74	74
	Minimum	4.59	0.01	342	0.31	55
	Maximum	8.94	0.25	689	7.81	2205
	Average	6.33	0.02	481	0.77	622
	Median	6.13	0.01	464	0.31	1324
	Standard Deviation	1.11	0.04	89	1.18	568
	10^{th} Percentile	5.15	0.01	386	0.31	333
	90^{th} Percentile	8.10	0.04	622	1.25	1762
TE2VK	# Samples	67	67	67	67	67
	Minimum	4.01	0.01	295	0.31	29
	Maximum	11.1	0.50	863	15.6	2763
	Average	5.68	0.06	429	1.81	238
	Median	5.54	0.03	418	0.94	456
	Standard Deviation	1.21	0.09	97	2.73	628
	10^{th} Percentile	4.37	0.01	324	0.31	104
	90^{th} Percentile	6.93	0.11	528	3.56	1490
TE3VK	# Samples	13	13	13	13	13
	Minimum	3.60	0.01	263	0.31	60
	Maximum	6.33	0.15	481	4.69	1211
	Average	5.16	0.10	387	3.03	128
	Median	5.12	0.11	384	3.44	120
	Standard Deviation	0.76	0.05	61	1.46	393
	10^{th} Percentile	4.40	0.02	327	0.56	83
	90^{th} Percentile	6.06	0.14	459	4.38	942
TE4VK	# Samples	33	33	33	33	33
	Minimum	5.57	0.01	420	0.31	12
	Maximum	12.8	1.24	997	38.8	3100
	Average	9.23	0.32	712	10.1	70
	Median	9.38	0.08	724	2.50	301
	Standard Deviation	2.02	0.40	161	12.6	1042
	10^{th} Percentile	6.39	0.01	485	0.31	16
	90^{th} Percentile	11.52	1.01	895	31.6	2653
TED1VK	# Samples	39	39	39	39	39
	Minimum	6.35	0.01	482	0.31	17
	Maximum	13.3	1.04	1041	32.50	3330
	Average	10.8	0.12	835	3.85	217
	Median	11.4	0.02	885	0.63	1498
	Standard Deviation	1.85	0.25	148	7.79	1148
	10^{th} Percentile	7.97	0.01	612	0.31	79
	90^{th} Percentile	12.3	0.34	959	10.50	3012
TEDMST	# Samples	23	23	23	23	23
	Minimum	2.42	0.01	168	0.31	13
	Maximum	11.2	0.66	866	20.6	1170
	Average	6.42	0.25	488	7.80	63
	Median	5.93	0.17	449	5.31	84
	Standard Deviation	2.55	0.19	204	5.99	408
	10^{th} Percentile	3.56	0.01	259	0.31	25
	90^{th} Percentile	10.3	0.48	799	14.9	1039
TELSX	# Samples	2	2	2	2	2
	Minimum	11.80	0.01	918	0.31	2936
	Maximum	12.64	0.01	985	0.31	3151
OVB	# Samples	4	4	4	4	4
	Minimum	5.36	0.02	335	0.60	210
	Maximum	6.34	0.06	406	1.60	669
	Average	5.99	0.04	381	1.00	381
	Median	6.13	0.04	392	0.90	438
	Standard Deviation	0.43	0.02	32	0.42	188
	10^{th} Percentile	5.58	0.03	349	0.69	274
	90^{th} Percentile	6.29	0.05	404	1.39	604
* LST Breccia	# Samples	8	8	8	8	8
	Minimum	9.88	0.01	764	0.31	45
	Maximum	12.2	0.61	946	19.1	3028
	Average	11.2	0.09	873	2.77	315
	Median	11.3	0.01	879	0.31	2570
	Standard Deviation	0.71	0.21	57	6.59	1113
	10^{th} Percentile	10.6	0.01	818	0.31	671
	90^{th} Percentile	12.1	0.20	940	6.38	3007
All	# Samples	263	263	263	263	263
	Minimum	2.42	0.01	168	0.31	12
	Maximum	13.3	1.24	1041	38.8	3330
	Average	7.33	0.11	559	3.46	162
	Median	6.35	0.02	482	0.63	685
	Standard Deviation	2.54	0.21	204	6.71	883
	10^{th} Percentile	4.88	0.01	361	0.31	52
	90^{th} Percentile	11.5	0.37	893	11.5	2240

Notes:
* Samples classified as containing limestone and breccia

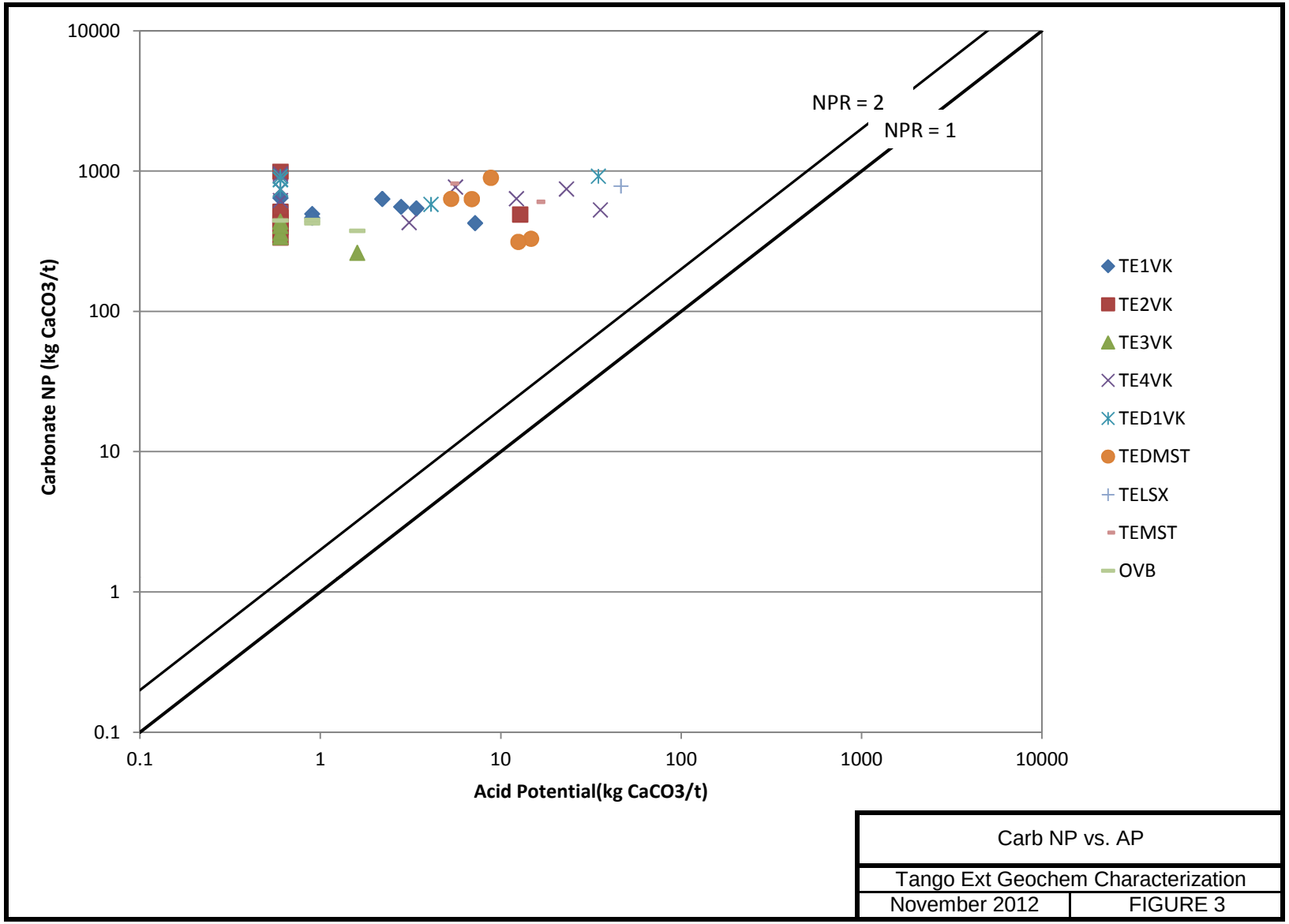
FIGURES



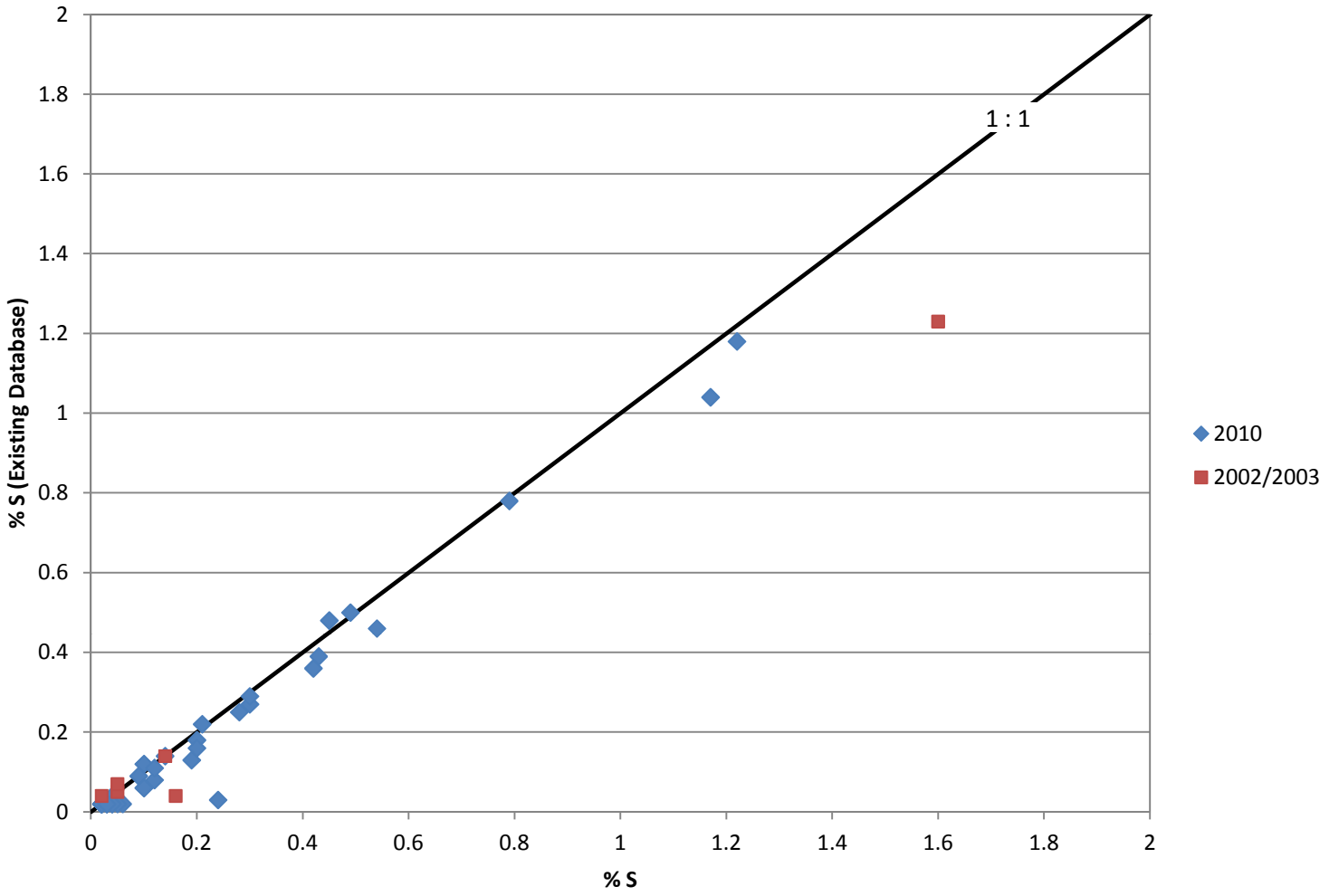
Total Sulphur vs. Sulphide Sulphur	
Tango Ext Geochem Characterization	
November 2012	FIGURE 1



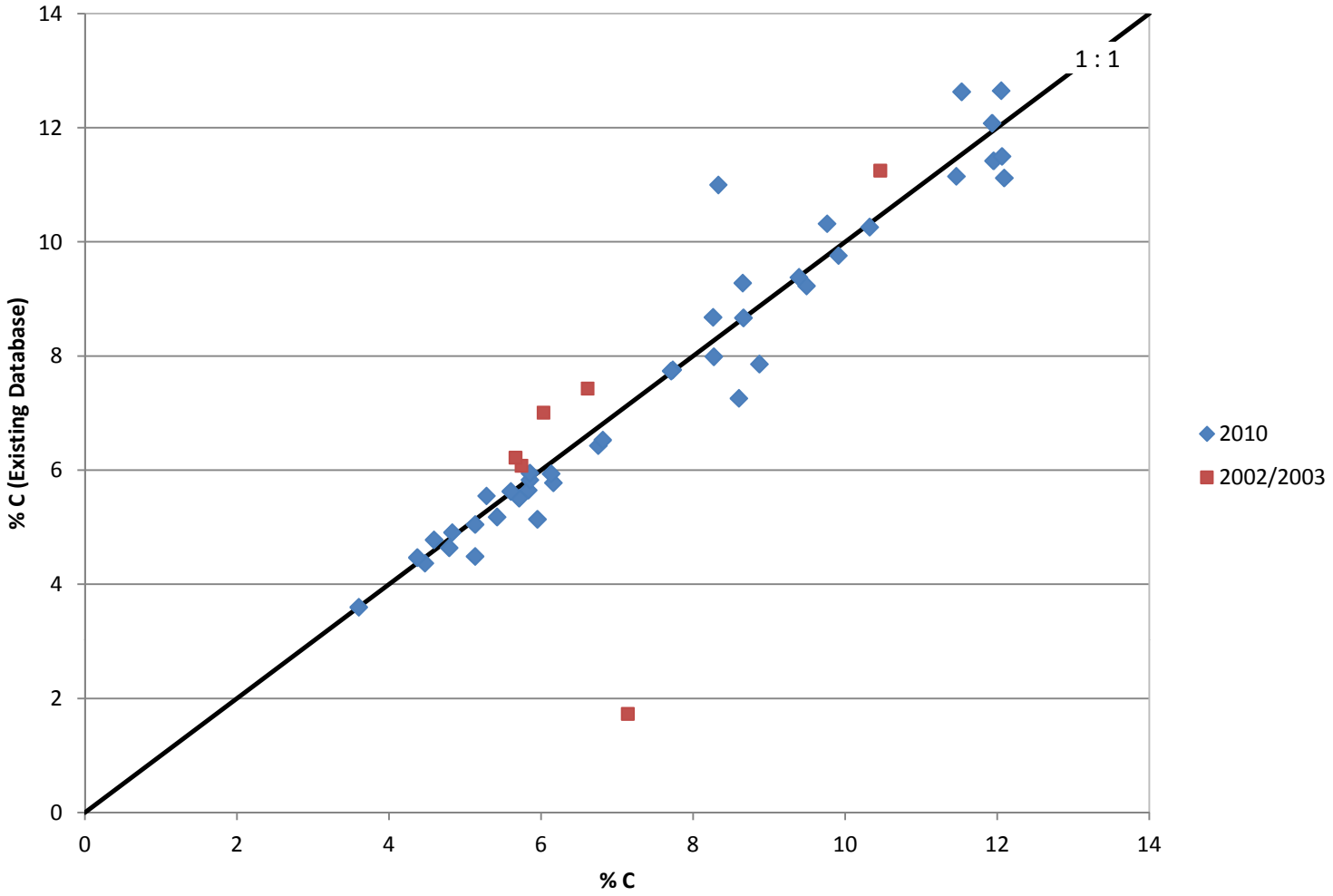
Modified Sobek NP vs. Carb NP	
Tango Ext Geochem Characterization	
November 2012	FIGURE 2



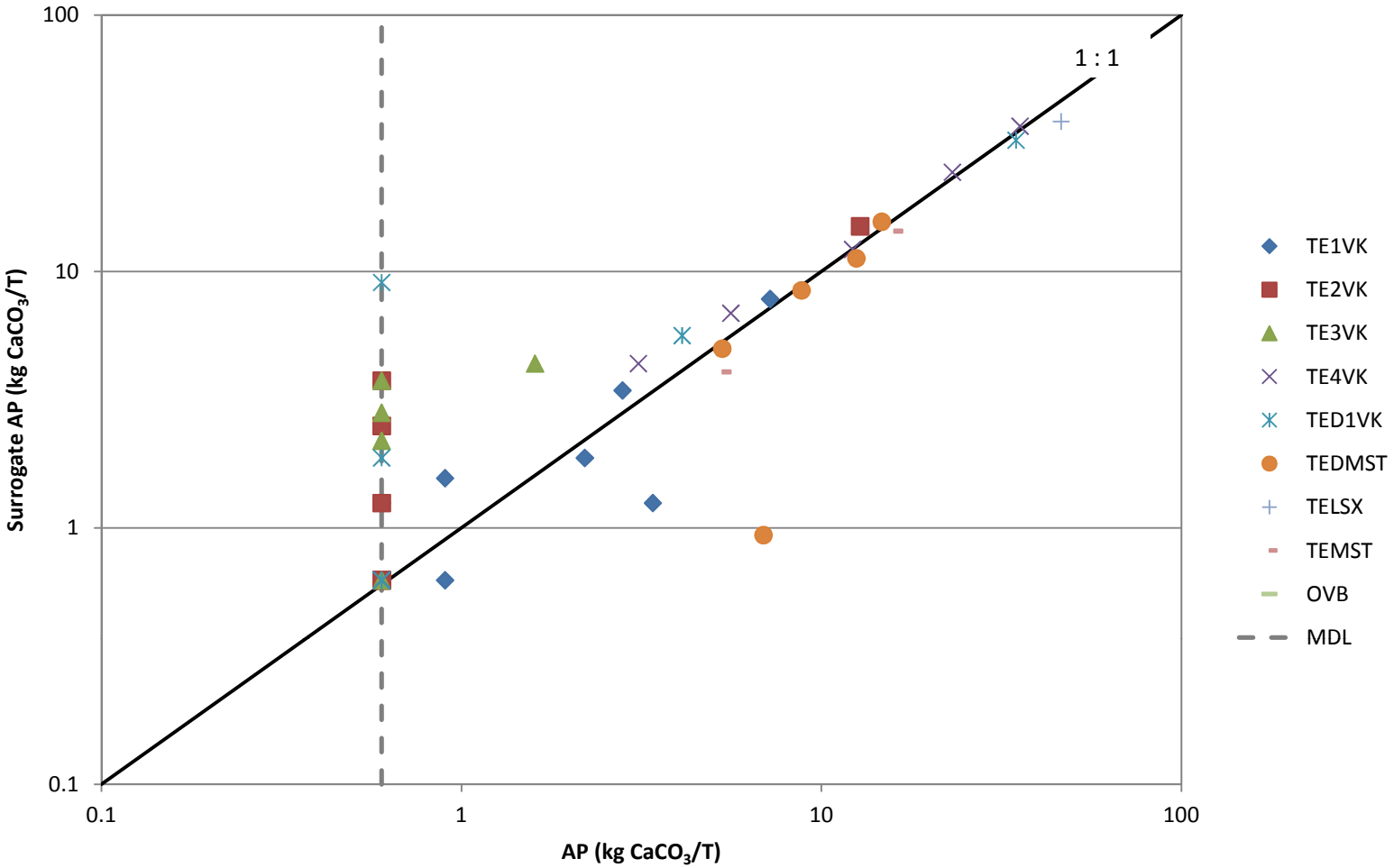
Carb NP vs. AP	
Tango Ext Geochem Characterization	
November 2012	FIGURE 3



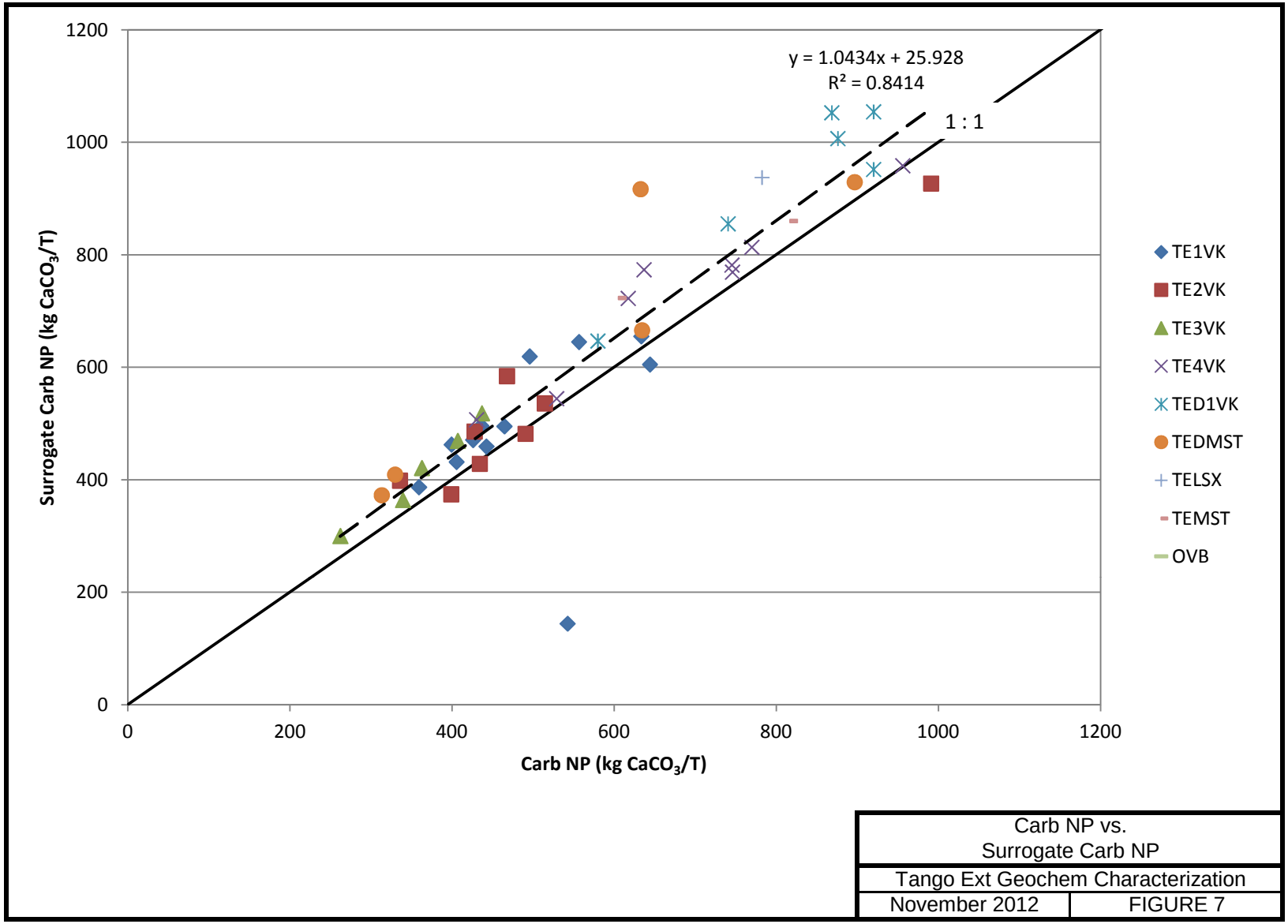
Total Sulphur vs. Total Existing Sulphur	
Tango Ext Geochem Characterization	
November 2012	FIGURE 4



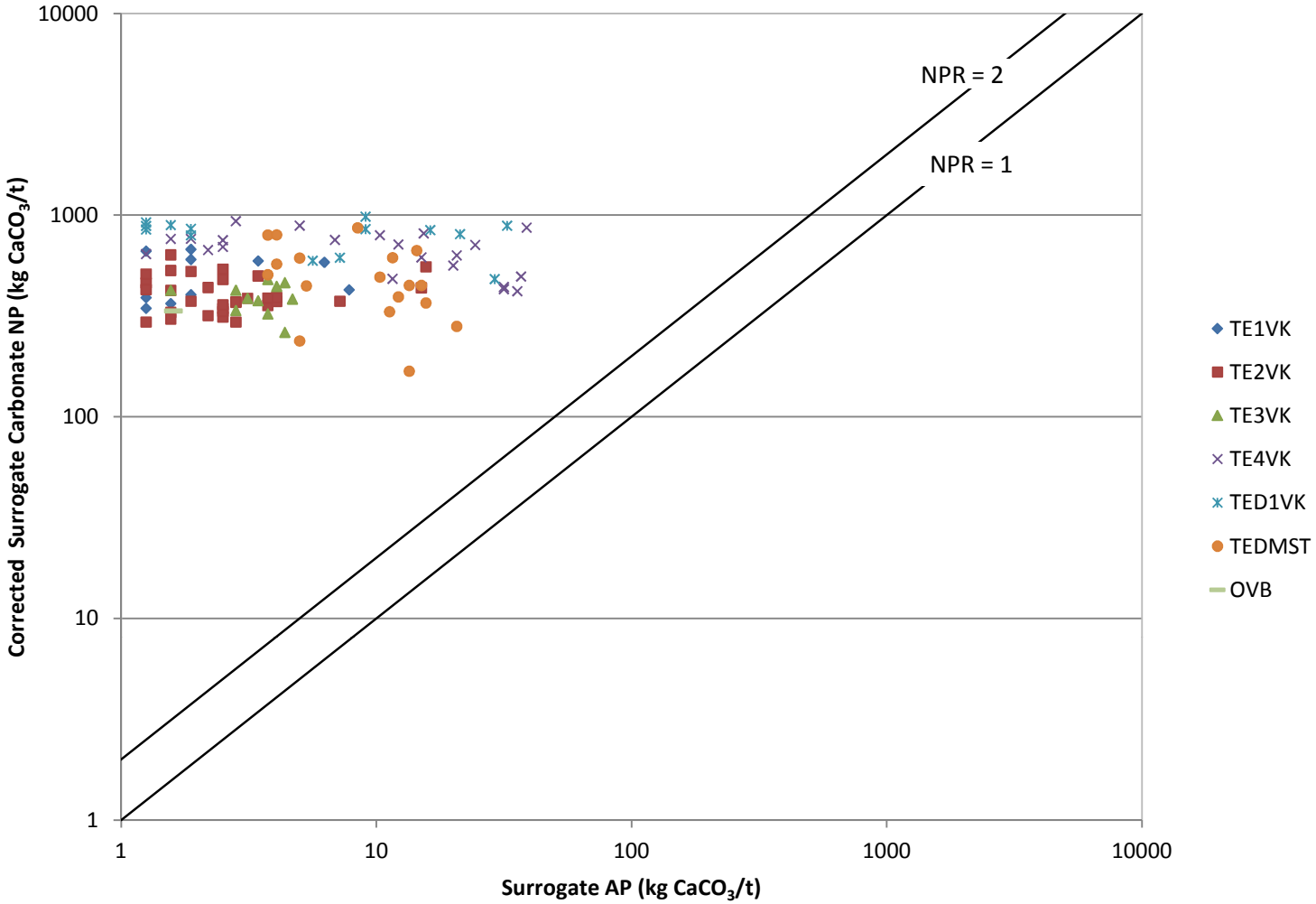
Total Carbon vs. Total Existing Carbon	
Tango Ext Geochem Characterization	
November 2012	FIGURE 5



AP vs. Surrogate AP	
Tango Ext Geochem Characterization	
November 2012	FIGURE 6



Carb NP vs. Surrogate Carb NP	
Tango Ext Geochem Characterization	
November 2012	FIGURE 7



Surrogate AP vs Corrected Surrogate Carb NP for Database	
Tango Ext Geochem Characterization	
November 2012	FIGURE 8

APPENDICES

APPENDIX A: Modified Acid-Base Accounting Results

Appendix-A: Modified Acid-Base Accounting Results

Borehole ID	Depth	Geology	Zone 17 U		Calc. Elevation	Paste pH	CO_2	Total S	HCl Extractable Sulphur	Sulphide Sulphur (by diff.)	Acid Generation Potential	Total Carbon	CaCO3 Equiv.	Mod. NP	NPR	$CaCO_3$ NPR
			Easting	Northing		pH Units	wt%	wt%	wt%	wt%	Kg CaCO3/T	wt%	Kg CaCO3/T	Kg CaCO3/T		
Method Code						Sobek	LECO	LECO	BBY0SOP-00010	Calc	Calc	LECO	Calc	Modified Sobek		
MDL						*N/A*	*0.02*	*0.02*	*0.01*	*0.02*	*0.60*	*0.02*	*0.50*	*0.10*	0.17	0.83
Overburden																
TE-10-030C	6.00	OVB	300844.60	5861882.40	87.4	8.43	19.8	0.04	<0.01	0.03	0.90	6.34	449.1	477.5	530.6	499.0
TE-10-033C	6.00	OVB	300950.05	5861876.11	81.7	8.22	18.7	0.04	<0.01	0.03	0.90	6.17	425.2	461.3	512.6	472.4
TE-10-039C	3.70	OVB	300933.78	5861789.90	84.7	8.20	16.5	0.06	<0.01	0.05	1.60	5.36	375.7	388.8	243.0	234.8
TE-10-055C	37.00	OVB	300823.90	5861640.90	50.4	8.37	19.6	<0.02	<0.01	<0.02	<0.60	6.09	444.8	465.0	775.0	741.3
Resedimented Volcaniclastic Kimberlite																
TE-03-016C	54.28	TE1VK	300941.97	5861812.85	29.5	8.43	21.8	0.05	0.02	0.03	0.90	6.61	495.7	608.8	676.4	550.8
TE-03-017C	95.03	TE1VK	300910.97	5861779.85	-11.3	7.92	23.9	0.16	0.05	0.11	3.40	7.14	542.5	658.8	193.8	159.6
TE-10-026C	38.00	TE1VK	300858.10	5861810.90	53.1	8.77	17.8	<0.02	0.02	<0.02	<0.60	5.42	405.5	542.5	904.2	675.8
TE-10-027C	38.00	TE1VK	300862.30	5861801.90	51.3	8.72	28.3	<0.02	<0.01	<0.02	<0.60	8.60	644.1	708.8	1181.3	1073.5
TE-10-030C	73.00	TE1VK	300844.60	5861882.40	29.9	8.21	18.7	0.28	0.05	0.23	7.20	5.83	425.9	616.3	85.6	59.2
TE-10-031C	75.00	TE1VK	300857.71	5861872.63	12.9	8.91	15.8	0.04	0.03	<0.02	<0.60	4.79	359.1	542.5	904.2	598.5
TE-10-033C	83.00	TE1VK	300950.05	5861876.11	4.7	9.10	17.6	0.03	0.02	<0.02	<0.60	5.28	399.3	525.0	875.0	665.5
TE-10-033C	93.00	TE1VK	300950.05	5861876.11	-5.3	8.95	19.5	0.03	0.02	<0.02	<0.60	5.71	442.3	560.0	933.3	737.2
TE-10-034C	97.00	TE1VK	300958.28	5861880.51	19.2	8.47	20.4	0.05	0.02	0.03	0.90	6.13	464.6	567.5	630.6	516.2
TE-10-036C	90.00	TE1VK	300967.60	5861879.62	8.3	8.88	19.2	0.04	0.04	<0.02	<0.60	5.85	435.9	620.0	1033.3	726.5
TE-10-037C	63.00	TE1VK	300935.72	5861779.71	36.6	8.44	24.5	0.12	0.03	0.09	2.80	7.71	556.6	655.0	233.9	198.8
TE-10-038C	70.00	TE1VK	300940.86	5861778.00	34.7	8.23	27.9	0.10	0.03	0.07	2.20	8.87	633.4	753.8	342.6	287.9
Resedimented Volcaniclastic Kimberlite																
TE-03-020C	85.95	TE2VK	300974.97	5861843.85	-2.2	8.68	20.6	0.02	0.02	<0.02	<0.60	6.03	467.7	581.3	968.8	779.5
TE-10-027C	121.00	TE2VK	300862.30	5861801.90	-26.7	9.13	22.6	0.02	0.02	<0.02	<0.60	6.75	514.3	637.5	1062.5	857.2
TE-10-027C	155.00	TE2VK	300862.30	5861801.90	-58.7	8.35	21.6	0.45	0.04	0.41	12.80	6.16	490.5	687.5	53.7	38.3
TE-10-028C	104.00	TE2VK	300867.18	5861815.84	8.1	8.90	19.1	0.02	0.02	<0.02	<0.60	5.95	434.1	588.8	981.3	723.5
TE-10-031C	166.00	TE2VK	300857.71	5861872.63	-78.1	8.74	14.8	0.10	0.09	<0.02	<0.60	4.59	335.7	603.8	1006.3	559.5
TE-10-032C	114.00	TE2VK	300856.80	5861873.30	-18.4	8.73	17.6	0.12	0.10	0.02	0.60	5.13	398.9	615.0	1025.0	664.8
TE-10-033C	133.00	TE2VK	300950.05	5861876.11	-45.4	8.91	18.8	0.02	0.02	<0.02	<0.60	5.85	427.7	600.0	1000.0	712.8
TE-10-034C	107.00	TE2VK	300958.28	5861880.51	12.1	8.70	43.6	<0.02	<0.01	<0.02	<0.60	12.09	990.9	1000.0	1666.7	1651.5
Mass Deposited Volcaniclastic Kimberlite																
TE-03-021C	199.43	TE3VK	300912.97	5861909.85	-115.7	8.67	19.2	0.05	0.04	<0.02	<0.60	5.66	436.8	620.0	1033.3	728.0
TE-10-031C	197.00	TE3VK	300857.71	5861872.63	-109.1	8.87	11.5	0.14	0.09	0.05	1.60	3.60	262.1	526.3	328.9	163.8
TE-10-031C	207.00	TE3VK	300857.71	5861872.63	-119.1	8.66	14.9	0.10	0.08	0.02	0.60	4.47	339.3	585.0	975.0	565.5
TE-10-032C	178.00	TE3VK	300856.80	5861873.30	-77.7	8.76	16.0	0.06	0.04	0.02	0.60	5.13	362.7	563.8	939.7	604.5
TE-10-033C	213.00	TE3VK	300950.05	5861876.11	-125.4	8.57	17.9	0.09	0.09	<0.02	<0.60	5.60	407.1	712.5	1187.5	678.5
Resedimented Kimberlite w/ Breccia																
TE-03-020C	126.99	TE4VK	300974.97	5861843.85	-43.2	8.44	18.9	0.14	0.04	0.10	3.10	5.74	430.2	661.3	213.3	138.8
TE-10-027C	161.00	TE4VK	300862.30	5861801.90	-64.3	8.01	23.3	1.22	0.08	1.14	35.60	6.81	528.9	740.0	20.8	14.9
TE-10-027C	175.00	TE4VK	300862.30	5861801.90	-77.4	7.90	32.8	0.79	0.05	0.74	23.10	9.49	745.9	829.3	35.9	32.3
TE-10-027C	192.00	TE4VK	300862.30	5861801.90	-93.4	8.96	42.1	<0.02	0.02	<0.02	<0.60	12.06	955.9	1000.0	1666.7	1593.2
TE-10-027C	207.00	TE4VK	300862.30	5861801.90	-107.5	8.60	33.9	0.21	0.03	0.18	5.60	9.91	769.8	845.0	150.9	137.5
TE-10-030C	92.00	TE4VK	300844.60	5861882.40	13.6	8.19	32.8	0.04	0.02	0.02	0.60	9.39	745.2	771.3	1285.5	1242.0
TE-10-034C	133.00	TE4VK	300958.28	5861880.51	-6.3	8.28	28.0	0.43	0.04	0.39	12.20	8.65	636.8	717.5	58.8	52.2
TE-10-034C	142.00	TE4VK	300958.28	5861880.51	-12.7	8.41	27.2	0.03	0.02	<0.02	<0.60	8.66	617.3	671.3	1118.8	1028.8
Carbonatized Kimberlite																
TE-10-026C	14.00	TED1VK	300858.10	5861810.90	75.6	8.31	40.5	1.17	0.06	1.11	34.70	11.95	920.0	960.0	27.7	26.5
TE-10-034C	179.00	TED1VK	300958.28	5861880.51	-38.8	8.31	40.5	0.04	0.03	<0.02	<0.60	12.05	920.0	963.8	1606.3	1533.3
TE-10-035C	165.00	TED1VK	300950.05	5861876.11	-61.9	8.29	25.5	0.20	0.07	0.13	4.10	7.73	579.8	722.5	176.2	141.4
TE-10-038C	190.00	TED1VK	300940.86	5861778.00	-57.3	8.68	38.2	0.30	0.29	<0.02	<0.60	11.53	868.4	925.0	1541.7	1447.3
TE-10-055C	211.00	TED1VK	300823.90	5861640.90	-123.6	8.10	38.5	0.03	0.03	<0.02	<0.60	11.93	875.9	962.5	1604.2	1459.8
TE-10-055C	345.00	TED1VK	300823.90	5861640.90	-257.6	8.02	32.6	0.10	0.08	0.02	0.60	10.32	740.5	823.8	1373.0	1234.2
Mudstone																
TE-10-027C	213.00	TEDMST	300862.30	5861801.90	-113.2	8.50	27.8	0.24	0.02	0.22	6.90	8.33	632.5	677.5	98.2	91.7
TE-10-037C	134.00	TEDMST	300935.72	5861779.71	-21.6	8.40	14.5	0.49	0.02	0.47	14.70	4.83	329.6	398.8	27.1	22.4
TE-10-037C	154.00	TEDMST	300935.72	5861779.71	-38.0	8.39	13.8	0.42	0.02	0.40	12.50	4.37	313.2	337.5	27.0	25.1
TE-10-038C	160.00	TEDMST	300940.86	5861778.00	-34.3	8.69	39.5	0.30	0.02	0.28	8.80	11.46	896.6	947.5	107.7	101.9
TE-10-038C	186.00	TEDMST	300940.86	5861778.00	-54.2	8.58	27.9	0.20	0.03	0.17	5.30	8.27	634.3	675.0	127.4	119.7
TE-10-034C	148.00	TEMST	300958.28	5861880.51	-16.9	8.45	26.6	0.54	0.03	0.51	15.90	8.26	605.2	668.8	42.1	38.1
TE-10-034C	153.00	TEMST	300958.28	5861880.51	-20.4	8.72	35.9	0.19	0.02	0.17	5.30	9.76	816.8	860.0	162.3	154.1
Diluted TE4VK w/ Limestone Debris																
TE-02-011C	204.50	TELSX	300926.97	5861801.85	-65.6	8.01	34.4	1.60	0.12	1.48	46.30	10.46	782.3	857.5	18.5	16.9

Note:

AP = Acid potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material. AP is determined from the sulphide sulphur content.

NP = Neutralization potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material.

Neutralization Potential Ratio = NPR = NP/AP

Carbonate Neutralization Potential Ratio = Carb NPR = Carb NP/AP

Carbonate NP is calculated from TIC originating from carbonate minerals and is expressed in kg $CaCO_3$/tonne.

Sulphate Sulphur determined by 25% HCL with S by ICP Finish

Sulphide Sulphur determined by Sobek 1:7 Nitric Acid with S by ICP Finish

Insoluble S is acid insoluble S (Total S - (Sulphate S + Sulphide S)).

For AP values of < 0.6 kg $CaCO_3$/tonne, a value of 0.6 was used for calculation of NPR

APPENDIX B: Elemental Content Results

Appendix-B : Elemental Content Results

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Drill Hole	Unit Code	MidPoint (m)	TOT/C	TOT/S	Ag	Al	As	Au	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Hf	Hg	Ho	K	La	Lu	Mg	Mn	Mo	Na	Nb	Nd	Ni	P	Pb	Pr	Rb	Sb	Sc	Se	Si	Sm	Sn	Sr	Ta	Tb	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn	Zr
	Analyte																																																											
	Unit		%	%	PPM	%	PPM	PPB	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	%	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
	MDL		0.02	0.02	0.1	0.01	0.5	0.5	1	1	0.1	0.01	0.1	0.2	0.002	0.1	0.05	0.1	0.05	0.03	0.02	0.04	0.05	0.1	0.01	0.02	0.01	0.01	0.1	0.01	0.02	0.01	0.01	0.1	0.01	0.02	0.1	0.1	0.5	0.01	0.05	1	0.5	0.01	0.05	1	0.5	0.1	0.01	0.02	0.1	0.01	0.01	0.1	8	0.5	0.1	0.05	1	0.1	0.01
	Average Crustal Concentration				0.035	0.075	8.23	1.8	-	425	3	0.17	4.15	0.15	66.5	25	0.0102	-	60				5.63	19	3	0.085			2.085	39	0.3	2.33	0.095	1.2	2.355				20	84	0.105		14	90	0.2	22	0.05	-		2.3	370	2	-	1.2	0.565	0.85			2.7	120	1.25	33	1.25	70	165
	Average Carbonate Concentration			0.12	0	0.42	1	0	10	0	0	30	0.035	11.5	0.1	0.00011	0	4				0.38	4		0.3	0.04		0.27	0	0.2	4.7	0.11	0.4	0.04				0.3	20	0.04		9	3	0.2	1	0.08	2.4		0	610	0	0.2	1.7	0.04	0		2.2	20	0.6	30	0.5	20	19	
TE-10-030C	OVB		6	<0.05	<0.1	0.87	3	0.5	49	6.6	<0.1	13.7	0.1		0.00		14					1.41	3			0.02		0.2	15		2.48	0.03	0.2	0.052					20.6	0.041	5.3			<0.1	3.1	<0.5				100			5	0.063	0.1		0.6	26	<0.1		29		
TE-10-033C	OVB		6	<0.05	<0.1	1.02	2.4	<0.5	63	7.4	0.1	13.9	<0.1		0.00		16					1.59	4			0.02		0.2	25		2.38	0.04	0.2	0.048					19.5	0.043	6.9			<0.1	3.2	0.7				104			6.4	0.068	0.1		0.8	26	<0.1		38		
TE-10-039C	OVB		3.7	0.05	<0.1	0.65	2.8	<0.5	28	5.2	<0.1	12	<0.1		0.00		8.3					1.14	2			<0.01		0.16	13		2.31	0.02	0.4	0.029					13.2	0.04	4.7			<0.1	2.2	<0.5				78			4.6	0.052	<0.1		0.6	20	<0.1		24		
TE-10-055C	OVB		37	<0.05	<0.1	0.77	1.1	<0.5	21	5.9	<0.1	9.02	<0.1		0.00		5.4					1.11	3			<0.01		0.38	15		5.36	0.03	<0.1	0.019					17.3	0.04	1.1			<0.1	3	<0.5				39			4.6	0.025	0.1		0.5	14	<0.1		22		
TE-02-011C	TE1VK	43.00	7.87	0.04	0.08	1.25	0.6	1.8	197	0.8	<0.1	17.06	0.08	27.5	39.6	0.07	0.3	14.3	0.55	0.46	0.35	3.75	1.7	0.96	0.6	0.008	0.1	0.12	17	0.03	24.7	0.06	0.2	0.09	26.4	10.4	775.8	0.124	1.7	2.97	6	0.08	4	<0.3	18.56	1.36	0.8	732.5	1.4	0.1	2.4	0.27	0.08	0.04	1.6	31	0.7	2.5	0.24	17	24.1
TE-02-011C	TE1VK	55.15	6.71	0.01	0.08	1.7	1.1	2.2	507	0.8	<0.1	15.45	0.08	87	41.6	0.126	0.4	35.2	1.28	0.5	0.94	4.53	2.5	2.52	1.1	0.008	0.19	0.18	51	0.06	25.07	0.07	0.2	0.07	76	32.3	850.6	0.42	1.9	9.1	9.9	0.08	9	<0.3	21.14	3.96	0.8	876.7	3.7	0.25	8.1	0.45	0.08	0.07	1.7	53	0.9	4.9	0.38	29	45.8
TE-02-011C	TE1VK	65.76	6.96	0.01	0.08	1.47	0.7	3.1	242	0.8	<0.1	16.9	0.08	36.1	40.5	0.09	0.5	17.2	0.83	0.35	0.46	3.82	2.4	1.27	0.7	0.008	0.13	0.18	21.3	0.05	24.32	0.06	0.3	0.06	32.8	14.1	805.9	0.175	2.5	3.95	9.4	0.08	5	<0.3	21.1	1.72	0.8	616.6	1.9	0.14	4.1	0.32	0.08	0.04	1.5	32	0.7	3.4	0.31	19	27.4
TE-02-011C	TE1VK	75.23	7.46	0.03	0.08	2.37	1.1	2.5	213	0.8	<0.1	18.13	0.08	42.3	33.7	0.067	1	21.3	1.15	0.55	0.54	3.46	3.2	1.73	1.2	0.008	0.2	0.44	24.7	0.08	22.24	0.06	0.2	0.07	33.2	17.2	546	0.182	2.9	4.68	21.6	0.08	5	0.5	20.39	2.33	0.8	491.5	1.8	0.19	5.1	0.38	0.08	0.08	1.7	36	0.9	4.8	0.48	22	44.2
TE-02-012C	TE1VK	37.28	7.87	0.04	0.08	1.4	0.3	0.9	208	0.8	<0.1	19.8	0.08	31.1	48.8	0.088	0.3	20.4	0.6	0.29	0.41	3.76	2	1.16	1	0.008	0.11	0.1	18.9	0.04	21.78	0.06	0.2	0.08	31.7	11.3	852.7	0.17	2.7	3.4	6.4	0.08	5	<0.3	19.66	1.59	0.8	702.2	1.7	0.15	3.1	0.3	0.08	0.04	1	29	0.8	4.0	0.29	27	35.2
TE-02-012C	TE1VK	47.44	6.95	0.03	0.08	1.76	0.3	1.4	178	0.8	<0.1	15.37	0.08	36.6	44.5	0.076	0.4	22.1	0.78	0.35	0.42	4.1	2.3	1.24	0.8	0.008	0.13	0.16	21.4	0.04	23.51	0.06	0.1	0.08	30.8	14.1	822.6	0.155	5.5	4	9.7	0.08	5	<0.3	22.82	1.88	0.8	531	1.6	0.15	3.4	0.3	0.08	0.05	1	29	0.8	4.0	0.29	27	28.3
TE-02-012C	TE1VK	57.23	6.63	0.03	0.08	1.93	0.6	0.7	218	0.8	<0.1	17.42	0.08	33.8	44.4	0.072	0.4	17	0.68	0.32	0.4	3.96	2.7	1.2	0.7	0.008	0.12	0.18	20.7	0.04	21.94	0.06	0.1	0.1	29.7	12.6	1612	0.115	4.5	3.61	10.8	0.08	5	<0.3	23.15	1.7	0.8	588.7	1.6	0.14	3.3	0.27	0.08	0.05	0.9	30	0.5	3.8	0.26	27	26.3
TE-02-012C	TE1VK	67.47	5.67	0.06	0.08	1.71	0.3	1.3	196	0.8	<0.1	14.91	0.08	35.7	53.4	0.091	0.5	15.9	0.69	0.33	0.42	4.74	2.4	1.24	0.8	0.008	0.13	0.18	21.7	0.04	23.68	0.06	0.2	0.11	36.6	13.1	983.1	0.145	3	3.88	12.6	0.08	5	<0.3	25.49	1.78	0.8	437.1	2.1	0.15	3.5	0.33	0.08	0.05	1.6	40	0.7	3.9	0.3	28	29.6
TE-02-012C	TE1VK	77.32	5.41	0.1	0.08	1.42	0.6	1.3	160	0.8	<0.1	13.62	0.08	35.9	56.4	0.085	0.4	22.8	0.66	0.26	0.42	5.01	2.1	1.14	0.9	0.008	0.11	0.12	22.3	0.03	23.74	0.05	0.2	0.1	35.7	13	1027.3	0.165	3.4	3.88	7.9	0.08	4	<0.3	27.04	1.63	0.9	546	2.1	0.13	3.6	0.32	0.08	0.04	1.4	35	0.3	3.2	0.24	35	28.2
TE-02-013C	TE1VK	55.96	6.32	0.01	0.08	1.12	0.6	0.7	165	0.8	<0.1	20.66	0.08	25.2	49.4	0.085	0.2	22.8	0.49	0.23	0.3	4.48	2	0.77	0.4	0.008	0.07	0.07	15.4	0.03	22.05	0.07	0.2	0.07	26.3	9.4	899.3	0.133	1.5	2.74	4.2	0.08	4	<0.3	19.77	1.2	0.8	478.8	1.5	0.09	2.5	0.25	0.08	0.02	2.4	36	0.5	2.0	0.18	21	16
TE-02-013C	TE1VK	67.13	6.6	0.02	0.08	1.36	0.3	1.2	220	0.8	<0.1	19.62	0.08	29.8	47.3	0.092	0.3	19.8	0.61	0.23	0.36	4.14	2.2	0.96	0.7	0.008	0.1	0.07	18.3	0.03	22.76	0.07	0.1	0.09	29.9	11.8	844.8	0.167	2.1	3.26	4.6	0.08	5	<0.3	19.92	1.52	0.8	549.3	1.6	0.11	2.6	0.31	0.08	0.04	1.8	36	0.3	2.6	0.19	19	24.1
TE-02-013C	TE1VK	76.04	6.52	0.01	0.08	1.31	0.8	0.8	378	0.8	<0.1	18.02	0.08	33	49.7	0.102	0.3	20.8	0.63	0.31	0.39	4.25	2.1	1.09	0.7	0.008	0.1	0.07	20.4	0.03	23.75	0.07	0.3	0.07	33.4	12.4	979.6	0.168	2.6	3.66	4.5	0.08	5	<0.3	21.56	1.6	0.8	563.3	1.9	0.12	3.1	0.35	0.08	0.04	1.6	33	0.8	2.8	0.24	26	23.9
TE-02-013C	TE1VK	86.39	6.26	0.01	0.08	1.36	1.2	2.3	203	0.8	<0.1	16.67	0.08	32.7	47.7	0.094	0.4	14.9	0.66	0.29	0.41	3.93	2.4	1.12	0.8	0.008	0.11	0.09	17.1	0.04	22.37	0.07	0.1	0.07	32.6	12.8	959.2	0.158	4	3.52	5.0	0.08	4	<0.3	22.37	1.68	0.8	486.9	1.9	0.12	3.1	0.3	0.08	0.04	1.5	29	0.6	2.8	0.24	23	21.8
TE-02-013C	TE1VK	96.01	6.29	0.01	0.08	1.33	0.3	0.3	108	0.8	<0.1	16	0.08	27.3	44.5	0.095	0.3	12.9	0.57	0.26	0.33	4.15	1.9	0.96	0.6	0.008	0.09	0.07	16.9	0.03	25.68	0.07	0.2	0.06	29.4	10.7	962.8	0.155	2.4	3.04	4.4	0.08	4	<0.3	22.24	1.36	0.8	350.3	1.6	0.1	3.2	0.29	0.08	0.03	2.1	29	0.6	2.4	0.19	22	22.9
TE-02-013C	TE1VK	105.10	5.17	0.03	0.08	1.75	0.6	0.6	125	0.8	<0.1	13.55	0.1	31.3	54.5	0.111	0.2	24.7	0.68	0.3	0.41	4.62	2.5	1.16	0.6	0.008	0.11	0.09	19.7	0.03	26.85	0.07	0.2	0.09	35.6	14.1	1080	0.145	9.4	3.58	4.6	0.08	5	<0.3	25.44	1.6	0.8	374.8	2	0.12	3.1	0.34	0.08	0.05	1.5	32	0.3	2.6	0.27	60	28.4
TE-02-013C	TE1VK	126.04	4.92	0.03	0.08	1.22	1.2	367	0.8	<0.1	13.56	0.08	36.5	58.2	0.115	0.3	10.9	0.61	0.25	0.42	5.08	2	1.14	0.6	0.008	0.11	0.04	22.2	0.03	29.17	0.08	0.2	0.06	36.4	13	1127.4	0.17	2.6	3.76	3.1	0.08	6	<0.3	24.58	1.62	0.8	699.7	2.1	0.14	3.8	0.32	0.08	0.04	1	30	0.3	3.1	0.22	24	24.4
TE-02-013C	TE1VK	136.18	4.68	0.05	0.08	1.53	0.8	0.3	518	0.8	<0.1	12.84	0.08	40.8	64.2	0.119	0.5	29.7	0.75	0.3	0.49	5.06	2.4	1.35	0.7	0.008	0.12	0.09	24.5	0.04	28.27	0.08	0.2	0.06	43.8	14.3	1107.3	0.194	3.3	4.31	9.0	0.08	6	<0.3	25.2	1.89	0.8	598.8	2.5	0.17	4	0.4	0.08	0.05	1	37	0.3	3.9	0.27	28	27
TE-02-013C	TE1VK	36.53	7.72	0.01	0.08	1.23	0.8	0.6	276	0.8	<0.1	23.1	0.08	31.4	45.4	0.096	0.3	15.1	0.72	0.29	0.37	3.65	1.5	0.97	0.6	0.008	0.1	0.1	18.9	0.03	19.48	0.07	0.1	0.07	32.6	11.9	817.2	0.145	2.4	3.36	5.4	0.08	4	0.7	18.29	1.5	0.8	655.9	1.8	0.11	2.8	0.31	0.08	0.04	1.6	36	0.7	2.7	0.22	19	22.9
TE-02-013C	TE1VK	46.52	7.97	0.03	0.08	1.33	1.1	1	208	0.8	<0.1	23.93	0.08	31.2	41.8	0.074	0.5	16.2	0.67	0.27	0.38	3.59	2.1	1	0.7	0.008	0.11	0.14	18.2	0.03	18.6	0.06	0.1	0.11	28.6	12.1	783.4	0.163	3.3	3.35	9.1	0.08	4	0.5	17.89	1.46	0.8	870.8	1.4	0.1	3.1	0.27	0.08	0.04	1.9	32	1	2.8	0.24	22	28.1
TE-02-013C	TE1VK	116.21	5.64	0.03	0.08	1.77	0.6	1.7	158	0.8	<0.1	15.36	0.08	37.2	55	0.113	0.5	24	0.67	0.3	0.44	4.33	2.9	1.18	0.6	0.008	0.12	0.07	35.8	0.03	25.55	0.07	0.3	0.08	35.8	13.1	1025.8	0.171	3.5	3.91	5.8	0.08	5	0.6	24.14	1.73	0.8	484.4	2	0.15	3.4	0.34	0.08	0.05	1.4	34	0.3	3.5	0.26	43	26
TE-02-014C	TE1VK	34.75	8.57	0.01	0.08	1.22	0.3	1.7	282	0.8	<0.1	23.74	0.08	27.9	38.1	0.074	0.4	16.7	0.58	0.27	0.32	3.08	1.7	0.92	0.5	0.008	0.1	0.11	16.9	0.04	18.18	0.06	0.08	0.06	25.9	9.5	670.5	0.139	2.4	2.87	7.7	0.08	4	<0.3	17.42	1.36	0.8	981.8	1.2	0.12	2.6	0.24	0.08	0.04	0.7	22	1	3.2	0.23	22	23.2
TE-03-014C	TE1VK	45.49	7.97	0.01	0.08	1.25	0.6	1.2	179	0.8	<0.1	23.19	0.08	25.8	40.6	0.083	0.3	14.3	0.54	0.24	0.3	3.29	1.9	0.91	0.5	0.008	0.09	0.1	15.3	0.03	18.9	0.06	0.08	0.08	25	9.1	744.3	0.124	1.9	2.73	5.9	0.08	4	<0.3	17.46	1.24	0.8	638.4	1.1	0.11	2.4	0.24	0.08	0.03	0.7	23	0.9	3	0.22	16	21.5
TE-03-014C	TE1VK	54.55	8.42	0.02	0.08	1.18	0.3	1.5	178	0.8	<0.1	23.92	0.08	27.4	38.7	0.069	0.3	10.4	0.58	0.27	0.32	3.06	1.8	1.01	0.6	0.008	0.1	0.1	16.9	0.03	18.46	0.06	0.08	0.06	26.3	10	737.8	0.126	1.7	2.92	6.9	0.08	3	<0.3	17.54	1.36	0.8	642.9	0.9	0.12	2.5	0.24	0.08	0.03	0.9	25	0.3	3.4	0.23	15	26.6
TE-03-015C	TE1VK	24.88	9.21	0.01	0.08	0.94	0.6	1.5	136	0.8	<0.1	20.29	0.08	25.2	44.4	0.074	0.1	16.1	0.52	0.23	0.31	2.76	1.5	0.89	0.5	0.008	0.09	0.05	16.4	0.03	15.07	0.1	0.1	0.07	25.5	9.6	800	0.097	1.4	2.82	2.9	0.08	4	<0.3	11.88	1.27	0.8	529.2	1.4	0.11	2.7	0.22	0.08	0.04	0.8	22	0.3	2.5	0.19	23	18.1
TE-03-015C	TE1VK	34.55	8.11	0.06	0.08	1.25	0.3	1.8	197	0.8	<0.1	27.33	0.08	33.7	62.5	0.109	0.1	20.8	0.54	0.25	0.39	5.12	1.8	1.11	0.5	0.008	0.09	0.04	21.7	0.03	14.48	0.08	0.08	0.09	38.3	12.9	1176.4	0.174	3.3	3.72	2.4	0.08	5	<0.3	16.6	1.66	0.8	535.4	1.4	0.13	3.3	0.31	0.08	0.04	0.5	30	0.3	2.9	0.26	20	20.7
TE-03-016C	TE1VK	24.91	7.71	0.01	0.08	1.21	0.5	1.1	214	0.8	<0.1	20.6	0.08	28.8	44.6	0.088	0.3	15.5	0.52	0.23	0.36	3.86	1.8	0.98	0.6	0.008	0.09	0.11	18	0.04	21.53	0.07	0.2	0.1	32.6	10.4	755	0.165	2.6	3.03	7.4	0.08	4	<0.3	18.67	1.41	0.8	1130.4	1.6	0.11	2.7	0.29	0.08	0.04	1.7	36	0.3	2.6	0.22	22	23.6
TE-03-016C	TE1VK	35.09	6.31	0.02	0.08	1.6	0.9	1.5	235	0.8	<0.1	14.87	0.08	35.3	49.9	0.106	0.6	20.9	0.69	0.31	0.45	4.45	2.3	1.23	1	0.008	0.12	0.17	21.8	0.05	24.38	0.07	0.2	0.1	40.4	12.6	936.6	0.175	3	3.66	11.5	0.08	5	<0.3	23.48	1.68	0.8	1240.3	2.2	0.14	3.4	0.36	0.08	0.05	2.1	38	0.7	3.4	0.26	24	38.4
TE-03-016C	TE1VK	44.97	7.32	0.02	0.08	1.34	0.6	0.7	242	0.8	<0.1	16.97	0.08	31.7	43.1	0.09	0.3	12.2	0.57	0.28	0.39	4.33	2.1	1.14	0.7	0.008	0.12	0.09	19.5	0.04	24.26	0.07	0.2	0.07	35.1	11.4	750.4	0.164	2.5	3.35	7.8	0.08	5	<0.3	20.87	1.56	0.8	976.9	1.8	0.12	3.5	0.3	0.08	0.04	1.2	32	0.6	3.1	0.23	29	29.7
TE-03-016C	TE1VK	54.28	7.43	0.05	0.08	1.95	0.5	0.7	240	0.8	<0.1	18.62	0.08	36.5	38.8	0.067	0.7	14.9	0.96	0.45	0.46	3.47	2.9	1.48	1.2	0.008	0.16	0.3	22.6	0.06	21.43	0.06	0.2	0.08	32.6	14	641.7	0.178	2.2	3.93	16.8	0.08	5	<0.3	21.38	1.92	0.8	746.6	1.6	0.17	3.7	0.3	0.08	0.07	1.2	31	0.6	4.6	0.4	20	42.2
TE-03-016C	TE1VK	65.39	7.89	0.01	0.08	2.46	0.9	1	190	0.8	<0.1	19.45	0.08	40.3	30.9	0.065	1	17.9	1.09	0.62	0.53	3.09	3.6	1.83	1.3	0.008	0.22	0.51	24.6	0.09	19.92	0.05	0.08	0.08	34.2	15.9	471.3	0.17	2.1	4.48	24.5	0.08	5	<0.3	20.48	2.27	0.8	479.4	1.7	0.2	4.4	0.34	0.08	0.09	1.3	30	0.9	5.8	0.57	20	47.8
TE-03-016C	TE1VK	75.74	7.09	0.01	0.08	1.6	1	1.1	222	0.8	<0.1	17.17	0.08	45.9	30.2	0.063	1.6	20.2	1.66	0.86	0.66	3.24	5.4	2.2	2.2	0.008	0.29	0.12	18.9	0.05	18.19	0.06	0.2	0.11	48.9	18.9	453.1	0.179	2.2	4.23	42.3	0.08	6	0.6	25.52	2.84	0.8	336.4	2.9	0.29	6.1	0.4	0.13	0.23	2.3	30	0.6	8.2	0.83	27	73.7
TE-03-017C	TE1VK	25.23	7.55	0.02	0.08	1.61	0.7	0.3	256	0.8	<0.1	18.98	0.08	37.4	42	0.086	0.5	20.2	0.84	0.41	0.49	3.65	2.4	1.41	0.8	0.008	0.18	0.18	21.8	0.08	21.87	0.05	0.08	0.08	35.6	14.5	688.1	0.194	5.3	3.96	11.0	0.08	5	<0.3	19.97	1.92	0.8	614.5	1.8	0.2	3.9	0.34	0.08	0.09	1	29	0.9	4.2	0.35	22	29.8
TE-03-017C	TE1VK	35.48	7.84	0.02	0.08	1.94	0.3	0.9	321	0.8	<0.1	18.04	0.08	44.5	37.5	0.096	0.6	20.2	1.04	0.48	0.57	3.67	3.1	1.58	1.3	0.008	0.21	0.25	25.9	0.08	22.27	0.07	0.2	0.08	41	17	581	0.214	3.4	4.73	15.2	0.08	5	<0.3	19.52	2.29	0.8	1041.6	2.2	0.23	4.3	0.37	0.08	0.09	1.3	30	1.1	5	0.41	20	46.7
TE-03-017C	TE1VK	45.54	6.74	0.01	0.08	1.54	0.3	0.3	183	0.8	<0.1	18.24	0.08	34.5	44	0.078	0.4	14.5	0.73	0.36	0.57	3.58	2.4	1.17	0.8	0.008	0.14	0.14	20.2	0.07	22.13	0.06	0.2	0.07	34.9	12.7	708.6	0.161	2.1	3.62	9.4	0.08	4	<0.3	22.66	1.78	0.8	481.2	2	0.17	3	0.31	0.08	0.08	1.2	28	0.7	3.7	0.27	16	31
TE-03-017C	TE1VK	55.04	6.21	0.03	0.08	1.67	0.3	0.3	213	0.8	<0.1	16.74	0.08	37.4	46.8	0.105	0.4	17.2	0.79	0.34	0.47	4.08	2.5	1.25	0.9	0.008	0.15	0.13	21.6	0.07	24.04	0.07	0.2	0.07	33	13.5	738.2	0.169	3.8	3.95	11.1	0.08	5	<0.3	23.88	1.83	0.8	485.2	1.8	0.18	3.3	0.3	0.08	0.07	1.6	30	1.2	3.9	0.3	23	29.9
TE-03-017C	TE1VK	64.29	5.88	0.11	0.08	1.61	0.3	0.6	209	0.8	<0.1	16.3	0.08	36.4	51.6	0.089	0.5	18.4	0.75	0.33	0.57	3.92	2.6	1.25	0.8	0.008	0.15	0.13	21.6	0.07	23.7	0.06	0.4	0.06	34.1	13.1	835.7	0.164	3	3.85	9.9	0.08	5	<0.3	24.28	1.85	0.8	560.5	2	0.18	3.5	0.31	0.2	0.07	1.6	30	1.4	3.8	0.31	20	30.8
TE-03-017C	TE1VK	74.32	6.86	0.01	0.08	1.48	0.3	0.6	246	0.8	<0.1	18.74	0.08	29.7	39.2	0.096	0.4	11.2	0.61	0.29	0.57	3.74	2.2	1	0.8	0.008	0.11	0.12	17.7	0.04	21.57	0.06	0.1	0.09	31.9	10.8	655.8	0.137	2.3	3.01	9.0	0.08	4	<0.3	21.7	1.48	0.8	671.5	1.8	0.13	2.6	0.28	0.08	0.04	1.4	34

Appendix-B : Elemental Content Results

Drill Hole	Unit Code	MidPoint (m)	TOT/C	TOT/S	Ag	Al	As	Au	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Hf	Hg	Ho	K	La	Lu	Mg	Mn	Mo	Na	Nb	Nd	Ni	P	Pb	Pr	Rb	Sb	Sc	Se	Si	Sm	Sn	Sr	Ta	Tb	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn	Zr
	Analyte																																																											
	Unit		%	%	PPM	%	PPM	PPB	PPM	PPM	PPM	%	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	%	%	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
	MDL		0.02	0.02	0.1	0.01	0.5	5	1	0.1	0.1	0.01	0.1	0.1	0.2	0.002	0.1	0.1	0.05	0.03	0.02	0.04	0.5	0.05	0.1	0.01	0.02	0.01	0.1	0.03	0.1	0.01	0.01	0.01	0.01	0.1	0.01	0.1	0.02	0.01	0.1	0.1	0.5	0.01	0.05	1	0.5	0.1	0.01	0.2	0.1	0.04	0	0.01	0.1	0.04	0.01	0.1	0.01	1	0.1
	Average Crustal Concentration		-	0.035	0.075	8.23	1.8	-	425	3	0.17	4.15	0.15	66.5	25	0.0102	-	60	-	-	-	-	5.63	19	3	3	0.085	2.085	39	0.3	2.33	0.095	1.2	2.355	-	20	84	0.105	-	1.4	90	0.2	22	0.05	-	1.5	370	2	-	1.2	0.565	0.85	-	2.7	120	1.25	30	1.5	70	165
	Average Carbonate Concentration		-	0.12	0	0.42	1	0	10	0	0	30	0.035	11.5	0.1	0.0011	0	4	-	-	-	-	0.38	4	-	3	0.04	-	0.27	0	0.2	4.7	0.11	0.4	0.04	-	0.3	20	0.04	-	9	3	0.2	1	0.08	2.4	-	0	610	0	0.2	1.7	0.04	0	-	2.2	20	0.6	30	0.5	20	19
TE-10-036C	TE1VK	49.595	5.18	<0.02	<0.1	1.36	2.8	<0.5	217	<1.0	<0.1	36	53.5	0.117	0.2	18.8	0.58	0.27	0.57	4.6	2.3	1.12	0.5	<0.01	0.09	0.07	22.1	0.04	23.67	0.07	0.2	0.08	32.1	0.12	9.9	3.74	4.6	<0.1	5	<0.5	24.38	1.76	<1	619.6	1.9	0.13	3.5	0.34	<0.1	0.04	1.5	36	<0.5	3.2	0.25	46	22.2
TE-10-036C	TE1VK	63.13	5.47	<0.02	<0.1	1.62	3.3	<0.5	186	<1.0	<0.1	19.53	<0.1	35.5	47.3	0.087	0.3	22	0.59	0.27	0.57	5.11	2.7	1.03	0.5	<0.01	0.1	0.11	21	0.03	21.21	0.08	0.2	0.11	29.7	11.7	792.3	0.16	3.2	3.49	6.5	<0.1	5	<0.5	22.19	1.51	<1	521.8	1.3	0.13	3.5	0.33	<0.1	0.04	1.1	28	<0.5	3	0.18	26	24.4
TE-10-036C	TE1VK	91.495	5.95	<0.02	<0.1	1.2	2.9	<0.5	269	<1.0	<0.1	15.67	<0.1	26.6	48.4	0.098	0.2	15.3	0.54	0.27	0.57	4.15	2.1	0.97	0.4	<0.01	0.1	0.06	16.5	0.03	25.78	0.06	0.1	0.05	24.4	9.2	900.5	0.12	2.1	2.82	3.8	<0.1	4	<0.5	22.29	1.37	<1	264.9	1	0.12	2.9	0.25	<0.1	0.03	0.9	24	<0.5	3	0.22	22	21.1
TE-10-036C	TE1VK	82.62	5.59	0.03	<0.1	1.44	3	0.7	107	<1.0	<0.1	15.66	<0.1	15.6	25.1	0.103	0.2	23.3	0.54	0.24	0.57	4.14	2.1	0.93	0.5	<0.01	0.1	0.07	17.4	0.03	25.15	0.06	0.2	0.07	25.1	10.3	926.3	0.14	2.9	2.98	4.4	<0.1	4	<0.5	23.3	1.32	<1	286.8	1.3	0.12	2.6	0.27	<0.1	0.03	1	25	<0.5	2.8	0.22	22	21.3
TE-10-036C	TE1VK	39.27	6.91	<0.02	<0.1	1.23	3.7	<0.5	165	<1.0	<0.1	20.35	<0.1	30.4	38.4	0.071	0.2	15.8	0.77	0.33	0.57	3.5	1.6	1.13	0.5	<0.01	0.12	0.08	17.7	0.04	22.41	0.06	0.2	0.08	25.1	10.7	653.6	0.14	2.3	3.11	5.4	<0.1	4	<0.5	18.01	1.41	<1	486	0.8	0.15	3.4	0.25	<0.1	0.05	1.5	32	0.6	4.2	0.32	18	24.1
TE-10-036C	TE1VK	73.125	5.75	<0.02	<0.1	1.11	2.7	<0.5	127	<1.0	<0.1	16.02	<0.1	26.1	49.6	0.1	0.1	13.4	0.48	0.22	0.57	4.52	1.6	0.77	0.4	<0.01	0.09	0.04	15.8	0.03	25.22	0.07	0.2	0.06	119.2	9.1	900.2	0.12	1.8	2.64	2.7	<0.1	4	<0.5	22.48	1.18	<1	544.4	22.4	0.1	2.6	0.3	<0.1	0.04	1.3	27	1.3	2.5	0.2	20	19.9
TE-10-036C	TE1VK	38.47	8.44	<0.02	<0.1	0.98	1.7	3.4	157	<1.0	<0.1	29.35	<0.1	25.8	41.9	0.082	0.2	12.8	0.42	0.16	0.57	3.34	1.5	0.66	0.4	<0.01	0.07	0.06	14.4	0.02	14.38	0.07	<0.1	0.06	25	7.7	638.3	0.15	2.8	2.4	3.8	<0.1	3	<0.5	14.73	1.1	<1	549	1.4	0.1	2.5	0.26	<0.1	0.02	0.6	17	<0.5	2.4	0.15	20	16.7
TE-10-037C	TE1VK	65.535	7.74	0.11	<0.1	1.21	1.7	1.7	214	<1.0	<0.1	25.1	<0.1	35.3	64.2	0.141	0.1	12.1	0.51	0.3	0.57	4.57	1.6	0.88	0.5	<0.01	0.07	0.09	0.05	19.6	0.03	17.91	0.08	0.2	0.06	36.2	11.3	1137.4	0.19	1.5	3.28	2.3	<0.1	5	<0.5	16.9	1.46	<1	417.9	1.9	0.13	3	0.32	0.2	0.03	1.5	34	<0.5	3.1	0.21	21	22.8
TE-10-037C	TE1VK	48.41	7.98	0.02	<0.1	0.9	1.5	2	191	<1.0	<0.1	26.78	<0.1	29.5	45.6	0.1	0.2	14	0.48	0.2	0.57	4.07	1.7	0.69	0.4	<0.01	0.07	0.06	16.6	0.02	15.04	0.07	0.1	0.06	28.2	9	765.8	0.16	2.2	2.8	3.8	<0.1	4	<0.5	18.54	1.22	<1	495.2	1.3	0.1	2.3	0.28	<0.1	0.02	0.6	23	0.5	2.3	0.16	19	18.2
TE-10-037C	TE1VK	59.275	8.62	0.04	<0.1	1.07	1.6	1.7	165	<1.0	<0.1	26.71	<0.1	33.1	52.5	0.12	0.2	13.5	0.52	0.22	0.57	4.51	1.7	0.76	0.6	<0.01	0.08	0.05	17.2	0.03	16.66	0.08	0.1	0.06	28.3	10.1	802.3	0.17	2.4	2.88	3	<0.1	4	<0.5	14.47	1.25	<1	640.4	1.6	0.11	2.8	0.28	<0.1	0.03	0.7	24	0.6	2.8	0.19	22	23
TE-10-038C	TE1VK	91.89	8.15	0.03	<0.1	1.66	3.3	0.5	222	<1.0	<0.1	29.65	<0.1	31.1	29.7	0.065	0.6	11	0.76	0.33	0.57	3.52	2.4	1.03	0.9	<0.01	0.13	0.23	18.7	0.05	13.54	0.09	<0.1	0.11	24	11.6	525.6	0.17	2.6	3.27	11.7	<0.1	4	<0.5	14.1	1.63	<1	554.8	1.5	0.15	2.8	0.27	<0.1	0.05	1	29	<0.5	4	0.33	14	32.8
TE-10-038C	TE1VK	61.645	7.63	0.2	<0.1	1.39	2.3	<0.5	148	<1.0	<0.1	28.55	<0.1	29.9	38.9	0.094	0.2	20.6	0.58	0.28	0.57	3.48	2	0.85	0.6	<0.01	0.11	0.18	18.3	0.04	14.65	0.09	0.2	0.09	27.2	10.2	716.6	0.17	2.3	3.14	9.4	<0.1	4	<0.5	17.13	1.44	<1	678.7	1.8	0.13	2.9	0.28	0.2	0.04	1.2	30	<0.5	3.2	0.26	19	23.8
TE-10-038C	TE1VK	38.225	6.12	<0.02	<0.1	1.87	1.8	<0.5	291	<1.0	<0.1	24.03	<0.1	37.5	36.5	0.091	0.7	17.5	0.83	0.36	0.57	3.75	2.7	1.24	0.8	<0.01	0.15	0.26	22.9	0.05	16.68	0.07	<0.1	0.07	30.4	13.7	704.5	0.19	2.2	3.99	14.6	<0.1	5	<0.5	20.96	1.84	<1	426.2	1.4	0.16	3.6	0.36	<0.1	0.05	0.7	35	0.5	4	0.33	21	31.5
TE-10-038C	TE1VK	49.545	6.51	<0.02	<0.1	1.46	1.8	1.1	180	<1.0	<0.1	23.71	<0.1	36.1	40	0.092	0.5	20	0.69	0.27	0.57	3.65	2.4	0.99	0.7	<0.01	0.12	0.17	22.7	0.04	16.69	0.07	<0.1	0.08	32	12.4	672.4	0.18	2.4	3.74	9.6	<0.1	4	0.7	21.22	1.67	<1	538.3	1.6	0.15	3.4	0.33	<0.1	0.04	1.3	27	1.3	2.5	0.2	20	19.9
TE-10-038C	TE1VK	82.92	8.79	0.06	<0.1	1.65	3	<0.5	114	<1.0	<0.1	28.99	<0.1	30.6	36.4	0.083	0.4	19.4	0.72	0.33	0.57	3.92	2.4	1.1	0.8	<0.01	0.13	0.22	18.5	0.04	13.77	0.08	0.2	0.21	24.7	10.7	583.8	0.17	1.7	3.27	9.8	<0.1	4	0.7	14.53	1.64	<1	786	1.5	0.15	2.9	0.27	<0.1	0.05	1.4	31	0.5	4	0.32	12	29.6
TE-10-038C	TE1VK	71.515	7.86	0.06	<0.1	1.33	3.4	1.2	111	<1.0	<0.1	28.02	<0.1	29.4	36.6	0.085	0.4	27.2	0.69	0.25	0.57	3.21	2	0.89	0.7	<0.01	0.11	0.18	17.6	0.04	15.7	0.07	0.3	0.11	25.6	10.2	616.4	0.14	2.7	3.02	9	<0.1	4	0.7	14.9	1.41	<1	694.6	1.6	0.13	2.8	0.28	0.1	0.04	1	27	0.6	3.2	0.26	14	24.6
TE-10-039C	TE1VK	42.38	7.79	<0.02	<0.1	1.26	4.2	2.1	190	<1.0	<0.1	21.74	<0.1	27.1	31.1	0.061	0.4	12.9	0.55	0.32	0.57	3.18	1.8	0.85	0.4	<0.01	0.1	0.24	15.5	0.04	18.89	0.06	<0.1	0.07	22.6	9.7	521.4	0.13	1.8	2.66	9.7	<0.1	4	<0.5	18.33	1.3	<1	763.3	1	0.12	2.5	0.25	<0.1	0.04	1	21	<0.5	2.9	0.24	14	21.9
TE-10-039C	TE1VK	52.03	8.22	<0.02	<0.1	0.77	4.5	0.9	111	<1.0	<0.1	23.58	<0.1	22	31.9	0.072	0.3	12.7	0.42	0.2	0.57	3.8	1.3	0.6	0.6	<0.01	0.07	0.06	25	0.04	19.25	0.05	0.2	0.06	25	7.4	495.4	0.1	1.8	2.14	4.1	<0.1	3	0.5	16.26	1.1	<1	352.7	1.5	0.09	2.5	0.26	<0.1	0.02	1.2	22	<0.5	2.1	0.12	16	17.2
TE-10-039C	TE1VK	63.05	7.25	0.03	<0.1	0.92	4.3	1.6	156	<1.0	<0.1	24.81	<0.1	28	42.9	0.086	0.2	8.8	0.47	0.15	0.57	3.52	<0.5	0.84	0.5	<0.01	0.08	0.08	16.4	0.02	17.69	0.09	<0.1	0.06	25.6	9.3	697.6	0.14	1.9	2.77	4.5	<0.1	4	<0.5	18.64	1.21	<1	703.8	1.2	0.1	2.6	0.26	<0.1	0.03	0.7	38	<0.5	2.4	0.17	14	19.3
TE-10-039C	TE1VK	78.155	8.35	0.03	0.4	1.02	4.2	1.3	160	<1.0	<0.1	23.23	<0.1	26.7	41.5	0.094	0.2	16.4	0.51	0.26	0.57	3.87	<0.5	0.85	0.6	<0.01	0.08	0.08	15.9	0.03	19.22	0.08	2.5	0.09	25.7	9.1	610.3	0.17	2.5	2.72	4.2	<0.1	4	<0.5	18.97	1.26	<1	569.7	1.6	0.11	2.6	0.27	<0.1	0.04	1	39	2	3.1	0.21	20	19.4
TE-10-039C	TE1VK	128.04	8.93	<0.02	<0.1	0.7	4.4	0.6	124	<1.0	<0.1	23.95	<0.1	17.6	25.3	0.049	0.1	11.1	0.35	0.15	0.57	3.23	1.5	0.6	0.4	<0.01	0.05	0.05	10.4	0.02	21.44	0.05	0.2	0.05	16.1	5.6	470	0.09	1.7	2.25	<0.1	0.78	<0.1	0.01	12.04	0.78	<1	617.7	1	0.08	1.5	0.16	0.1	0.02	0.8	18	25	<0.5	1.6	0.12	13	20.4
TE-10-049C	TE1VK	36.815	6.05	<0.02	<0.1	1.37	3.4	1.7	292	<1.0	<0.1	19.31	<0.1	32.3	47.2	0.1	0.3	14.5	0.55	0.22	0.57	4.32	2	0.88	0.6	<0.01	0.09	0.11	18.2	0.02	21.61	0.07	0.2	0.09	30.7	10.5	863.3	0.18	1.9	3.08	6.7	<0.1	4	<0.5	21.35	1.47	<1	874.4	0.9	0.13	3.2	0.3	<0.1	0.03	1.2	33	<0.5	3	0.23	18	23.2
TE-10-049C	TE1VK	106.985	5.99	<0.02	<0.1	2.63	3	1.3	122	<1.0	<0.1	17.75	<0.1	31.1	38.2	0.085	0.9	24.8	0.92	0.49	0.57	3.57	3.5	1.25	0.8	<0.01	0.18	0.36	16.6	0.06	22.54	0.06	0.1	0.08	41.5	15.2	608.1	0.15	2.5	3.09	18.4	<0.1	5	<0.5	22.01	1.69	<1	312	1.2	0.18	3.6	0.31	<0.1	0.06	1.2	29	<0.5	5.1	0.46	21	33.1
TE-10-049C	TE1VK	46.85	5.59	<0.02	<0.1	1.32	3.1	0.9	272	<1.0	<0.1	17.39	<0.1	33.5	49.9	0.099	0.4	11.3	0.55	0.22	0.57	4.54	1.7	0.95	0.5	<0.01	0.09	0.09	20.1	0.03	22.96	0.07	0.2	0.1	32.9	11	932.1	0.2	1.6	3.27	6	<0.1	5	<0.5	22.92	1.52	<1	772.7	1.3	0.12	3.3	0.33	<0.1	0.04	1.1	32	<0.5	2.9	0.18	17	22.9
TE-10-049C	TE1VK	57.135	6.95	0.02	<0.1	1.86	2.9	1	221	<1.0	<0.1	14.76	<0.1	36.4	50.3	0.114	0.4	9.1	0.68	0.29	0.57	4.89	2.4	0.99	0.7	<0.01	0.12	0.16	14.4	0.02	23.88	0.08	0.1	0.16	34.4	12.2	974.3	0.18	2.3	3.39	8.3	<0.1	6	<0.5	24.8	1.56	<1	1496.1	1.9	0.14	3.6	0.35	<0.1	0.04	1.7	44	<0.5	3.4	0.24	24	25.5
TE-10-049C	TE1VK	67.1	5.26	0.02	<0.1	1.56	2.9	1	174	<1.0	<0.1	15.48	<0.1	31.9	50.1	0.099	0.4	17.7	0.61	0.26	0.57	4.56	2.2	0.91	0.5	<0.01	0.1	0.14	18.3	0.04	24.39	0.07	0.2	0.09	28.5	10.1	957.4	0.17	1.6	3.07	7.8	<0.1	5	<0.5	24.29	1.45	<1	470.6	1.4	0.13	3.5	0.31	<0.1	0.04	2.2	36	<0.5	3.3	0.25	23	22.2
TE-10-049C	TE1VK	97.35	4.59	0.03	<0.1	2.81	2.2	1.2	219	<1.0	<0.1	15.07	0.1	42.9	53.9	0.085	0.5	64.2	1.72	0.9	0.57	5.85	4.5	1.98	1	<0.01	0.31	0.28	22.2	0.11	22.76	0.09	0.1	0.32	33.1	15.9	886.8	0.19	17.5	4.24	9	<0.1	10	<0.5	26.06	2.63	<1	371	1.6	0.31	3.3	0.4	<0.1	0.13	1.1	58	<0.5	9.2	0.8	70	30.3
TE-10-049C	TE1VK	76.755	6.67	0.02	<0.1	1.31	3.4	1.1	122	<1.0	<0.1	19.83	<0.1	26.4	41.5	0.085	0.3	18.7	0.64	0.29	0.57	3.69	2	0.83	0.5	<0.01	0.11	0.09	14.6	0.03	22.95	0.06	0.2	0.1	24.1	9.2	777	0.14	2.9	2.52	4.6	<0.1	4	0.5	19.54	1.28	<1	500.7	1.2	0.12	2.3	0.25	<0.1	0.04	1.7	27	<0.5	3.2	0.24	19	20.5
TE-10-049C	TE1VK	87.68	6.01	0.02	<0.1	1.39	3	<0.5	104	<1.0	<0.1	17.76	<0.1	30.8	42.8	0.087	0.2	15.3	0.61	0.25	0.57	4.5	1.9	1.02	0.6	<0.01	0.08	0.08	16.9	0.04	24.16	0.06	0.2	0.08	26.9	9.7	861.7	0.15	1.8	2.98	5.3	<0.1	4	<0.5	21.14	1.33	<1	333.5	1.4	0.12	3.3	0.29	<0.1	0.04	1.7	27	<0.5	3	0.23	21	28.4
TE-02-011C	TE3VK	84.46	6.84	0.03	0.08	1.61	0.9	3	269	0.8	<0.1	15.9	0.08	39.1	46.7	0.109	0.4	18.8	0.73	0.33	0.57	4.15	2.3	1.16	0.8	0.008	0.11	0.17	23.2	0.03	24.14	0.07	0.2	0.1	37	14.3	857.6	0.192	4.8	4.15	9.3	0.08	5	<0.3	22.19	1.83	0.8	861.6	2.2	0.13	3.9	0.37	0.08	0.04	1.3	33	1	3	0.27	34	25.8
TE-02-011C	TE3VK	94.54	7.12	0.02	0.08	1.27	1	3	230	0.8	<0.1	18.64	0.08	37.3	42.1	0.09	0.4	17.6	0.64	0.29	0.57	3.69	2.1	1.13	0.9	0.008	0.11	0.11	22.4	0.04	23.08	0.06	0.1	0.08	34.8	13.8	800.7	0.197	2.6	4.05	7.2	0.08	5	<0.3	20.37	1.84	0.8	615.3	1.9	0.12	3.8	0.33	0.08	0.04	1.6	29	0.7	2.8	0.22	23	31
TE-02-011C	TE3VK	104.46	7.72	0.03	0.08	1.4	0.6	2.2	169	0.8	<0.1	21.38	0.08	31.9	36.7	0.088	0.6	9.7	0.66	0.29	0.57	3.53	2.1	1.02	0.7	0.008	0.1	0.19	19	0.04	20.88	0.05	0.2	0.09	29.2	11.9	711.1	0.149	1.2	3.32	11.2	0.08	4	<0.3	18.77	1.48	0.8	468.5	1.5	0.11	3.2	0.28	0.08	0.04	1.4	27	0.3	2.8	0.24	16	26.8
TE-02-011C	TE3VK	113.75	4.53	1.01	0.08	2.29	1.3	1.2	>50000	0.8	<0.1	11.34	0.08	35	6.5	0.04	0.3	14	0.56	0.27	0.57	2.9	1.15	0.57	0.2	0.008	0.05	0.05	7.5	0.02	17.1	0.08	0.2	0.12	7.3	13.5	1.2	0.079	0.5	19.88	2.79	0.8	28.41	5.2	0.08	2	<0.3	6.14	0.41	0.8	5.29	0.08	0.41	0.1	2.1	40	0.8	10.4	1.11	18	83.9
TE-02-011C	TE3VK	114.50	5.99	0.02	0.08	1.41	1.4	1.8	264	0.8	<0.1	14.94	0.08	33.2	47.8	0.088	0.4	16.8	0.65	0.33	0.57	4.78	1.7	1.06	0.5	0.008	0.11	0.13	19.3	0.04	26.16	0.07	0.2	0.07	30.1	12.1	895	0.149	1.7	3.58	6.9	0.08	5	<0.3	22.43	1.55	0.8	494.3	1.8	0.22	3.1	0.3	0.08	0.04	1.7	31	0.3	2.8	0.24	20	25.2
TE-02-011C	TE3VK	124.80	6.61	0.03	0.08	1.39	0.9	1.7	166	0.8	<0.1	17.68	0.08	59.6	44.5	0.107	0.3	12.2	0.64	0.29	0.57	4.22	1.9	1.19	0.6	0.008	0.11	0.14	34.3	0.04	23.54	0.06	0.1	0.1	31.9	21	884.1	0.142	1.9	6.16	6	0.08	5	<0.3	21.75	2.21	0.8	391.6	1.8	0.12	2.7	0.28	0.08	0.05	1.3	29	0.3	2.8	0.26	17	21.8
TE-02-011C	TE3VK	134.47	4.89	0.03	0.08	1.44	0.8	1.8	320	0.8	<0.1	13.86	0.08	31.3	30.7	0.108	0.2	26.3	0.62	0.23	0.57	4.92	1.7	0.97	0.9	0.008	0.1	0.08	33.4	0.03	18.47	0.04	0.1	0.06	33.4	12.3	1014.4	0.151	1.3	5.59	3.9	0.08	4	<0.3	23.64	1.53	0.8	629.9	1.8	0.1	2.8	0.33	0.08	0.04	1.9	29	0.3	2.7	0.24	19	24.8
TE-02-012C	TE3VK	87.45	6	0.04	0.08	1.16	0.9	0.3	239	0.8	<0.1	14.36	0.08	29.7	57.6	0.107	0.3	16.4	0.61	0.25	0.57	4.5	1.9	1.02	0.6	0.008	0.09	0.07	18.3	0.03	25.52	0.06	0.1	0.08	31.2	11.2	1057.8	0.14	2.4	3.18	4.7	0.08	5	<0.3	24.24	1.35	0.8	715.8	1.9	0.12	3.2	0.28	0.08	0.04	1.5	36	0.6	3.1	0.22	20	28.4
TE-02-012C	TE3VK	97.29	7.14	0.42	0.08	1.03	0.6	1.2	363	0.8	<0.1	18.89	0.08	29.8	54.8	0.094	0.2	71	0.54	0.22	0.57	4.11	1.7	0.92	0.6	0.008	0.09	0.05	19.5	0.03	23.9	0.07	0.1	0.06	32.3	11	982.8	0.156	1.7	3.22	3	0.08	5	<0.3	20.46	1.38	0.8	703.1	1.8	0.12	2.8	0.28	0.2	0.04	0.8	30	0.5	2.9	0.21	23	17.9
TE-02-012C	TE3VK	107.45	6.64	0.05	0.08	1	0.3	1.3	140	0.8	<0.1	16.22	0.08	30	53.7	0.094	0.1	15.7	0.53	0.24	0.57	4.02	1.6	1.01	0.4	0.008	0.1	0.05	19.2	0.03	25.94	0.06	0.1	0.05	33.2	11	1023.2	0.139	1.8	3.14	2.7	0.08	4	<0.3	21.41	1.41	0.8	588.7	1.9	0.12	3.1	0.32	0.08	0.04	1	29	0.3	3	0.21	20	19.9
TE-02-012C	TE3VK	117.42	6.99	0.05	0.08	1.05	0.3	1.4	204	0.8	<0.1	14.89	0.09	31.9	52.5	0.098	0.2	12.6	0.54	0.23	0.57	4.23	1.7	0.94	0.5	0.008	0.08	0.06	20.8	0.03	26.61	0.07	0.1	0.05	32.5	11.7	985.9	0.14	2.1	3.48	3.8	0.08

Appendix-B : Elemental Content Results

Drill Hole	Unit Code	MidPoint (m)	TOT/C	TOT/S	Ag	Al	As	Au	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Hf	Hg	Ho	K	La	Lu	Mg	Mn	Mo	Na	Nb	Nd	Ni	P	Pb	Pr	Rb	Sb	Sc	Se	Si	Sm	Sn	Sr	Ta	Tb	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn	Zr
	Analyte																																																											
	Unit		%	%	PPM	%	PPM	PPB	PPM	PPM	PPM	%	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	%	PPM	%	%	PPM	%	PPM	%	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
	MDL		0.02	0.02	0.1	0.01	0.5	0.5	1	1	0.1	0.01	0.1	0.1	0.2	0.002	0.1	0.1	0.05	0.03	0.02	0.04	0.5	0.05	1	0.03	0.01	0.01	0.1	0.3	0.1	0.01	0.01	0.01	0.01	0.1	0.02	0.1	0.1	0.02	0.1	0.1	1	0.5	0.01	0.05	1	0.5	0.1	0.01	0.02	0.1	0.1	0.01	0.1	0.1	0.05	1	0.1
	Average Crustal Concentration			0.035	0.075	8.23	1.8	-	425	3	0.17	4.15	0.15	66.5	25	0.0102	-	60	-	-	-	5.63	19	3	3	0.085	2.085	39	0.3	2.33	0.095	1.2	2.355	-	20	2.3	20	84	0.105	-	14	90	0.2	22	0.05	-	2.3	370	2	-	1.2	0.565	0.85	-	2.7	120	1.25	33	1.25	70	165
	Average Carbonate Concentration			0.12	0	0.42	1	0	10	0	0	30	0.035	11.5	0.1	0.0011	0	4	-	-	-	0.38	4	-	0.3	0.04	-	0.27	0	0.2	4.7	0.11	0.4	0.04	-	0.3	20	0.04	-	9	3	0.2	1	0.08	2.4	-	0	610	0	0.2	1.7	0.04	0	-	2.2	20	0.6	30	2.5	20	19
TE-10-027C	TE2VK	142.015	5.66	0.03	<0.1	1.34	2	<0.5	109	<1.0	<0.1	17.99	<0.1	29.2	9.9	301.2	0.09	0.3	8.5	0.48	0.21	0.57	4.51	2	0.81	0.5	<0.01	0.09	0.08	17.2	0.03	23.92	0.06	0.1	0.07	29.2	9.9	825.9	0.17	1.6	2.85	4.9	<0.1	5	<0.5	22.61	1.3	<1	228.8	1.4	0.11	2.7	0.28	<0.1	0.03	1	25	<0.5	2.9	0.21	15	20.3
TE-10-027C	TE2VK	122.395	6.43	0.02	<0.1	0.77	2.3	<0.5	267	<1.0	<0.1	18.2	<0.1	22.7	40.9	0.086	0.1	5.1	0.4	0.16	0.57	4.05	1.3	0.62	0.3	<0.01	0.07	0.03	13.3	0.02	25.25	0.06	<0.1	0.06	25.2	7.3	803.1	0.13	1.1	2.23	2.4	<0.1	4	0.6	19.66	1.05	<1	456.8	1	0.09	2.1	0.22	<0.1	0.03	0.9	20	<0.5	2.1	0.15	15	18.1
TE-10-027C	TE2VK	131.88	4.14	0.05	<0.1	1.18	1.8	<0.5	60	<1.0	<0.1	12.95	<0.1	32.8	58	0.127	0.2	7.2	0.57	0.21	0.57	5.98	1.8	0.92	0.5	<0.01	0.1	0.05	19.7	0.03	28.01	0.07	0.1	0.05	34.5	11.4	1149.5	0.18	1.3	3.26	3	<0.1	6	0.5	26.25	1.36	<1	2133.8	2.2	0.12	2.8	0.37	<0.1	0.04	0.8	30	<0.5	2.7	0.2	24	20.8
TE-10-027C	TE2VK	151.955	5.96	0.03	<0.1	1.29	2.5	<0.5	100	<1.0	<0.1	20.15	<0.1	36.2	45.3	0.104	0.5	13.4	0.65	0.27	0.57	3.87	1.9	0.91	0.6	<0.01	0.1	0.12	20.5	0.04	21.06	0.06	<0.1	0.08	30.9	11.8	790.1	0.18	2.4	3.47	7.4	<0.1	5	0.5	22.61	1.56	<1	281.8	1.5	0.13	3.4	0.32	<0.1	0.04	1.1	24	0.6	3.3	0.22	13	23.5
TE-10-027C	TE2VK	157.37	5.78	0.48	<0.1	1.48	2.4	<0.5	314	<1.0	<0.1	19.62	<0.1	38.1	42.1	0.093	0.9	16.2	0.78	0.35	0.57	4.45	2.2	1.04	0.8	<0.01	0.1	0.13	25.1	21.3	0.05	21	0.06	0.1	0.07	32.8	12.4	733.5	0.18	2.5	3.64	9.4	<0.1	5	0.8	23.1	1.84	<1	272.1	1.6	0.15	3.9	0.32	<0.1	0.04	1	27	0.7	4	0.3	18	34.7
TE-10-028C	TE2VK	106	5.14	<0.02	<0.1	1.4	1.9	<0.5	488	<1.0	<0.1	14.46	<0.1	30.8	54.4	0.11	0.1	14	0.58	0.27	0.57	4.49	2.1	0.78	0.5	<0.01	0.09	0.05	18	0.01	27.46	0.06	0.2	0.06	34.1	10.5	915.6	0.14	1.5	3.04	3.4	<0.1	5	<0.5	22.2	1.27	<1	734.3	2.3	0.11	2.7	0.31	<0.1	0.02	0.8	28	<0.5	2.9	0.21	19	19.6
TE-10-028C	TE2VK	96.09	4.98	0.02	<0.1	1.09	1.9	<0.5	204	<1.0	<0.1	12.73	<0.1	32.1	54	0.135	0.1	11.6	0.48	0.17	0.57	5.04	2.2	0.81	0.3	<0.01	0.07	0.04	19.7	0.01	28.41	0.08	<0.1	0.05	32.6	10.6	1122.5	0.15	1.6	3.24	3	<0.1	6	<0.5	24.16	1.49	<1	644.6	2	0.1	2.9	0.31	<0.1	0.02	0.8	28	<0.5	2.6	0.14	20	17.3
TE-10-028C	TE2VK	85.385	5.26	0.02	<0.1	1.61	2.1	0.8	244	<1.0	<0.1	14.29	<0.1	37.8	53.7	0.106	0.4	16.5	0.71	0.33	0.57	4.65	3	1.06	0.8	<0.01	0.13	0.17	21.6	0.02	25.52	0.07	0.1	0.08	38.4	13.9	976.4	0.21	1.7	3.78	9.5	<0.1	5	<0.5	23.87	1.78	<1	899	2.5	0.15	4	0.36	<0.1	0.03	1.1	31	<0.5	3.6	0.31	22	29.9
TE-10-028C	TE2VK	46.025	6.78	0.02	<0.1	0.82	2.9	<0.5	154	<1.0	<0.1	21.29	<0.1	27.9	43.4	0.088	0.1	16.1	0.51	0.19	0.57	4.16	1.1	0.99	0.6	<0.01	0.09	0.03	16.7	0.03	21.5	0.06	0.1	0.06	26.1	9.2	670.5	0.13	1.4	2.81	2	<0.1	4	<0.5	18.79	1.2	<1	412.9	1.3	0.11	2.6	0.25	<0.1	0.03	2.1	28	<0.5	3	0.21	15	19.8
TE-10-028C	TE2VK	118.31	5.33	0.08	<0.1	0.9	2.4	<0.5	322	<1.0	<0.1	16.57	<0.1	26.3	44	0.074	0.2	12.5	0.47	0.2	0.57	3.85	1.8	0.93	0.4	<0.01	0.09	0.04	16.6	0.03	26.86	0.06	0.2	0.04	23.7	9	770.9	0.13	1.3	2.78	3	<0.1	4	<0.5	20.48	1.22	<1	362.7	0.9	0.12	2.5	0.24	<0.1	0.02	1.1	22	<0.5	2.5	0.16	20	20.9
TE-10-031C	TE2VK	138.345	5.16	0.1	<0.1	1.02	2.1	<0.5	407	<1.0	<0.1	14.48	<0.1	30.2	56.5	0.114	0.2	6.1	0.54	0.21	0.57	4.93	1.5	1.04	0.5	<0.01	0.09	0.05	19	0.03	28.36	0.08	0.2	0.04	29.6	10.5	977	0.15	2.6	3.17	4.2	<0.1	5	<0.5	23.63	1.45	<1	498.2	1.5	0.12	2.9	0.29	<0.1	0.03	0.9	27	<0.5	2.7	0.17	23	18
TE-10-031C	TE2VK	107.26	4.95	0.09	<0.1	1.59	2.3	0.8	443	<1.0	<0.1	13.25	<0.1	43.6	52.2	0.108	0.5	13	0.68	0.26	0.57	4.82	2	1.26	0.9	<0.01	0.11	0.11	26.3	0.04	27.74	0.07	0.2	0.07	34.8	15.2	917.5	0.19	2.6	3.45	7.7	<0.1	5	<0.5	24.47	1.82	<1	486.5	2.2	0.14	5.1	0.39	<0.1	0.04	1.3	30	<0.5	3.3	0.22	22	32.9
TE-10-031C	TE2VK	128.435	6.57	0.11	<0.1	1.14	3	1.1	299	<1.0	<0.1	17.83	<0.1	27.6	45.3	0.074	0.2	19.2	0.49	0.23	0.57	3.61	1.5	0.95	0.5	<0.01	0.09	0.05	16.7	0.03	25.92	0.06	0.2	0.05	25.4	10	703.3	0.14	2.8	2.97	3.1	<0.1	4	<0.5	19.27	1.32	<1	517.3	1.1	0.11	2.5	0.25	<0.1	0.03	1	23	<0.5	3.1	0.21	22	18.6
TE-10-031C	TE2VK	148.325	5.21	0.13	<0.1	1.39	2.3	0.6	475	<1.0	<0.1	14.56	<0.1	33.8	57.8	0.103	0.3	20.6	0.61	0.26	0.57	4.56	1.8	1.19	0.7	<0.01	0.11	0.09	21	0.04	27.7	0.07	0.2	0.05	33.1	11.9	865	0.19	2.7	3.59	6.8	<0.1	5	<0.5	23.2	1.65	<1	579.7	1.9	0.15	3.5	0.34	<0.1	0.04	0.9	27	<0.5	3.5	0.24	23	21.9
TE-10-033C	TE2VK	164.68	5.62	0.05	<0.1	1.8	2.1	1.2	577	<1.0	<0.1	16.24	<0.1	40.7	51.4	0.096	0.3	34.2	0.86	0.35	0.57	4.27	2.6	1.3	1	<0.01	0.13	0.09	23.5	0.05	25.56	0.06	0.1	0.06	36.1	13.7	855.9	0.2	5.2	3.99	5.7	<0.1	5	<0.5	21.93	1.92	<1	544.7	2	0.17	3.6	0.4	<0.1	0.06	1.2	36	<0.5	4	0.3	28	33.7
TE-10-033C	TE2VK	174.76	5.67	0.04	<0.1	1.58	2.3	1.1	546	<1.0	<0.1	18.21	<0.1	45.2	43.8	0.109	0.4	28	0.8	0.37	0.57	3.91	2.1	1.39	0.9	<0.01	0.13	0.08	25.9	0.05	24.83	0.07	0.2	0.05	34.5	12.7	966.8	0.19	2.9	3.68	6.1	<0.1	5	<0.5	24.83	1.67	<1	1840.3	2.2	0.14	3.4	0.34	<0.1	0.04	1.1	27	<0.5	3.1	0.2	25	24.4
TE-10-033C	TE2VK	178.39	4.99	0.13	<0.1	1.3	2.5	0.8	493	<1.0	<0.1	13.4	<0.1	36.9	52.5	0.114	0.4	22.4	0.66	0.29	0.57	5.64	2.1	1.17	0.7	<0.01	0.11	0.09	22.5	0.04	28.41	0.08	0.2	0.04	35.1	12.8	901	0.19	2.6	4.36	6.4	<0.1	6	<0.5	23.7	1.72	<1	953	1.9	0.14	3.7	0.35	<0.1	0.04	0.9	28	<0.5	3.2	0.26	33	26.81
TE-10-033C	TE2VK	188.475	5	0.03	<0.1	1.83	2.3	0.9	393	<1	<0.1	14.39	<0.1	34.6	48.9	0.086	0.5	11.6	0.69	0.31	0.57	4.26	2.2	1.26	1.2	<0.01	0.13	0.08	24.6	0.05	27.09	0.06	0.3	0.09	32.4	12.5	816.9	0.17	3.5	3.54	9.6	<0.1	5	<0.5	24.15	1.76	<1	586.4	2	0.16	3.4	0.35	<0.1	0.05	1.1	26	<0.5	3.8	0.29	18	47.4
TE-10-032C	TE2VK	115.56	4.49	0.08	<0.1	1.25	2.5	<0.5	732	<1.0	<0.1	13.27	<0.1	29	56.3	0.104	0.2	27.4	0.58	0.28	0.57	5.08	2.3	1.05	0.6	<0.01	0.1	0.06	17.8	0.04	28.01	0.08	0.2	0.06	28.6	10.1	1051.5	0.14	3.6	3.05	3.6	<0.1	5	<0.5	24.81	1.41	<1	1458.6	1.6	0.13	2.6	0.31	<0.1	0.04	0.8	29	<0.5	3.1	0.23	33	27.8
TE-10-032C	TE2VK	150.295	6.09	0.04	<0.1	1.09	3.5	<0.5	327	<1.0	<0.1	16.41	<0.1	26.6	43.5	0.097	0.2	10.8	0.44	0.18	0.57	4.11	2	0.82	0.4	<0.01	0.08	0.07	16	0.03	26.09	0.06	0.3	0.05	38.5	8.8	833.4	0.12	2.1	2.65	5.3	<0.1	4	<0.5	21.12	1.18	<1	1627.9	3.5	0.1	2.8	0.26	<0.1	0.03	1	25	<0.5	2.4	0.18	21	17.7
TE-10-032C	TE2VK	160.61	5	0.01	<0.1	0.96	2.7	<0.5	778	<1.0	<0.1	13.69	<0.1	30	47.4	0.115	0.2	9.2	0.57	0.51	0.57	4.31	2.1	1.07	0.4	<0.01	0.1	0.04	30.8	17.9	0.03	28.18	0.05	0.2	0.04	30.5	10.3	1017.8	0.16	2.2	2.99	4.1	<0.1	4	<0.5	24.09	1.27	<1	3410.5	1.7	0.11	2.7	0.31	<0.1	0.04	0.8	25	<0.5	2.7	0.16	23	16.6
TE-10-032C	TE2VK	170.5	4.01	0.04	<0.1	1.4	2.4	<0.5	411	<1.0	<0.1	11.75	<0.1	39.1	59.8	0.112	0.2	16.2	0.68	0.21	0.57	4.97	2.6	1.15	0.6	<0.01	0.1	0.1	23.4	0.04	28.92	0.07	0.3	0.06	34.2	14.5	1210.3	0.18	2.8	4.04	6.7	<0.1	5	<0.5	27.22	1.83	<1	401	1.9	0.14	3.7	0.35	<0.1	0.04	1.1	33	<0.5	3.2	0.24	34	26.5
TE-10-032C	TE2VK	105.775	4.44	0.05	<0.1	1.36	2.4	<0.5	461	<1.0	<0.1	12.21	0.2	37.6	58.6	0.13	0.3	32.8	0.65	0.26	0.57	6.38	2.4	1.17	0.7	<0.01	0.11	0.07	23.6	0.04	25.82	0.09	0.2	0.06	34.8	15.2	1093	0.19	8.1	3.91	5.1	<0.1	6	<0.5	24.19	1.63	<1	590.1	1.9	0.15	4	0.36	<0.1	0.04	0.9	32	<0.5	3.1	0.25	70	25.5
TE-10-032C	TE2VK	125.355	5.18	0.02	<0.1	1.23	2.9	<0.5	513	<1.0	<0.1	14.39	<0.1	36.6	49.1	0.114	0.3	13.7	0.64	0.26	0.57	4.84	1.9	1.1	0.5	<0.01	0.1	0.06	21.2	0.04	27.16	0.07	0.2	0.05	33.8	12.6	984.2	0.17	2.6	3.6	4.7	<0.1	5	<0.5	23.35	1.6	<1	498.4	1.7	0.14	3.5	0.34	<0.1	0.03	1	29	<0.5	3.2	0.2	26	24.5
TE-10-032C	TE2VK	140.785	5.54	<0.02	<0.1	1.32	3.6	<0.5	466	<1.0	<0.1	18.68	<0.1	34	42.7	0.087	0.3	20.6	0.61	0.26	0.57	4.56	1.8	1.19	0.7	<0.01	0.11	0.09	21	0.04	27.7	0.07	0.2	0.05	33.1	11.9	841.8	0.18	3.1	3.46	6.1	<0.1	4	<0.5	22.67	1.53	<1	599.5	1.4	0.14	3.5	0.32	<0.1	0.04	1.1	28	<0.5	3.2	0.22	24	24.5
TE-10-033C	TE2VK	164.68	5.62	0.05	<0.1	1.8	2.1	1.2	577	<1.0	<0.1	16.24	<0.1	40.7	51.4	0.096	0.3	34.2	0.86	0.35	0.57	4.27	2.6	1.3	1	<0.01	0.13	0.09	23.5	0.05	25.56	0.06	0.1	0.06	36.1	13.7	855.9	0.2	5.2	3.99	5.7	<0.1	5	<0.5	21.93	1.92	<1	544.7	2	0.17	3.6	0.4	<0.1	0.06	1.2	36	<0.5	4	0.3	28	33.7
TE-10-033C	TE2VK	174.76	5.67	0.04	<0.1	1.58	2.3	1.1	546	<1.0	<0.1	18.21	<0.1	45.2	43.8	0.109	0.4	28	0.8	0.37	0.57	3.91	2.1	1.39	0.9	<0.01	0.13	0.08	25.9	0.05	24.83	0.07	0.2	0.05	37.8	15.2	748.5	0.22	2.3	4.4	6.6	<0.1	5	<0.5	20.3	1.97	<1	761.3	1.6	0.17	4.3	0.38	<0.1	0.06	1.2	37	<0.5	4.2	0.34	21	34.4
TE-10-033C	TE2VK	184.7	5.8	0.07	<0.1	1.57	2	1.2	433	<1.0	<0.1	15.54	<0.1	39.1	47.5	0.096	0.5	16.9	0.76	0.32	0.57	4.67	2.4	1.24	0.9	<0.01	0.12	0.12	22.6	0.04	26.54	0.07	0.2	0.05	34	13.4	909.2	0.2	2.7	3.82	8.5	<0.1	5	0.6	21.8	1.73	<1	745.7	1.7	0.16	3.9	0.33	<0.1	0.05	1.1	34	<0.5	3.8	0.27	28	32
TE-10-033C	TE2VK	114.477	5.66	<0.02	<0.1	1.71	2.1	<0.5	245	<1.0	<0.1	11.16	<0.1	51.4	46.5	0.099	0.5	25.8	0.88	0.36	0.57	4.38	1.6	1.1	0.6	<0.01	0.12	0.08	40.2	16	0.04	32.5	0.24	0.7

Appendix-B : Elemental Content Results

Drill Hole	Unit Code	MidPoint (m)	TOT/C	TOT/S	Ag	Al	As	Au	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Hf	Hg	Ho	K	La	Lu	Mg	Mn	Mo	Na	Nb	Nd	Ni	P	Pb	Pr	Rb	Sb	Sc	Se	Si	Sm	Sn	Sr	Ta	Tb	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn	Zr
	Analyte																																																											
	Unit		%	%	PPM	%	PPM	PPB	PPM	PPM	PPM	%	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	%	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
	MDL		0.02	0.02	0.1	0.01	0.5	0.5	1	0.1	0.1	0.01	0.1	0.1	0.2	0.002	0.1	0.1	0.05	0.03	0.02	0.04	0.5	0.05	0.1	0.01	0.1	0.02	0.1	0.1	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.02	0.1	0.1	1	0.5	0.01	0.05	1	0.5	0.1	0.01	0.2	0.1	0.01	0.1	0.01	0.1	0.01	0.1	0.05	1	0.1
	Average Crustal Concentration			0.035	0.075	8.23	1.8	-	425	3	0.17	4.15	0.15	66.5	25	0.0102	-	60	-	-	-	5.63	19	3	3	0.085	2.085	39	0.3	2.33	0.095	1.2	2.355	-	20	84	0.105	-	14	90	0.2	22	0.05	-	55	370	2	-	1.2	0.565	0.85	-	2.7	120	1.25	33	1.25	70	165
	Average Carbonate Concentration			0.12	0	0.42	1	0	10	0	0	30	0.035	11.5	0.1	0.0011	0	4	-	-	-	0.38	4	-	0.3	0.04	-	0.27	0	0.2	4.7	0.11	0.4	0.04	-	9	3	0.2	1	0.08	2.4	-	0	610	0	0.2	1.7	0.04	0	-	2.2	20	0.6	30	0.5	20	19
TE-10-027C	TE4VK	187.92	10.1	0.02	<0.1	1.66	3.9	8.7	66	<1.0	<0.1	25.48	<0.1	11	3.9	0.011	0.8	3.2	0.65	0.33	0.57	2.02	3.8	1.94	1.6	<0.01	0.26	1.1	30.5	0.1	8.57	0.03	<0.1	0.07	40.1	21.5	244.9	0.27	7.3	5.72	23.5	<0.1	5	<0.5	14.98	2.94	<1	328.4	2.8	0.28	5.9	0.43	<0.1	0.09	1.6	41	1.1	7.7	0.58	39	62.4
TE-10-030C	TE4VK	84.585	8.05	0.48	<0.1	3.56	4.2	<0.5	9982	<1.0	<0.1	30.99	<0.1	35.2	10.6	0.026	1	11.1	1.4	0.76	0.57	2.53	4.3	1.9	1.9	<0.01	0.26	1.1	18.3	0.11	10.12	0.05	0.4	0.07	18.2	14.2	151.6	0.11	3.1	3.66	28.2	<0.1	4	<0.5	16.22	2.3	<1	366.7	1.1	0.26	3.9	0.29	0.1	0.11	1.1	26	1.2	7.6	0.69	14	72.2
TE-10-031C	TE4VK	251.795	12.02	0.09	<0.1	0.12	5.9	<0.5	9	<1.0	<0.1	53.25	<0.1	2.8	<0.2	<0.002	<0.1	0.5	0.06	<0.03	0.57	0.19	<0.5	0.12	<0.1	<0.01	<0.02	0.03	1.6	<0.01	1.21	0.01	0.5	0.02	1.4	1.1	6.4	<0.01	1.5	0.3	0.8	<0.1	<1	<0.5	2.17	0.15	<1	316.2	0.2	0.02	0.3	0.01	<0.1	0.01	0.5	<8	<0.5	0.4	<0.05	<1	3.8
TE-10-031C	TE4VK	237.325	11.44	0.16	<0.1	0.31	7.9	<0.5	152	<1.0	<0.1	52.31	<0.1	4.4	0.7	<0.002	<0.1	1.4	0.16	0.09	0.57	0.35	<0.5	0.22	0.1	<0.01	0.04	0.01	2.8	0.01	2.35	0.02	0.3	0.02	1.6	1.5	11.4	<0.01	5.1	0.46	0.8	<0.1	<1	<0.5	2.24	0.26	<1	2243	<0.1	0.04	0.4	0.02	<0.1	0.01	0.5	<8	<0.5	1.2	0.09	2	4.3
TE-10-031C	TE4VK	246.245	6.37	0.37	0.2	1.74	4.2	1.5	197	3	<0.1	26.22	<0.1	138.6	64.6	0.218	0.5	62	1.72	0.56	0.57	4.41	3.1	3.87	1.3	0.02	0.25	0.1	78.1	0.06	14.27	0.06	0.6	0.11	125.6	44.6	910.4	0.79	9.5	13.53	5.7	<0.1	13	<0.5	21.19	5.95	<1	590.4	6.7	0.43	14	1.12	<0.1	0.07	2.2	81	1.8	6.7	0.42	10	64.2
TE-10-032C	TE4VK	227.285	8.23	0.66	<0.1	0.78	5.8	1.5	102	<1.0	<0.1	34.72	<0.1	15.7	36.1	0.063	0.2	4.6	0.31	0.16	0.57	2.74	0.8	0.55	0.6	<0.01	0.06	0.03	9.4	0.02	13.54	0.05	1.7	0.04	18.1	5	584.9	0.07	2.1	1.4	2	<0.1	3	<0.5	13.56	0.65	<1	275.7	1.8	0.06	1.3	0.17	0.1	0.01	0.7	11	0.8	1.8	0.13	16	20.1
TE-10-032C	TE4VK	188.28	10.73	<0.02	<0.1	1.33	5.4	<0.5	44	<1.0	<0.1	45.51	<0.1	15.1	8.5	0.006	0.7	3.4	0.52	0.27	0.57	0.78	1.5	0.65	0.2	0.02	0.09	0.3	9.2	0.04	4.63	0.02	<0.1	0.04	7	5.7	82.3	0.02	1.6	1.65	13.5	<0.1	2	<0.5	5.52	0.9	<1	314.7	0.2	0.1	1.2	0.08	<0.1	0.04	0.5	11	<0.5	3.2	0.23	5	12.3
TE-10-033C	TE4VK	125.59	11.52	<0.02	<0.1	0.04	3.3	<0.5	2	<1.0	<0.1	29.65	<0.1	1.4	1.6	<0.002	<0.1	0.6	0.12	0.06	0.57	0.3	<0.5	0.1	<0.1	<0.01	0.02	0.01	1	<0.01	20.45	0.01	<0.1	0.05	0.3	0.6	23.7	0.02	2	0.13	0.2	<0.1	<1	<0.5	1.79	0.1	<1	67.2	<0.1	0.01	<0.2	<0.01	<0.1	<0.01	1.7	<8	<0.5	0.9	<0.05	3	1
TE-10-034C	TE4VK	130.655	8.73	0.07	<0.1	0.89	3.3	<0.5	75	<1.0	<0.1	32.89	<0.1	28.9	51.4	0.096	0.2	15.2	0.49	0.24	0.57	3.34	1.3	0.84	0.5	<0.01	0.09	0.07	16.7	0.03	12.48	0.1	0.2	0.05	27.4	9.5	1013.1	0.15	1	2.78	3.4	<0.1	4	<0.5	12.87	1.21	<1	336.7	1.9	0.11	2.3	0.3	<0.1	0.03	0.9	26	<0.5	2.7	0.17	15	18
TE-10-034C	TE4VK	143.825	8.67	<0.02	<0.1	3.74	2.5	3.5	180	<1.0	<0.1	21.32	<0.1	35.3	8.6	0.024	1.4	8.4	1.61	0.97	0.57	2.09	4.6	1.92	2.2	0.07	0.32	2.04	16.9	0.13	13.27	0.03	0.2	0.07	10.2	13.1	120.6	0.1	3.4	3.62	42.8	<0.1	4	<0.5	23.3	2.26	<1	107.2	0.6	0.29	3.8	0.25	<0.1	0.14	1.3	36	2.1	9.4	0.93	30	74.6
TE-10-034C	TE4VK	139.25	7.41	<0.02	<0.1	5.77	2.3	1.1	273	<1.0	<0.1	17.24	<0.1	38.9	12	0.026	1.8	8.9	2	1.13	0.57	2.46	7.3	2.35	2.4	<0.01	0.38	3.2	17.8	0.16	12.12	0.04	<0.1	0.09	11	16.1	170.5	0.1	1.6	4.21	64	<0.1	5	<0.5	28.69	2.74	<1	102.2	0.7	0.37	5.4	0.32	0.1	0.17	1.1	37	1	10.9	1.07	21	91.3
TE-10-034C	TE4VK	135.275	9.28	0.39	<0.1	2.83	3.5	<0.5	459	<1.0	<0.1	34.04	<0.1	30.3	32.7	0.062	1	13.4	1.09	0.58	0.57	3.28	3.6	1.38	1.5	<0.01	0.19	1.17	15.4	0.09	7.99	0.09	0.1	0.06	19.3	11	585.1	0.14	1.7	3.06	27.6	<0.1	4	<0.5	15.16	1.7	<1	342.9	1.2	0.19	3.7	0.27	<0.1	0.09	1.6	30	0.6	6.2	0.58	19	51.8
TE-10-035C	TE4VK	144.715	9.73	0.08	<0.1	0.66	2.8	<0.5	137	<1.0	<0.1	24.48	<0.1	14.1	27.3	0.044	0.3	21.6	0.27	0.16	0.57	2.36	0.9	0.46	0.4	<0.01	0.06	0.09	7.9	0.02	20.4	0.04	0.3	0.06	13.1	5.4	438.3	0.06	1.9	1.33	4.2	<0.1	2	<0.5	12.85	0.62	<1	1217.8	0.8	0.06	1.8	0.13	<0.1	0.02	1.2	11	<0.5	1.9	0.13	10	12.8
TE-10-035C	TE4VK	137.17	6.45	<0.02	<0.1	1.15	2.4	<0.5	170	<1.0	<0.1	18.04	<0.1	28.3	45.5	0.081	0.5	10.4	0.53	0.24	0.57	4.06	1.9	0.87	0.8	<0.01	0.08	0.14	16.9	0.03	22.34	0.05	<0.1	0.09	25.7	11	780.6	0.14	1.8	2.93	7.4	<0.1	4	<0.5	21.58	1.39	<1	840.2	1.3	0.12	3.4	0.26	<0.1	0.03	1.1	20	0.5	2.9	0.21	13	23.8
TE-10-037C	TE4VK	106.55	12.44	<0.02	<0.1	0.11	4.3	<0.5	14	<1.0	<0.1	27.31	<0.1	5.2	2	0.006	<0.1	1.5	0.13	0.09	0.57	0.25	<0.5	0.19	0.1	<0.01	0.03	0.05	2.9	0.01	18.71	0.02	0.2	0.04	2.3	1.5	28.5	0.04	0.7	0.47	0.7	<0.1	<1	<0.5	9.43	0.26	<1	67.5	0.2	0.03	0.5	0.02	<0.1	<0.01	1.7	<8	<1	0.9	0.07	3	4.4
TE-10-037C	TE4VK	115.575	10.54	<0.02	<0.1	3.89	6.4	0.8	117	<1.0	<0.1	23.21	<0.1	24	8.1	0.008	1.9	18.1	1.25	0.73	0.57	2.21	5.4	1.38	1.3	0.01	0.24	1.73	10.9	0.11	16.54	0.03	0.4	0.07	5.9	9.3	51.2	0.08	2	0.58	2.3	0.4	2	<0.5	5.23	0.82	2	0.2	0.1	1.9	34	0.6	6.8	0.66	22	23.9
TE-10-037C	TE4VK	95.07	12.8	0.02	0.3	0.46	5.1	1.1	29	<1.0	<0.1	29.55	<0.1	3.1	0.8	0.015	<0.1	4.4	0.22	0.1	0.57	0.55	0.6	0.28	0.2	<0.01	0.04	0.05	1.5	0.05	5.1	2.7	90.2	0.07	1	0.74	1.8	<0.1	<1	<0.5	1.8	0.37	<1	99.8	0.3	0.04	0.6	0.05	<0.1	0.02	2.1	12	2.3	1.6	0.1	5	8.8
TE-10-038C	TE4VK	133.12	8.35	0.04	<0.1	4.18	3.1	<0.5	211	<1.0	<0.1	29.69	<0.1	41.1	12.8	0.036	1.6	8.7	1.86	1.09	0.57	1.9	5.4	2.23	2.5	<0.01	0.39	2.24	21.8	0.16	7.93	0.05	0.3	0.07	17.9	16.9	173.8	0.14	2.8	4.62	42.2	<0.1	5	<0.5	19.62	2.79	<1	221.2	1	0.36	5.1	0.33	<0.1	0.16	2.1	36	0.7	10.7	0.99	18	89.8
TE-10-038C	TE4VK	138.985	5.57	1.14	<0.1	7.72	1.5	<0.5	314	1	<0.1	15.06	<0.1	42.3	12.6	0.016	2.8	8.4	2.64	1.56	0.57	3.68	9.1	2.94	4.3	<0.01	0.52	4.24	21.6	0.23	9.72	0.04	0.1	0.1	11	9.2	142.3	0.11	2	3.48	35.2	3.47	<1	111.2	0.7	0.48	6.9	0.41	0.1	0.25	2.2	45	0.8	15	1.61	27	159.7
TE-10-038C	TE4VK	145.635	5.69	1.01	<0.1	8.49	2.4	0.7	295	<1.0	<0.1	13.02	<0.1	45.9	10.7	0.01	3.6	12.7	2.72	1.58	0.57	3.85	10.7	2.67	2.6	<0.01	0.54	4.49	23	0.23	10.28	0.03	0.1	0.09	8	19.3	64.7	0.09	2.1	3.28	87.1	<0.1	8	<0.5	36.26	3.58	<1	85.1	0.6	0.68	8.3	0.42	0.2	0.27	1.8	52	0.7	14.7	1.44	39	92.9
TE-10-038C	TE4VK	150.8	7.36	0.64	<0.1	6.01	1.5	<0.5	234	<1.0	<0.1	18.02	<0.1	34.4	9.6	0.02	2.2	13.5	2.09	1.14	0.57	2.35	7	2.29	2.3	<0.01	0.42	3.41	16.8	0.17	11.73	0.04	0.3	0.08	9.4	15.8	80.7	0.1	2.1	4.19	57.6	<0.1	5	0.6	29.28	2.82	1	118.9	0.6	0.39	5.1	0.33	0.1	0.18	1.6	34	0.7	11.9	1.17	23	76.4
TE-10-038C	TE4VK	155.015	5.83	1.01	<0.1	7.81	3.4	0.5	325	<1.0	<0.1	17.72	<0.1	50.2	12.5	0.022	2.8	12.4	2.53	1.46	0.57	3.6	10.4	2.86	3.1	<0.01	0.52	4.12	23.7	0.22	8.57	0.06	0.3	0.1	12.6	21	101	0.16	1.9	5.52	80.3	<0.1	8	0.6	32.67	3.48	1	148.2	0.9	0.48	6.5	0.43	0.2	0.22	3	46	0.9	15.5	1.43	33	103.2
TE-10-026C	TED1VK	154.82	11.21	<0.02	<0.1	0.34	3.8	<0.5	16	<1.0	<0.1	46.65	<0.1	12.5	1.6	0.018	<0.1	3.4	0.19	0.09	0.57	0.49	0.6	0.34	0.3	<0.01	0.04	0.03	1.2	4.1	35.4	0.07	2.1	1.23	2.2	<0.1	1	<0.5	2.13	0.57	<1	218	0.6	0.05	1.2	0.09	<0.1	0.01	0.5	10	<0.5	1.1	0.08	8	11.9
TE-10-026C	TED1VK	150.345	10.88	0.02	<0.1	1.26	3.9	<0.5	43	<1.0	<0.1	40.96	<0.1	23.5	8.6	0.026	0.4	9.2	0.59	0.65	0.57	0.33	1.7	0.58	0.7	0.08	0.08	<0.01	0.1	2.6	13.6	0.04	9.79	0.03	0.1	0.08	0.4	8	114.8	0.1	2.1	2.39	10.7	<0.1	2	<0.5	4.7	1.14	<1	171.3	0.9	0.13	3.2	0.17	<0.1	0.04	1	14	0.6	3.5	0.26	14	24.4
TE-10-026C	TED1VK	145.655	11.42	1.04	<0.1	0.71	4.1	0.6	18	<1.0	<0.1	40.52	<0.1	20.7	13.8	0.023	0.2	9	0.38	0.17	0.57	1.56	1.3	0.63	0.4	<0.01	0.06	0.12	12.7	0.02	11.81	0.03	0.7	0.04	15.5	7.4	147.9	0.08	3.5	2.08	4.5	<0.1	2	<0.5	2.45	0.93	<1	118.5	1	0.08	2.2	0.16	<0.1	0.03	1.9	14	<0.5	2.1	0.15	6	17
TE-10-026C	TED1VK	163.745	10.34	<0.02	<0.1	1.31	6	<0.5	58	<1.0	<0.1	46.98	<0.1	11.8	5.2	0.018	0.4	3.4	0.56	0.31	0.57	1	1.6	0.67	0.8	<0.01	0.1	0.64	6	0.04	3.72	0.03	0.2	0.03	5.1	4.8	106	0.07	2	1.3	12.7	<0.1	2	<0.5	7.3	0.8	<1	121.7	0.3	0.1	1.4	0.09	<0.1	0.04	0.9	12	0.7	3.2	0.29	16	26
TE-10-026C	TED1VK	159.725	10.4	0.68	<0.1	1.72	4	<0.5	77	<1.0	<0.1	40.81	<0.1	16.7	14.8	0.034	0.6	4.8	0.72	0.4	0.57	1.89	2.3	0.9	0.9	<0.01	0.14	0.76	8.7	0.06	8.77	0.03	0.2	0.04	8.6	6.9	324.9	0.05	1.1	1.83	16	<0.1	2	0.5	6.61	1.08	<1	128.6	0.6	0.14	2	0.15	<0.1	0.06	1.1	16	0.9	4.4	0.37	9	38.5
TE-10-027C	TED1VK	236.475	11.84	0.04	<0.1	0.26	6.9	2.3	14	<1.0	<0.1	53.8	0.9	3.1	0.4	<0.002	0.2	0.7	0.19	0.1	0.57	0.53	0.5	0.19	0.1	<0.01	0.03	0.02	0.6	0.01	0.78	0.02	0.2	0.01	0.8	1.5	10.1	<0.01	0.8	0.13	1.2	<0.1	<1	<0.5	1.37	0.22	<1	159.8	<0.1	0.03	0.4	0.04	0.7	0.06	0.5	<8	<0.5	1.2	0.09	3	6.4
TE-10-027C	TED1VK	231.215	10.95	0.04	<0.1	1.51	6	2.5	72	<1.0	<0.1	41.63	<0.1	9.2	2.4	0.005	0.6	2.4	0.56	0.32	0.57	0.7	2	0.62	0.4	<0.01	0.1	0.85	4.6	0.04	6.91	0.02	0.3	0.03	2	3.8	33.2	0.04	1.1	1.06	15.7	<0.1	1	<0.5	6.71	0.71	<1	115.4	0.1	0.11	1.5	0.07	<0.1	0.04	1.2	12	0.6	3.8	0.32	8	20.8
TE-10-027C	TED1VK	225.985	8.02	0.23	<0.1	4.55	4.8	5.7	255	<1.0	<0.1	32.54	<0.1	30.3	11.1	0.023	1.5	9.4	1.56	0.91	0.57	2.51	5.6	1.71	2.7	0.03	0.31	2.36	13.6	0.14	4.61	0.03	0.2	0.06	8.9	12	157.4	0.08	1.7	2.76	43.2	<0.1	5	<0.5	21.45	2.19	<1	101.9	0.4	0.28	4	0.26	0.1	0.15	1.4	27	0.6	9.2	0.9	20	99.9
TE-10-034C	TED1VK	164.305	10.14	<0.02	<0.1	0.64	3.6	<0.5	26	<1.0	<0.1	31.41	<0.1	5.8	1.3	<0.002	0.3	1.6	0.25	0.12	0.57	0.52	1.6	0.37	0.4	0.03	0.05	0.36	2.5	<0.01	18.3	0.02	0.1	0.03	1	2.7	8.7	<0.01	3.4	0.63	7.1	<0.1	<1	<0.5	2.47	0.33	<1	105.8	<0.1	0.04	0.5	0.03	<0.1	<0.01	0.7	<8	<0.5	1.8	0.13	3	12.6
TE-10-038C	TED1VK	158.6	11	<0.1	1.3	3.3	0.6	49	<1.0	<0.1	29.49	<0.1	2	0.2	0.5	0.017	<0.1	0.5	0.17	0.07	0.57	0.45	0.5	0.26	0.1	0.01	0.09	0.04	3.5	0.11	18.93	0.05	0.6	0.01	1.7	3.5	11.2	0.02	5.2	0.95	0.1	0.2	<0.1	<1	<0.5	0.26	0.6	<1	101.1	<0.1	0.09	0.1	0.06	0.2	0.01	0.5	27	0.5	1.8	0.25	11	19.2
TE-10-038C	TED1VK	180.605	12.65	<0.02	<0.1	0.34	5.7	<0.5	24	<1.0	<0.1	53.48	<0.1	15.7	2.3	0.035	<0.1	5.1	0.24	0.1	0.57	0.59	0.6	0.49	0.2	<0.01	0.04	0.06	8.5	0.01	0.92	0.02	0.2	0.02	14.3	4.9	50.9	0.15	2.4	1.47	1.3	<0.1	2	<0.5	1.1	0.7	<1	309	0.9	0.05	1.9	0.12	<0.1	0.01	1	13	0.6	1.2	0.08	8	8.9
TE-10-034C	TED1VK	169.765	10.96	<0.02	<0.1	1.77	4	<0.5	72	<1.0	<0.1	32.71	<0.1	14.6	3.5	0.004	0.7	5	0.74	0.42	0.57	0.78	2.3	0.9	1	0.02	0.15	1.09	6.3	0.06	12.75	0.03	0.3	0.04	2.7	5.5	23	0.05	5.2	1.59	22.1	<0.1	2	<0.5	8.52	1.04	<1	168.8	0.2	0.14	2.1	0.1	<0.1	0.07	0.8	13	0.7	3.8	0.45	6	35.9
TE-10-038C	TED1VK	180.185	11.85	<0.02	<0.1	0.21	5.8	1.1	19	<1.0	<0.1	31.58	<0.1	2.9	1.6	<0.002	0.2	2.5	0.16	0.12	0.57	0.88	1.6	0.2	0.2	<0.01	0.03	0.03	1.8	0.1	1.44	0.02	0.1	0.03	0.5	1.4	32.5	0.04	1.1	0.43	17.4	<0.1	2	0.6	2.61	0.18	<1	108.5	0.1	0.03	0.5	0.02	<0.1	<0.01	0.5	<8	<0.5	1.6	0.08	3	5.3
TE-10-035C	TED1VK	159.55	12.24	<0.02	<0.1	0.41	3.7	<0.5	18	<1.0	<0.1	31.66	<0.1	7.4	6.5	0.01	0.1	3.3	0.22	0.14	0.57	0.85	<0.5	0.25	0.3	<0.01	0.04	0.04	4.4	0.01	18.39	0.02	0.2	0.04	5.3	2.8	100.4	0.04	1.5	0.73	2	<0.1	<1	<0.5	2.35	0.39	<1	134.7	0.2	0.04	0.7	0.04	<0.1	0.01	1.2	<8	<0.5	1.6	0.09	9	7
TE-10-035C	TED1VK	167.225	7.76	0.18	<0.1	0.9	4.2	2	3033	<1.0	<0.1	23.16	<0.1	23.9	37.1	0.065	0.4	11.6	0.47	0.26	0.57	3.52	1.5	0.78	0.6	<0.01	0.09	0.16	14.1	0.03	19.38	0.05	0.3	0.08	19.4	7.7	523	0.09	1.4	2.26	6.3	<0.1	3	<0.5	17.83	1.12	<1	226.7	0.7	0.1	1.8	0.2	<0.1	0.03	0.9	21	<0.5	3.5	0.24	11	26.7
TE-10-037C	TED1VK	195.38	8.23	<0.02	<0.1	4.32	3.2	<0.5	144	<1.0	<0.1	26.37	<0.1	28.2	5.7	0.004	2.1	19	1.67	0.94	0.57	1.53	5.7	1.91	1.6	0.07	0.34	2.41	14.2	0.13	9.12	0.04	0.1	0.08	4.9	13.3	18.4	0.09	22.5	3.46	45.8	<0.1	4	<0.5	21.2	2.43	<1	155.3	0.2	0.32	4.3	0.24	<0.1	0.14	1.2	35	0.6	9.3	0.9	14	60.5
TE-10-038C	TED1VK	215.145	13.34	<0.02	<0.1	0.11	5.6	0.5	4	<1.0	<0.1	29.94	<0.1	0.8	<0.2	<0.002	<0.1	0.2	0.03	0.02	0.57	<0.03	0.5	0.02	<0.1	<0.01	0.01	0.02	<0.1	0.01	0.44	0.01	<0.1	0.04	0.1	0.4	20.48	0.01	0.5	0.08	0.1	<0.1	<1	<0.5	0.5	0.08	<1	50.3	<0.1	<0.1	<0.2	<0.01	<0.1	<0.01	0.2	<8	<0.5	0.4	<0.05	5	2.6
TE-10-038C	TED1VK	210.55	11.99	<0.02	<0.1	0.07	5.2	0.6	4	<1.0	<0.1	30.8	<0.1	1.1	<0.2	<0.002	<0.1	0.3	<0.05	<0.03	0.57	0.17	<0.5	0.05	<0.1	<0.01	<0.02	0.04	1.1	<0.01	20.32	0.01	0.1	0.05	0.1	0.5	1.6	<0.01	2.3	0.11	0.8	<0.1	<1	0.6	0.31	0.06	<1	57.6	<0.1	<0.01	<0.2	<0.01	<0.1	<0.01	0.2	<8	<0.5	0.4	<0.05	5	2.7
TE

APPENDIX C: MEND SFE Test Results

Appendix-C: MEND SFE Test Results

Drill Hole	Sample Depth (m)	Geology	pH	EC	ORP	SO4	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Hardness CaCO3	Al	Sb	As	Ba
Units			**pH Units**	**uS/cm**	**mV**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Detection Limits				0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.0002	0.00002	0.00002	0.00002
PWQO			UL 8.5									0.015	0.02	0.1	
O. Reg 560/94			UL 9.5											0.5	
TE-10-027C	38	TE1VK	8.7	228	125	9.4	43	52	<0.5	<0.5	25.3	0.0065	0.00028	0.00074	0.00847
TE-10-027C	155	TE2VK	8.5	335	135	40.1	27	33	<0.5	<0.5	59.5	**0.0326**	0.00005	0.00016	0.05690
TE-10-030C	73	TE1VK	8.5	326	140	110.0	32	38	<0.5	<0.5	106.0	0.0024	0.00005	0.00014	0.00850
TE-10-031C	197	TE3VK	8.6	571	135	25.1	23	29	<0.5	<0.5	134.0	0.0017	0.00005	0.00003	0.13600
TE-10-033C	93	TE1VK	8.9	252	110	10.8	39	47	<0.5	<0.5	21.3	0.0066	0.00013	0.00012	0.06140
TE-10-033C	133	TE2VK	9.0	224	110	16.7	39	47	<0.5	<0.5	20.6	0.0048	0.00008	0.00015	0.01520
TE-10-034C	107	TE2VK	8.8	307	120	21.5	28	35	<0.5	<0.5	63.2	0.0047	0.00007	0.00011	0.01330
TE-10-034C	133	TE4VK	8.7	310	130	69.4	33	41	<0.5	<0.5	73.5	0.0125	0.00019	0.00039	0.07930
TE-10-034C	148	TEMST	8.1	540	115	102.0	17	21	<0.5	<0.5	135.0	**0.0573**	0.00012	0.00067	0.00893
TE-10-034C	179	TED1VK	8.2	234	145	12.8	13	16	<0.5	<0.5	50.2	0.0143	0.00005	0.00038	0.00851
TE-10-035C	165	TED1VK	8.4	337	135	99.8	35	42	<0.5	<0.5	108.0	0.0023	0.00011	0.00018	0.05100
TE-10-037C	63	TE1VK	8.2	488	150	62.8	35	42	<0.5	<0.5	108.0	0.0115	0.00010	0.00032	0.02030
TE-10-037C	134	TEDMST	7.9	336	185	42.7	24	29	<0.5	<0.5	72.2	**1.300**	0.00010	0.00045	0.00548
TE-10-037C	154	TEDMST	7.9	363	160	44.1	24	29	<0.5	<0.5	71.1	**0.4980**	0.00006	0.00042	0.00459
TE-10-038C	186	TEDMST	8.1	347	135	55.5	30	36	<0.5	<0.5	72.2	**0.1410**	0.00006	0.00020	0.00202
TE-10-055C	345	TED1VK	7.9	645	160	79.9	34	41	<0.5	<0.5	158.0	0.0121	0.00050	0.00012	0.00980
TE-03-017C	95.03	TE1VK	8.0	545	150	79.5	44	54	<0.5	<0.5	131.0	0.0037	0.00007	0.00033	0.01950
TE-03-021C	199.43	TE3VK	8.2	302	125	18.0	52	64	<0.5	<0.5	67.8	0.0017	0.00005	0.00006	0.14700
TE-10-27C	121	TE2VK	8.9	216	110	8.6	32	39	<0.5	<0.5	24.9	0.0032	0.00010	0.00009	0.10600
TE-10-027C	207	TE4VK	8.1	446	135	83.9	21	25	<0.5	<0.5	106.0	0.0097	0.00025	0.00055	0.00421
TE-10-030C	92	TE4VK	7.7	177	160	7.8	31	37	<0.5	<0.5	23.8	**0.0160**	0.00005	0.00022	0.01930
TE-10-031C	166	TE2VK	8.1	348	135	38.5	40	49	<0.5	<0.5	128.0	0.0026	0.00008	0.00003	0.13400
TE-10-031C	207	TE3VK	8.0	364	130	32.0	31	38	<0.5	<0.5	120.0	0.0014	0.00008	0.00004	0.09840
TE-10-034C	142	TE4VK	8.0	380	145	41.6	28	34	<0.5	<0.5	77.1	0.0106	0.00016	0.00016	0.00851
TE-10-33C	6	OVB	8.2	219	145	12.1	64	78	<0.5	<0.5	47.6	**1.800**	0.00028	0.00161	0.03090
TE-10-039C	3.7	OVB	8.3	185	140	8.5	37	45	<0.5	<0.5	33.8	**0.0707**	0.00028	0.00094	0.00711
TE-10-055C	37	OVB	8.4	198	135	8.6	43	53	<0.5	<0.5	44.4	**0.0717**	0.00016	0.00030	0.00757

Notes:
Bold values represent concentrations exceeding PWQO

Appendix-C: MEND SFE Test Results

Drill Hole	Sample Depth (m)	Geology	Be	Bi	B	Cs	Cd	Ca	Cr	Co	Cu	La	Fe	Pb	Li
Units			**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Detection Limits			0.00001	0.000005	0.05	0.00005	0.000005	0.05	0.0001	0.000005	0.00005	0.00005	0.001	0.000005	0.0005
PWQO			0.011				0.0002		0.001	0.0009	0.005			0.005	
O. Reg 560/94											0.3			0.2	
TE-10-027C	38	TE1VK	<0.00001	<0.000005	0.05	<0.00005	<0.000005	4.93	0.0001	0.000016	0.00069	<0.00005	0.008	0.000007	0.0018
TE-10-027C	155	TE2VK	<0.00001	<0.000005	0.35	0.0001	<0.000005	12.60	0.0007	0.000023	0.00030	<0.00005	0.030	0.000010	0.0139
TE-10-030C	73	TE1VK	<0.00001	<0.000005	<0.05	<0.00005	<0.000005	19.00	0.0006	0.000035	0.00046	<0.00005	0.008	0.000008	0.0067
TE-10-031C	197	TE3VK	<0.00001	<0.000005	0.50	0.0001	<0.000005	15.30	0.0004	0.000187	0.00032	<0.00005	0.004	0.000024	0.0049
TE-10-033C	93	TE1VK	<0.00001	<0.000005	0.25	<0.00005	<0.000005	5.00	0.0007	0.000008	0.00026	<0.00005	0.004	0.000026	0.0051
TE-10-033C	133	TE2VK	<0.00001	<0.000005	0.33	<0.00005	<0.000005	4.78	0.0007	<0.000005	0.00027	<0.00005	0.003	0.000009	0.0057
TE-10-034C	107	TE2VK	<0.00001	<0.000005	0.10	<0.00005	<0.000005	13.10	0.0001	0.000024	0.00059	<0.00005	0.005	0.000020	0.0102
TE-10-034C	133	TE4VK	<0.00001	<0.000005	0.16	<0.00005	<0.000005	19.90	0.0003	0.000099	0.00047	<0.00005	0.011	0.000013	0.0254
TE-10-034C	148	TEMST	<0.00001	<0.000005	0.24	<0.00005	<0.000005	32.70	0.0002	0.000312	0.00121	0.00007	0.040	0.000034	0.0166
TE-10-034C	179	TED1VK	<0.00001	<0.000005	0.12	<0.00005	<0.000005	15.00	0.0004	0.000016	0.00072	<0.00005	0.002	0.000007	0.0088
TE-10-035C	165	TED1VK	<0.00001	<0.000005	0.56	<0.00005	<0.000005	22.80	0.0001	0.000022	0.00013	<0.00005	0.005	0.000006	0.0183
TE-10-037C	63	TE1VK	<0.00001	<0.000005	0.14	<0.00005	<0.000005	19.60	0.0004	0.000090	0.00161	<0.00005	0.019	0.000020	0.0056
TE-10-037C	134	TEDMST	0.00011	<0.000005	0.56	0.0002	<0.000005	18.40	0.0020	0.000298	0.00105	0.00298	0.495	0.000093	0.0276
TE-10-037C	154	TEDMST	0.00003	<0.000005	0.59	0.0002	<0.000005	18.40	0.0010	0.000198	0.00112	0.00064	0.275	0.000031	0.0264
TE-10-038C	186	TEDMST	<0.00001	<0.000005	0.31	0.0001	<0.000005	18.90	0.0003	0.000070	0.00040	0.00015	0.069	0.000012	0.0211
TE-10-055C	345	TED1VK	<0.00001	<0.000005	0.53	<0.00005	<0.000005	45.70	0.0002	0.000043	0.00099	<0.00005	0.033	0.000021	0.0418
TE-03-017C	95.03	TE1VK	<0.00001	<0.000005	0.06	<0.00005	<0.000005	22.80	0.0001	0.000048	0.00047	<0.00005	0.006	0.000018	0.0123
TE-03-021C	199.43	TE3VK	<0.00001	<0.000005	0.33	0.0001	<0.000005	12.60	0.0007	0.000009	0.00013	<0.00005	<0.001	0.000008	0.0089
TE-10-27C	121	TE2VK	<0.00001	<0.000005	0.19	<0.00005	<0.000005	5.32	0.0005	<0.000005	0.00024	<0.00005	0.003	0.000015	0.0022
TE-10-027C	207	TE4VK	<0.00001	<0.000005	0.08	<0.00005	<0.000005	25.70	<0.0001	0.000076	0.00033	<0.00005	0.003	0.000013	0.0271
TE-10-030C	92	TE4VK	<0.00001	<0.000005	<0.05	<0.00005	<0.000005	6.15	0.0004	0.000039	0.00046	0.000079	0.033	0.000052	0.0037
TE-10-031C	166	TE2VK	<0.00001	<0.000005	0.35	0.0002	<0.000005	10.50	0.0009	0.000137	0.00023	<0.00005	0.001	0.000006	0.0011
TE-10-031C	207	TE3VK	<0.00001	<0.000005	0.75	0.0001	<0.000005	14.90	0.0005	0.000106	0.00017	<0.00005	<0.001	0.000005	0.0027
TE-10-034C	142	TE4VK	<0.00001	<0.000005	0.15	<0.00005	<0.000005	19.70	0.0001	0.000025	0.00044	<0.00005	0.013	0.000014	0.0111
TE-10-33C	6	OVB	0.00007	0.000011	0.10	0.0001	<0.000005	11.50	0.0030	0.000790	**0.00783**	0.000914	1.420	0.000671	0.0085
TE-10-039C	3.7	OVB	<0.00001	<0.000005	<0.05	<0.00005	<0.000005	10.60	0.0002	0.000078	**0.00693**	0.000072	0.064	0.000038	0.0060
TE-10-055C	37	OVB	<0.00001	<0.000005	0.08	<0.00005	<0.000005	12.70	0.0002	0.000019	0.00046	0.000085	0.050	0.000011	0.0061

Notes:
Bold values represent concentrations exceeding PWQO

Appendix-C: MEND SFE Test Results

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Drill Hole	Sample Depth (m)	Geology	Mg	Mn	P	Mo	Ni	K	Rb	Se	Si	Ag	Na	Sr	S	Te
Units			**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Detection Limits			0.05	0.00005	0.002	0.00005	0.00002	0.05	0.00005	0.00004	0.1	0.000005	0.05	0.00005	10	0.00002
PWQO					0.01	0.04	0.025			0.1		0.0001				
O. Reg 560/94							0.5									
TE-10-027C	38	TE1VK	3.14	0.000111	**0.019**	0.00058	0.00050	1.05	0.00405	0.00019	2.8	<0.000005	20.7	0.122	<10	<0.00002
TE-10-027C	155	TE2VK	6.80	0.000450	**0.021**	0.00055	0.00064	2.08	0.00473	0.00174	3.0	<0.000005	15.6	0.447	15	<0.00002
TE-10-030C	73	TE1VK	14.10	0.000591	**0.016**	0.00228	0.00252	2.19	0.00674	0.00005	3.1	<0.000005	33.2	1.09	40	<0.00002
TE-10-031C	197	TE3VK	23.30	0.000204	0.009	0.00065	0.00495	2.31	0.01250	<0.00004	0.4	<0.000005	20.6	2.16	<10	<0.00002
TE-10-033C	93	TE1VK	2.15	0.000084	**0.019**	0.00131	0.00017	2.46	0.00649	0.00022	2.9	<0.000005	28.3	0.163	<10	<0.00002
TE-10-033C	133	TE2VK	2.11	0.000159	0.004	0.00023	0.00012	1.66	0.00461	<0.00004	2.9	<0.000005	29.4	0.170	<10	<0.00002
TE-10-034C	107	TE2VK	7.41	0.000760	0.004	0.00174	0.00053	1.93	0.00239	0.00007	1.8	<0.000005	22.0	0.406	<10	<0.00002
TE-10-034C	133	TE4VK	5.78	0.001160	0.005	0.00161	0.00400	4.44	0.00328	0.01480	3.1	<0.000005	19.9	0.405	24	<0.00002
TE-10-034C	148	TEMST	13.00	0.013300	**0.017**	0.00218	0.00272	9.44	0.00903	0.00132	1.1	<0.000005	13.8	0.532	35	<0.00002
TE-10-034C	179	TED1VK	3.06	0.000235	0.014	0.00117	0.00024	1.87	0.00211	<0.00004	0.8	<0.000005	10.4	0.243	<10	<0.00002
TE-10-035C	165	TED1VK	12.30	0.000304	**0.020**	0.00371	0.00363	1.12	0.00156	0.00007	4.3	<0.000005	20.8	0.551	33	<0.00002
TE-10-037C	63	TE1VK	14.40	0.001090	0.012	0.00094	0.00780	1.29	0.00269	0.00039	2.8	0.000005	24.8	0.342	23	<0.00002
TE-10-037C	134	TEDMST	6.36	0.008410	**0.056**	0.00162	0.00281	7.20	0.00899	0.00024	4.4	0.000008	26.9	0.401	16	<0.00002
TE-10-037C	154	TEDMST	6.08	0.007110	**0.049**	0.00171	0.00148	9.23	0.00983	0.00032	3.0	0.000005	21.0	0.383	16	<0.00002
TE-10-038C	186	TEDMST	6.07	0.001730	0.010	0.00372	0.00073	9.08	0.00696	0.00018	2.2	<0.000005	21.7	0.313	20	<0.00002
TE-10-055C	345	TED1VK	10.80	0.003440	**0.028**	0.01240	0.00032	6.45	0.00413	0.00006	1.0	<0.000005	35.5	1.050	27	<0.00002
TE-03-017C	95.03	TE1VK	18.10	0.000416	**0.015**	0.00656	0.00352	3.91	0.00799	0.00030	2.3	<0.000005	11.5	0.486	27	<0.00002
TE-03-021C	199.43	TE3VK	8.82	0.000405	0.005	0.00038	0.00022	2.43	0.00917	<0.00004	2.3	<0.000005	32.3	1.62	<10	<0.00002
TE-10-27C	121	TE2VK	2.81	0.000066	0.006	0.00018	0.00026	0.92	0.00353	0.000047	1.4	<0.000005	21.1	0.177	<10	<0.00002
TE-10-027C	207	TE4VK	10.30	0.000498	**0.017**	0.00709	0.00227	7.26	0.00557	0.00073	1.0	<0.000005	15.9	0.516	29	<0.00002
TE-10-030C	92	TE4VK	2.06	0.000240	**0.022**	0.00059	0.00074	3.34	0.00167	0.000132	1.1	<0.000005	15.5	0.139	<10	<0.00002
TE-10-031C	166	TE2VK	24.70	0.000681	0.006	0.00056	0.00414	2.90	0.02530	<0.00004	0.3	<0.000005	21.9	1.73	13	<0.00002
TE-10-031C	207	TE3VK	20.20	0.000389	0.006	0.00033	0.00391	2.55	0.01300	0.00005	0.5	<0.000005	19.6	1.15	11	<0.00002
TE-10-034C	142	TE4VK	6.80	0.000822	0.008	0.00050	0.00065	5.31	0.00224	0.00037	2.6	<0.000005	26.1	0.428	15	<0.00002
TE-10-33C	6	OVB	4.62	0.026900	**0.043**	0.00199	0.00220	6.40	0.00465	0.00152	4.5	0.000011	35.5	0.103	<10	<0.00002
TE-10-039C	3.7	OVB	1.81	0.003860	**0.063**	0.00520	0.00038	5.53	0.00291	0.00100	1.2	<0.000005	8.0	0.047	<10	<0.00002
TE-10-055C	37	OVB	3.06	0.004260	0.006	0.00027	0.00017	4.38	0.00158	0.00044	1.1	<0.000005	8.3	0.176	<10	<0.00002

Notes:
Bold values represent concentrations exceeding PWQO

Drill Hole	Sample Depth (m)	Geology	Tl	Th	Sn	Ti	W	U	V	Zn	Zr	Hg
Units			**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Detection Limits			0.000002	0.000005	0.0002	0.0005	0.00001	0.000002	0.0002	0.0001	0.0001	0.00005
PWQO			0.0003					0.005	0.006	0.03	0.004	0.2
O. Reg 560/94										0.5		
TE-10-027C	38	TE1VK	0.000028	<0.000005	0.0004	<0.0005	0.00074	0.000012	0.0122	0.0032	<0.0001	<0.00005
TE-10-027C	155	TE2VK	0.000010	0.000005	0.0004	0.0017	0.00028	0.000010	0.0030	0.0010	<0.0001	<0.00005
TE-10-030C	73	TE1VK	0.000109	<0.000005	0.0003	<0.0005	0.00015	0.000008	0.0011	0.0010	<0.0001	<0.00005
TE-10-031C	197	TE3VK	0.000125	<0.000005	0.0006	<0.0005	0.00002	<0.000002	<0.0002	0.0009	<0.0001	<0.00005
TE-10-033C	93	TE1VK	0.000052	<0.000005	0.0003	<0.0005	0.00049	0.000003	0.0027	0.0007	<0.0001	<0.00005
TE-10-033C	133	TE2VK	0.000017	<0.000005	0.0002	<0.0005	0.00031	0.000004	0.0007	0.0004	<0.0001	<0.00005
TE-10-034C	107	TE2VK	0.000076	<0.000005	0.0022	<0.0005	0.00273	0.000021	0.0009	0.0008	<0.0001	<0.00005
TE-10-034C	133	TE4VK	0.000027	<0.000005	0.0003	<0.0005	0.00034	0.000735	**0.0179**	0.0006	<0.0001	<0.00005
TE-10-034C	148	TEMST	0.000021	0.000009	0.0007	0.0021	0.00077	0.002490	0.0031	0.0014	0.00013	<0.00005
TE-10-034C	179	TED1VK	0.000011	<0.000005	0.0004	<0.0005	0.00011	0.000015	0.0004	0.0005	<0.0001	<0.00005
TE-10-035C	165	TED1VK	0.000032	<0.000005	<0.0002	<0.0005	0.00009	0.000013	0.0011	0.0004	<0.0001	<0.00005
TE-10-037C	63	TE1VK	0.000258	<0.000005	0.0006	0.0009	0.00025	0.000274	0.0132	0.0009	<0.0001	<0.00005
TE-10-037C	134	TEDMST	0.000010	0.000388	0.0003	0.0551	0.00054	0.001880	**0.0407**	0.0022	0.00389	<0.00005
TE-10-037C	154	TEDMST	0.000007	0.000126	0.0005	0.0270	0.00028	0.000679	**0.0232**	0.0025	0.00104	<0.00005
TE-10-038C	186	TEDMST	0.000004	0.000030	0.0004	0.0029	0.00054	0.000801	0.0111	0.0010	0.00047	<0.00005
TE-10-055C	345	TED1VK	0.000013	<0.000005	0.0002	<0.0005	0.00906	0.000041	0.0007	0.0034	<0.0001	<0.00005
TE-03-017C	95.03	TE1VK	0.000067	<0.000005	0.0004	<0.0005	0.00018	0.000066	0.0038	0.0023	<0.0001	<0.00005
TE-03-021C	199.43	TE3VK	0.000093	<0.000005	<0.0002	<0.0005	0.00011	<0.000002	<0.0002	0.0002	<0.0001	<0.00005
TE-10-27C	121	TE2VK	0.000027	<0.000005	0.0004	<0.0005	0.00009	<0.000002	0.0004	0.0004	<0.0001	<0.00005
TE-10-027C	207	TE4VK	0.000049	<0.000005	0.0003	<0.0005	0.00002	0.000463	0.0013	0.0007	<0.0001	<0.00005
TE-10-030C	92	TE4VK	0.000004	<0.000005	<0.0002	0.0025	0.00017	0.000025	0.0007	0.0004	<0.0001	<0.00005
TE-10-031C	166	TE2VK	0.000093	<0.000005	0.0002	<0.0005	0.00002	<0.000002	<0.0002	0.0005	<0.0001	<0.00005
TE-10-031C	207	TE3VK	0.000060	<0.000005	<0.0002	<0.0005	0.00003	<0.000002	<0.0002	0.0003	<0.0001	<0.00005
TE-10-034C	142	TE4VK	0.000005	<0.000005	0.0003	<0.0005	0.00897	0.000034	0.0019	0.0005	<0.0001	<0.00005
TE-10-33C	6	OVB	0.000024	0.000239	0.0005	0.0431	0.00017	0.001260	0.0081	0.0051	0.00403	<0.00005
TE-10-039C	3.7	OVB	0.000005	0.000016	0.0004	0.0026	0.00013	0.000534	0.0065	0.0007	<0.0001	<0.00005
TE-10-055C	37	OVB	0.000003	0.000011	0.0004	0.0017	0.00010	0.000303	0.0022	0.0005	0.00014	<0.00005

Notes:
Bold values represent concentrations exceeding PWQO

APPENDIX C

VMEP Consultation and Engagement Plan

VMEP CONSULTATION AND ENGAGEMENT PLAN

1.0 INTRODUCTION

1.1 Federal EA and Consultation Plan Requirements

The Canadian Environmental Assessment Agency (CEA Agency) has recently released guidance for the Consultation and Engagement Plan (CEP) required as part of a Project Description for a designated project (CEA Agency 2012). A Project Description is used by the CEA Agency to conduct a screening of a designated project and determine whether an EA is required.

The guide states that the Project Description must include:

> *a consultation and information gathering plan that outlines the ongoing and proposed Aboriginal engagement or consultation activities, the general schedule for these activities and the type of information to be collected (or alternatively, an indication of why such engagement or consultation is not required). Include background information on Aboriginal groups' potential or established Aboriginal or treaty rights. Provide information on the impact area of the designated project and how it overlaps with uses by Aboriginal groups that have potential or established Aboriginal or treaty rights (CEA Agency 2012).*

The CEP presented herein is intended to meet the Federal consultation plan requirements for the De Beers Canada (DBC) Victor Mine Extension Project (VMEP) located at the Tango Extension kimberlite ore body. This plan builds on pre-existing community engagement and consultation processes that were established with First Nations communities on the James Bay Coast, through the Victor Mine environmental assessment process and the related respective Impact Benefit Agreements.

1.2 Responsibility for CEP Implementation

De Beers will manage the CEP process directly, with support from existing staff resources and consultants as appropriate. Lead accountabilities will be as follows:

- VMEP project team leader – Leo Fusciardi, Vice President Technical, De Beers Canada
- VMEP EA lead for CEP – Brian Steinback, Environmental Superintendent, Victor Mine
- VMEP lead for external communications – Ashley Brown, Senior Communication Specialist, External & Corporate Affairs
- Consultants – Lesley Lorrimer, Sheila Daniel of AMEC and others

2.0 CONSULTATION APPROACH AND TOOLS

2.1 De Beers Consultation Approach

The intent of this plan is to ensure that the members and leadership of the respective First Nations and other aboriginal and non-aboriginal communities who may be directly or indirectly affected by the proposed VMEP development are provided with comprehensive information as early as possible at each stage of development and multiple opportunities to provide comment about that proposal and its expected and potential environmental impacts. All communities close to the project site and its winter road access routes are First Nations reserves, with the exception of the Town of Moosonee. Consequently these are the primary focus of this plan, although regional centres such as the City of Timmins and Cochrane will also be engaged.

Recognizing that in the region there is a broad range of proficiency with the English language, both spoken and written, the consultation will facilitate this dialogue through multiple levels of engagement, and on several occasions throughout the environmental assessment process including;

- Presentations at community meetings will be provided with verbal translation into the predominant local dialect;
- Providing printed summaries, newsletters, etc. of project information, with an emphasis on maps and pictorial representations;
- Meeting with Elders committees or other groups within communities who may be identified by community leaders as having a particular interest or perspective;
- Provision of comment forms or cards at meetings, to facilitate the submission of comments from people uncomfortable with speaking in public or who wish to provide comment after the meeting concludes;
- The use of internet web-sites to provide information, which will include means to electronically submit comments regarding the proposed project. In recent years the aboriginal communities on the James Bay coast have installed effective high-speed internet connections which make this option a viable means of obtaining feedback;
- Scheduling of community meetings in consultation with community leaders as much as practical, to avoid periods when other important cultural activities are expected, such as the goose hunt.
- Providing printed materials and information sessions at the mine site to engage workers who are members of the local aboriginal communities but who may not live on-reserve.

It is intended that the comments and suggestions from these communities of interest will identify opportunities to improve the project design and also help mitigate or minimise possible impacts on the communities and the environment.

2.2 Stakeholder and Issues Tracking

At this time, the plan is that all records of Stakeholder Engagement, whether undertaken by consultants or by the De Beers permitting team directly will be entered into De Beers Community Engagement database on De Beers' electronic data management system (EDMS). The community engagement system will be used for tracking of items, whether these are open or closed, and maintained on this system for the Permitting Team by ECA.

Should an evaluation indicate that the CEAA, 2012 consultation tracking requirements exceed the abilities of the EDMS system, specialised commercially available computer software will be implemented in its place.

2.3 Resolution of Issues and Plan Modification

Questions or concerns with respect to the VMEP are expected to be raised through a variety of venues, including but not limited to:

- formal community consultation sessions;
- meetings with Band Councils or Elders committees, or other small sub-groups;
- information sessions for De Beers employees and contractors at the Victor Mine, which include many members of local aboriginal communities who reside both on and off-reserve. Approximately 50% of the mine workforce are of First Nations origin;
- formal working groups established through existing Impact Benefit Agreements including the respective Senior Implementation Committees (SIMC) for the Attawapiskat First Nation (AttFN), Fort Albany First Nation (FAFN), Kashechewan First Nation (KFN), and Moose Cree First Nation (MCFN); the joint AttFN / DBC Environmental Management Committee (EMC); the James Bay Winter Road Environmental monitoring and Management Committee (JBWR-EMMC)

3.0 ABORIGINAL GROUP PARTICIPANTS

3.1 Delegation of Procedural Aspects of Consultation

It is expected that as in other recent consultation processes with aboriginal peoples for environmental assessments under CEAA, 2012, the Government of Canada will provide overall guidance, but will largely delegate the procedural aspects of consultation to the project

proponent, De Beers Canada. Similarly the Province of Ontario will participate in the environmental assessment consultation process but is unlikely to conduct independent consultation on this proposal with aboriginal groups.

3.2 Aboriginal Groups Involved in the VMEP

The Aboriginal groups to be engaged in relation to the Project were identified using the following criteria:

- Proximity to the Project; if the stakeholders or Aboriginal groups are resident in and/or have jurisdiction over the area in which the project is proposed or has the potential to affect;

- Past or current interest in similar projects or developments in the region; if the stakeholders or Aboriginal groups have been involved in consultation processes in current or past projects in the region that are anticipated to have a similar interest in the Project (such as the Victor Mine);

- Demonstrated previous interest in potential biophysical and socio-economic environmental effects of the Project; or

- Aboriginal groups with traditional lands encompassing the Project site and its related proposed infrastructure.

The four primary aboriginal groups involved in the VMEP are expected to be the First Nation communities of Attawapiskat (AttFN), Kashechewan (KFN), Fort Albany (FAFN) and Moose Cree First Nations (MCFN). Existing Impact Benefit Agreements are in place between these First Nations and De Beers Canada pertaining to the operation of the Victor Mine.

Other aboriginal groups will be engaged by De Beers with respect to the VMEP, though to a lesser degree as their traditional territories are not directly impacted by the proposed development of the Tango Extension kimberlite. Engagement will consist primarily of providing information unless specific requests are made for more extensive dialogue. These will include the following:

- MoCreeBec Council of the Cree Nation in Moose Factory;
- Weenusk First Nation in Peawanuk;
- Taykwa Tagamou First Nation in New Post;
- Marten Falls First Nation in Ogoki Post;
- Neskantanga First Nation in Lansdowne House; and

- Webequie First Nation;

The political organizations which represent First Nations at the regional scale will similarly be provided with information, and more detailed briefings on request, including:

- Nishnawbe Aski Nation; and
- Mushkegowuk Council of the James Bay Cree.

At this time De Beers is not aware of any traditional or self-described Metis communities within the area of the proposed development, and thus no consultation is planned in that regard.

3.3 Aboriginal Treaty Rights Related to VMEP

Aboriginal and Treaty rights in the area of the VMEP were summarized in the Section 7.5.6.2 of the Environmental Assessment Comprehensive Study report for the Victor Mine (CSEA 2004). That summary is reproduced below in italics. However De Beers is aware that a challenge is currently in process by the First Nations communities which were signatories to the James Bay Treaty (Treaty No. 9, of 1905 and 1906, with adhesions made in 1929 and 1930). This challenge is based on the discovery of detailed personal diaries of one of the treaty commissioners, which recorded verbal discussions which differ from the written treaty on key points relating to the "taking up" of lands by the Crown, and which support the oral tradition of the First Nations people who witnessed that Treaty. While this complicates the legal situation, with respect to the VMEP this challenge only strengthens the existing obligation and commitment by De Beers Canada to both consult with and negotiate development and impact benefit agreements, or similar agreements on benefits, with the First Nations affected by the proposed development prior to their commencement.

It is expected that these agreement(s) for the VMEP will build upon the three existing Impact Benefit Agreements (IBAs) with the Attawapiskat, Kashechewan, Fort Albany and Moose Cree First Nations (note: Fort Albany and Kashechewan First Nations share one IBA).

The following text is an extract from CSEA 2004:

> *Aboriginal and Treaty Rights are enshrined in Section 35 of the 1982 Constitution Act, which states that:*
> *35. (1) The existing Aboriginal and treaty rights of the Aboriginal peoples of Canada are hereby recognized and affirmed.*
>
> *(2) In this Act, "Aboriginal peoples of Canada" includes the Indian, Inuit and Metis peoples of Canada.*

(3) For greater certainty, in subsection (1) "treaty rights" includes rights that now exist by way of land claims agreements or may be so acquired.

(4) Notwithstanding any other provision of this Act, the Aboriginal and treaty rights referred to in subsection (1) are guaranteed equally to male and female persons.

The James Bay Treaty (Treaty No. 9, of 1905 and 1906, with adhesions made in 1929 and 1930), among other aspects, specifies the following:

"And whereas, the said commissioners have proceeded to negotiate a treaty with Ojibway, Cree and other Indians, inhabiting the district hereafter defined and described, and the same has been agreed upon, and concluded by the respective bands at the dates mentioned hereunder, the said Indians do hereby cede, release, surrender and yield up to the government of the Dominion of Canada, for His Majesty the King and his successors for ever, all their rights titles and privileges whatsoever, to the lands included within the following limits ……"

"And His Majesty the King hereby agrees with the said Indians that they shall have the right to pursue their usual vocations of hunting, trapping and fishing throughout the tract surrendered as heretofore described, subject to such regulations as may from time to time be made by the government of the country, acting under the authority of His Majesty, and saving and excepting such tracts as may be required or taken up from time to time for settlement, mining, lumbering, trading or other purposes."

(underscore added)

Aboriginal rights are not defined in the Constitution Act, but are generally interpreted to mean the general rights of Aboriginal peoples to use their traditional lands for traditional purposes such as hunting, fishing, trapping, gathering, and other functions (Coates 2000, Parson 2001).

The Marshall Decision of 1999 by the Supreme Court of Canada extended treaty rights in a limited way to commercial harvesting of marine fisheries resources (specifically eels), and therefore beyond the realm of Aboriginal rights which were previously limited to harvesting for food and community use (Coates 2000). However, trapping, which is a traditional activity, has always been carried out as a commercial activity, and in this sense, the Marshall Decision only reaffirms the right of Aboriginal peoples to carry out commercial harvesting.

In essence, considerations involving the application of Aboriginal and treaty rights to the Victor Diamond Project mean that development of the Victor Diamond Project should

not infringe on such rights. In the case of mining activities, Treaty No. 9 makes specific reference to such activities, as per the above. The case of Aboriginal rights, however, is not defined, as Aboriginal rights are considered separate from treaty rights, as per the above.

Nevertheless, where the infringement of Aboriginal and treaty rights occurs and cannot be reasonably avoided, there is a moral and ethical obligation on the part of De Beers to consult with and to come to agreement with the Attawapiskat FN (AttFN)on such matters, and to provide fair and reasonable compensation to the AttFN to offset any losses incurred by the First Nation. This interpretation is consistent with Paragraph (Article) 4 (a), (b) and (c) of the initial Memorandum of Understanding (MOU) signed by De Beers and the First Nation on November 6, 1999 (no longer in force), and Article 5.3 of the current Feasibility Partnering Agreement (FPA) signed by De Beers and the AttFN on October 22, 2002. Provisions of the FPA will be supplanted by the IBA, and by any other agreements with the local First Nations.

4.0 STAKEHOLDER PARTICIPANTS

The list of interested stakeholders is expected to grow and will continue to evolve throughout the project development to reflect varying levels of interest and issues over time. Stakeholders which De Beers expects to engaged or have already engaged to date include:

Business and Community Interests:

- Attawapiskat Resources Inc. (ARI);
- Keewaytinok Askee Enterprises (Attawapiskat)
- Bradley Young Consulting (Attawapiskat)
- Roger Nakogee Rentals & Construction (Attawapiskat)
- Kattawapiskak Development Co. Inc. (Attawapiskat)
- Koostachin Group (Attawapiskat)
- K A Joint Venture (Attawapiskat)
- Shu-Pae Stayo Enterprises (Attawapiskat)
- Joseph Fireman Ontario 190552620 (Attawapiskat)
- Masowatch Partnership Ontario 1779522 (Attawapiskat)
- Koostachin-Cecconli Joint Venture (Attawapiskat)
- ASWM Contracting Inc. (Attawapiskat)
- Meenish Enterprises (Attawapiskat)
- Tundra Hawk Rentals (Attawapiskat)

- Neegan Naynowan Jacques Whitford LP (Attawapiskat)
- ORTECH Consulting Inc. (Attawapiskat)
- Northern College;
- Timmins and District Chamber of Commerce;
- Mining Watch Canada;
- Northwatch;
- Wildlife Conservation Society; and
- Other local small business owners.

Municipal Government:

- Town of Cochrane;
- Town of Moosonee; and
- City of Timmins.

Provincial (Ontario) Government:

- Ministry of Aboriginal Affairs;
- Ministry of Economic Development and Trade;
- Ministry of Energy;
- Ministry of Labour;
- Ministry of Natural Resources;
- Ministry of Northern Development and Mines;
- Ministry of the Environment;
- Ministry of Transportation;
- Ministry of Training, Colleges and Universities
- Hydro One Networks Inc.; and
- Ontario Provincial Police.

Federal Government:

- Aboriginal Affairs and Northern Development Canada;
- Canadian Environmental Assessment Agency;
- Environment Canada;
- Fisheries and Oceans Canada;
- Health Canada;
- Natural Resources Canada; and
- Transport Canada.

5.0 PROPOSED CONSULTATION ACTIVITIES

De Beers will inform and involve the public and stakeholders in a variety of ways focussing on the required regulatory processes while recognizing the remoteness of the Project site. These activities are expected to include:

- Distribution of notices of community information events in local communities (using methods such as local newspapers and/or newsletters; local radio / television advertising; and posting to the De Beers website.

- Updating the De Beers website to include information about the Federal EA process and provide a link for direct feedback.

- Continuing discussions with stakeholders to gather feedback on the VMEP and EA process.

- Hosting public information meetings or open houses in local non-aboriginal communities (primarily Moosonee, Timmins and Cochrane) to provide updated information about the VMEP and gather feedback.

It is understood that there may be a number of public review processes associated with the Federal EA process, and De Beers will be supportive of the needs of the CEA Agency as appropriate. These activities are anticipated to include a Federal-led public review on the Project Description Summary, Draft Environmental Impact Statement (EIS) Guidelines, and Draft Federal Environmental Assessment Report. De Beers will lead consultation related to collating comments on the VMEP to support preparation of the draft and final EIS.

5.1 Stage 1: Consultation on the Project Description Summary

- In the first quarter of 2013, hold public information meetings in four coastal James Bay communities (Attawapiskat, Fort Albany, Kashechewan, Moose Cree) to update them on the VMEP.
- Circulate project description and a summary presentation to the four coastal James Bay communities and secondary communities of interest for their information, and make additional presentations if requested.
- Meetings with key government agencies, federal and provincial.
- Collate feedback from those consulted
- Meetings with CEA Agency.

5.2 Stage 2: Consultation on the EIS Draft Guidelines

- In the month following release of the draft EIS guidelines by CEA Agency, hold public information meetings in four coastal James Bay communities, as well as Moosonee, Timmins and Cochrane, to ascertain comments on the VMEP to support draft EIS preparation
- Collate feedback from those consulted
- Meetings with CEA Agency.

5.3 Stage 3: Consultation on the Draft EIS

- Provide copies of the draft EIS and a summary thereof, to the four coastal James Bay communities , as well as in Moosonee, Timmins and Cochrane.
- Make available or provide a copy and a summary of the draft EIS to secondary communities of interest and make presentations if requested.
- Circulate and discuss the draft EIS to key government agencies, federal and provincial.
- Within approximately 60 days following release of the draft EIS, hold public information meetings in four coastal James Bay communities, if communities are amenable.
- Collate feedback from those consulted
- Meetings with CEA Agency and other government agencies in support of finalizing the EIS.

5.4 Stage 4: Consultation on the EIS and other

- Provide copies of the final EIS to designated government representatives, the four James Bay coastal communities as well as Moosonee, Timmins and Cochrane, (and other FNs / stakeholders as determined through the draft EIS review process)
- Hold meetings with the four coastal James Bay communities as appropriate to address any outstanding concerns.
- Meetings with CEA Agency and other government agencies as appropriate, to develop a Follow-Up Program as necessary.

6.0 References

Canadian Environmental Assessment Agency, July 2012. Guide to Preparing a Description of a Designated Project under the *Canadian EA Act*, 2012.

Environmental Assessment Comprehensive Study report for the Victor Mine (CSEA 2004), De Beers Canada

APPENDIX D

Meeting Minutes

DE BEERS CANADA
VICTOR MINE

Record of Meeting		Issued	16 August 2012
Meeting Date	09:00 – 11:15 a.m. Friday, August 10, 2012	Meeting Location	Ministry of the Environment 435 James Street South Thunder Bay, Ontario
Subject	**De Beers Victor Mine resource extension project: Hydrogeological investigation of the Tango Extension Kimberlite**		

Attendees in person:

Alisdair Brown – Hydrogeologist, Ministry of the Environment, alisdair.brown@ontario.ca
Todd Kondrat – Surface Water Specialist, MOE, todd.kondrat@ontario.ca
Ghulam Sarwar – MOE reviewer
Leo Fusciardi – VP Mineral Resource Management, DBC
Brian Steinback – Environment Superintendent, DBC, brian.steinback@debeerscanada.com
Houmao Liu – Principal Hydrogeologist, Itasca Denver, hliu@itascadenver.com
David Simms – Principal, Environmental Assessment, AMEC, david.simms@amec.com
Simon Gautrey - Senior Hydrogeologist, AMEC, simon.gautrey@amec.com

(via teleconference)

Peter Williamson – DBC peter.williamson@debeerscanada.com
Patrick Rummel – Hydrogeologist, DBC, Patrick.rummel@debeerscanada.com
Lesley Lorrimer – AMEC Lesley.lorrimer@amec.com

The main take home messages were:

1. The EA can be completed without the results of the 60-day pump test, but 60-day pump test results would be needed for permitting (see further comments below on possible permitting phases);
2. Do more with the overburden, because the main concern of MOE will be affects to surface water systems (Unnamed Creek, muskeg ponds);
3. Be prepared to look at springs in the Attawapiskat River near shore area (may be difficult to address, but need to make the effort);
4. Alisdair also has to answer to comments from the public so may request things that might not always appear necessary; and
5. Be prepared for delays in approvals, because there are typically requests for further information with all complex approval applications.

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Specific comments from Alisdair:

- He agreed that we likely already have enough information to proceed with the EA (can model with existing information, supported by additional geotechnical and geophysical data).
- We do not have enough site specific information to obtain a PTTW for bedrock dewatering for mining, and that would need to be supported by a long term (60 day) pumping test in the bedrock.
- We are looking at 3 to 4 PTTW applications, one for each of:
    - The pumping test
    - The test trench
    - Overburden stripping (this could be a phased permitting approach, where 60-day test would not be needed for this phase of dewatering – PTTW could be based on results observed for test trench dewatering effects, but test trench would need to have an associated, mainly shallow depth, monitoring program)
    - Mine dewatering (requires results of 60-day pump test)
- He considered the PTTW applications for the pump test and test trench dewatering to be relatively straight forward approvals, and we should have no problem receiving these in the standard MOE 90 day review and approval period; but should allow more time as contingency because MOE almost always requests some further information. He had no specific comments on the proposed pumping test plan with regards to the placement of monitoring wells, but did say more overburden monitoring would be better.
- The pumping test would be needed to confirm that there were no unexpected fracture patterns in the bedrock. From his perspective there needs to be an effort to collect information from the overburden, which in terms of environmental impact (to surface water systems – Unnamed Creek and muskeg ponds) is the most important unit to investigate. He commented that this was initially not emphasised enough in the Victor work.
- In a general discussion about the test trench, we said that monitoring of the test trench work would likely provide information on the overburden (which could then be used to support a phased PTTW for overburden stripping), but not enough to give us the engineering information substitute for a pumping test which is needed for the engineering.
- We discussed flow profiling, and why it is important for design of the dewatering wells. This task might be delayed until a large rig was available onsite.
- There were no comments on the Brian's plan for scouting the Unnamed tributary this summer, but they were interested in the presentation, and generally appeared pleased. We would look at underdrained conditions at the rock outcrop at the downstream end.
- Alisdair said that he would consider the PTTW for overburden stripping to be part of the mine application, so would need approval of the EA before issuing a PTTW for overburden stripping (but not for the test trench).
- He cautioned (several times) that approval of PTTW for large scale dewatering will most likely take more than 90 days, and that the clock stops if the application is incomplete or they need to ask questions.
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- The main issues for the MOE will be impacts on surface water features: the Unnamed creek and Attawapiskat River (possible seeps or near-shore upwellings – if these can be detected). Todd agreed. It was not clear if Ponds were an issue (likely depends on fisheries data)

- Mercury was discussed as an important issue for mine permitting, but not necessarily part of the PTTW. Brian discussed the university research results on fish sampling.

- Alisdair commented that impacts to the Attawapiskat River will likely be insignificant, but did mention that recent PTTW applications have had to address the role of springs in sustaining fish habitat. We had a discussion about how this might be done in a river as large as the Attawapiskat River, but did not reach any conclusions. Infra-red cameras from a helicopter was brought up, as well as possible chemical signatures under low water conditions.

- There was a discussion about the timing of the flooding of Victor on dewatering efforts at Tango Extension, and whether there would be a period of overlapping dewatering, or whether flooding of the Victor Pit would interfere with dewatering at Tango Extension. We generally agreed that while there would be a couple of years of overlapping dewatering (to at least strip the overburden), the distance was too far to cause much interference between either dewatering or flooding. Alisdair noted that it may not be necessary to pump water into the finished Victor Pit if there was a potential for flooding of the pit to interfere with dewatering at Tango Extension. De Beers introduced the design concept of partially back-filling the Victor pit with Fine PK from Tango Extension, which has both environmental and cost benefits. This seemed to be well received.

- There was a discussion about the model, and whether there would be two models as in Victor. At Victor we had one model for bedrock and model one for the overburden as the original bedrock model had a very simple interpretation of the overburden. We said there would be a single model with a more detailed overburden component.

- In terms of schedule, we did not reach any conclusions, but we did say we would need the PTTW for overburden stripping by 2015 (three years ahead of the closure of Victor in 2018, although two years might be ok). Working backwards this means we could do the following:

    - EA can be completed now with information in hand (plus some additional geotechnical and geophysical data to confirm similarity of conditions with Victor; or to allow model parameter adjustments) .

    - Early 2014 test trench (application submitted in 2013 – EA doesn't have to be completed as the test trench is an information gathering tool)

    - Early 2014 or early 2015, drill prototype well and undertake pumping test in summer. Application to be submitted in the previous year.

    - Submit PTTW application for overburden stripping (and mining) in same year as pumping test completed, likely in the late summer to allow stripping in the following winter (note this is a tight schedule given the pumping test, which would be the basis of the application, will end in mid-summer and Alisdair warned us to expect delays on this review).

    - Depending on timing of the pumping test, overburden stripping could start in early 2015 (if there is a 2014 pumping test) or early 2016 (if there is a 2015 pumping test), assuming the approval is rapid (warned that this is unlikely). Given Alisdair's warnings, a 2014 pumping test with an overburden stripping start of early 2016 would be best. – Dave Simms – my recollection was that we could permit overburden stripping based on results of the test trench, and would not need the 60-day pump test results. However, it was also recognized that it would likely be in De Beers interest to completed the 60-day pump test before starting overburden stripping (for mining) because one would not want to incur the costs of stripping only to find out that dewatering were far more costly than envisioned.

Specific comments from Todd and Alisdair

- Both greatly appreciated the meeting and having it take place so far in advance of the PTTW application.
- Todd agreed with Alisdair that the main PTTW issues would be impacts to surface water.
- Both Todd and Alisdair are happy with the plan to use the existing discharge location on Attawapiskat River.

Brian Steinback

Final Meeting Summary Notes

MEETING TOPIC: Overview: Proposed De Beers' Tango-Extension Satellite Pit at the Victor Diamond Mine + Potential Federal EA Requirements

Meeting Date:	Wednesday August 22, 2012	**Location:**	55 St. Clair Ave EAST, Toronto, Room 312
Meeting Time:	1pm – 3:15pm	**Teleconference Dial-in Number:**	1-613-960-7516 Access # 5164674
Organizer Contact Information	Name: Darla Cameron (Chair) Email: darla.cameron@ceaa-acee.gc.ca		
Participants:	*AMEC* – Lesley Lorrimer; Sheila Daniel *CEA Agency* – Darla Cameron *De Beers* – Brian Steinback; Leo Fusciardi; Peter Williamson *MNDM* – Glenn Seim *MoE* – Carroll Leith; Larry Lefebvre; Solange DeSautels	**Regrets:**	Ross Lashbrook, MoE

Purpose: Information sharing and determination of next steps/timing

Outcomes: Participants understand: i. proposed project based on information currently available; ii. information required and process steps for determining federal EA requirements; iii. provincial requirements that may apply, based on information currently available about the proposed project.

Documents to Review:

De Beers Circulated in Advance: information about the proposed project/components, including (if available) a brief overview of studies planned / ongoing & local engagement activities

De Beers Circulated After the Meeting: photos of site and local area from recent field work and fly over(s)

From CEA Agency in Advance:

Overview - Canadian Environmental Assessment Act, 2012:
http://www.ceaa.gc.ca/default.asp?lang=En&n=16254939-1
Regulations Designating Physical Activities ***(click on this link)***
Prescribed Information for the Description of a Designated Project Regulations ***(click on this link)***
CEA Agency Project Description Guide:
http://www.ceaa.gc.ca/Content/D/A/C/DACB19EE-468E-422F-8EF6-29A6D84695FC/PD%20Guide%20-%20Fixed%20Cover-ENG.pdf
Canadian Environmental Assessment Act, 2012 – Legislation:
http://www.parl.gc.ca/HousePublications/Redirector.aspx?RefererUrl=%2fHousePublications%2fPublication.aspx%3fLanguage%3dE%26Mode%3d1%26DocId%3d5697420%26File%3d9&File=74#15

AGENDA

Item	Topic	Speaker	Time
1	**Welcome / Introductions & Roles**	**Darla/All**	**1:00 – 1:10**
2	**Overview:** - proponent's proposed project / components and planning work to date	**De Beers' Team**	**1:10 – 2:05**
3	**Provincial Requirements:** - that may apply based on information currently available about the proposed project	**MNDM/MoE**	**2:05 – 2:20**
4	**Information Requirements and Process Steps for Determining Federal EA Requirements:** - CEAA 2012 + summary of timelines - Designated Physical Activities and Project Description Regulations - Project Description Content and Agency Review - Federal Roles / Duties - Environmental Impact Statement Guidelines - Aboriginal Crown Consultation and Proponent's Engagement of Aboriginal Groups	**CEA Agency**	**2:25 – 2:55**
5	**Next Steps and Action Items**	**All**	**2:55 – 3:15**

SUMMARY NOTES & ACTION ITEMS

Item	Action/ By/Timing
Topic 2 – Overview of Proposed Project	
• De Beers wishes to build on what it views as a successful Victor Diamond Mine operation that includes community engagement and local hiring. The Victor mine is predicted to finish production by 2018. De Beers would like to develop the Tango Kimberlite Extension, 7-8 km away from the Victor mine; with production beginning at a Tango open pit, as the Victor mine finishes production. The Tango deposit is predicted to have approx. 5 years of yield compared to 11 years for Victor. Because of development challenges (existing winter road is only open for 5-6 weeks\yr and there is approx. 20m of overburden over the kimberlite deposit), De Beers would like to proceed expeditiously through the EA and approvals process for the Tango proposal. This meeting is the start of De Beers` identification of process requirements. In parallel, De Beers is working on taking its mining claims to lease in the Tango area.	
• De Beers proposes to use most of the existing Victor Diamond Mine facilities and infrastructure to support the Tango Extension development. Subject to project planning/EA + regulatory requirements, De Beers believes little work or expansion would be needed on the discharge-intake infrastructure facilities on the Attawapiskat River or in the Victor mine processing facility. However, De Beers` project planning will consider water taking / water balance, accounting for wind-down of Victor site dewatering as Tango site dewatering would begin.	Brian to circulate photos of site/local area **Completed Aug. 23**
• De Beers mentioned it does not need provincial permits to continue use of the existing winter roads if the Tango extension gains approval. Figures showing the proposed Tango open pit and related areas are maximum size anticipated to be needed.	
• De Beers and AMEC have maps showing watersheds in the area of the proposed Tango Extension and the existing Victor Diamond Mine. The Tango extension has a smaller watershed. However, AMEC acknowledged that due to the very flat landscape and the bog/fen environment, there are interconnections between some watercourses as well as the watersheds. The unnamed watercourse near the Tango deposit is characterized as a stream. The Tango deposit tips towards the Attawapiskat River.	

Item	Action/ By/Timing
• Regarding the status of De Beers` existing baseline studies (page 3 of De Beers summary information) all on the list are completed or about to be completed with the exception of groundwater sampling and hydrogeological modelling that remain underway. Baseline studies build upon De Beers` ongoing work required through EA, permits and Impact Benefits Agreements for the Victor mine.	
• De Beers' senior management is planning to visit local (coastal) Aboriginal communities in the next couple of weeks. These visits are part of commitments in Impact Benefits Agreements (IBA) as well as the company's desire to raise potential development of the Tango deposit with Chiefs and other senior community representatives. De Beers' experience shows that it can take time to gain access to Attawapiskat First Nation. Brian and Sheila advise federal and provincial officials to take this into account for planning Aboriginal Crown consultation.	
Topic 3 – Likely Provincial EA Requirements	
• Glenn / his staff will play a one-window coordination service into the provincial government. Pulling together key ministries, including Ministry of Natural Resources. • De Beers is advised to submit its Notice of Project Status (under Ontario`s *Mining Act*) at approximately the same time as the Project Description. • Ontario staff involved in EAs for proposed mining projects have experience in working with Agency Regional staff in mapping out a coordinated approach.	Glenn to notify MNR, including the Far North Branch, about De Beers' proposal. **Completed Aug 22** Brian plans to contact Dianne Corbett, Director of the Far North Branch, to learn about the implications of Ontario's Far North Act to the Tango Extension Proposal. **Completed** **[As of Sept. 26, 2012 call between CEA Agency, Ontario Region (Darla Cameron), De Beers (Brian Steinback), AMEC (Sheila Daniel), Brian scheduled to have this discussion with Dianne end-Sept. - early Oct. 2012.]** De Beers consider timing of submission of the Notice of Project Status; suggest discussion with Glenn. **Ongoing**

Item	Action/ By/Timing
	Glenn and Darla will discuss process coordination opportunities. This would be best-timed after receipt of De Beers' draft Project Description. **Ongoing**
• The most likely provincial Class EA requirement is MNR's Resource Stewardship and Facility Development. Provincial Class EA requirements will be confirmed as further information becomes available from De Beers (starting with draft Project Description). De Beers indicated it's unlikely to volunteer for an individual EA. In response to a question from AMEC, provincial consideration of substitution or equivalency for this file (per CEAA 2012) not under consideration as of meeting date.	Glenn to include other ministries, including MNR, to a broader introductory meeting about the proposed project. Agency staff will also be invited. This will likely occur after receipt of De Beers' draft Project Description. **Ongoing**
• MNDM staff will work with provincial staff and the CEA Agency to coordinate, to the extent possible, Aboriginal Crown Consultation. This begins with the identification of Aboriginal groups through the conduct of consultation.	Glenn and Darla will be discussing opportunities for coordinated Aboriginal Crown Consultation after receipt of De Beers' draft Project Description. **Ongoing**
Topic 4 – Federal EA Overview	
• Key points of federal EA administration and Agency role were summarized (see agenda sub-points above). Darla highlighted that proponents are asked to translate into French the Executive Summary of the final Project Description. The Summary is posted to support the first formal public consultation period led by the Agency. Agency staff also formally notify Aboriginal groups about receipt of an acceptable Project Description and invite input. Regarding the drafting of Environmental Impact Statement (EIS) Guidelines, the Agency has a generic starting point from which project specific needs are incorporated in an efficient manner.	Darla to set up discussion with De Beers, AMEC and MNDM about federal Project Description requirements and Agency expectations re: proponent`s engagement of Aboriginal Groups. **Completed; call held Aug 24.**
Topic 5 – Next Steps (in addition to action items noted above)	
• Contact information as promised: Solange Desautels, Supervisor (A) Northern/southwest/WC Unit Environmental Assessment Services Section Environmental Approvals Branch Solange.Desautels@ontario.ca Phone: 416-314-7765	**Completed Aug 23**.

Item	Action/ By/Timing
• De Beers aims to submit a draft Project Description in September (after the long weekend) and the final in October, pending senior management dialogue with local Aboriginal groups.	De Beers to submit draft Project Description for review. **Completed** **[As of Sept. 26, 2012 call between CEA Agency, Ontario Region (Darla Cameron), De Beers (Brian Steinback), AMEC (Sheila Daniel), De Beers currently tracking mid-end November/12 for draft Project Description submission to Agency. De Beers/AMEC may connect in advance with Darla if any questions during drafting.]**