GAHCHO KUÉ MINE
NI 43-101 TECHNICAL REPORT
NWT, CANADA

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Report Date: March 1, 2020

Date & Signature Page

This report entitled Gahcho Kué Mine NI 43-101 Technical Report, Northwest Territories, Canada, effective as of December 31, 2019 was prepared and signed by the following authors:

Original document signed and sealed by:

Daniel D. Johnson *March 16, 2020*

Daniel D. Johnson, P. Eng. Date Signed
JDS Energy & Mining Inc.

Original document signed and sealed by:

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NOTICE

JDS Energy & Mining Inc. prepared this National Instrument 43-101 Technical Report, in accordance with Form 43-101F1, for Mountain Province Inc. (MPD). The quality of information, conclusions and estimates contained herein is 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 report.

MPD filed this Technical Report with the Canadian Securities Regulatory Authorities pursuant to provincial securities legislation. Except for the purposes legislated under provincial securities law, any other use of this report by any third party is at that party's sole risk.

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1 Summary

1.1 Property Description & Ownership

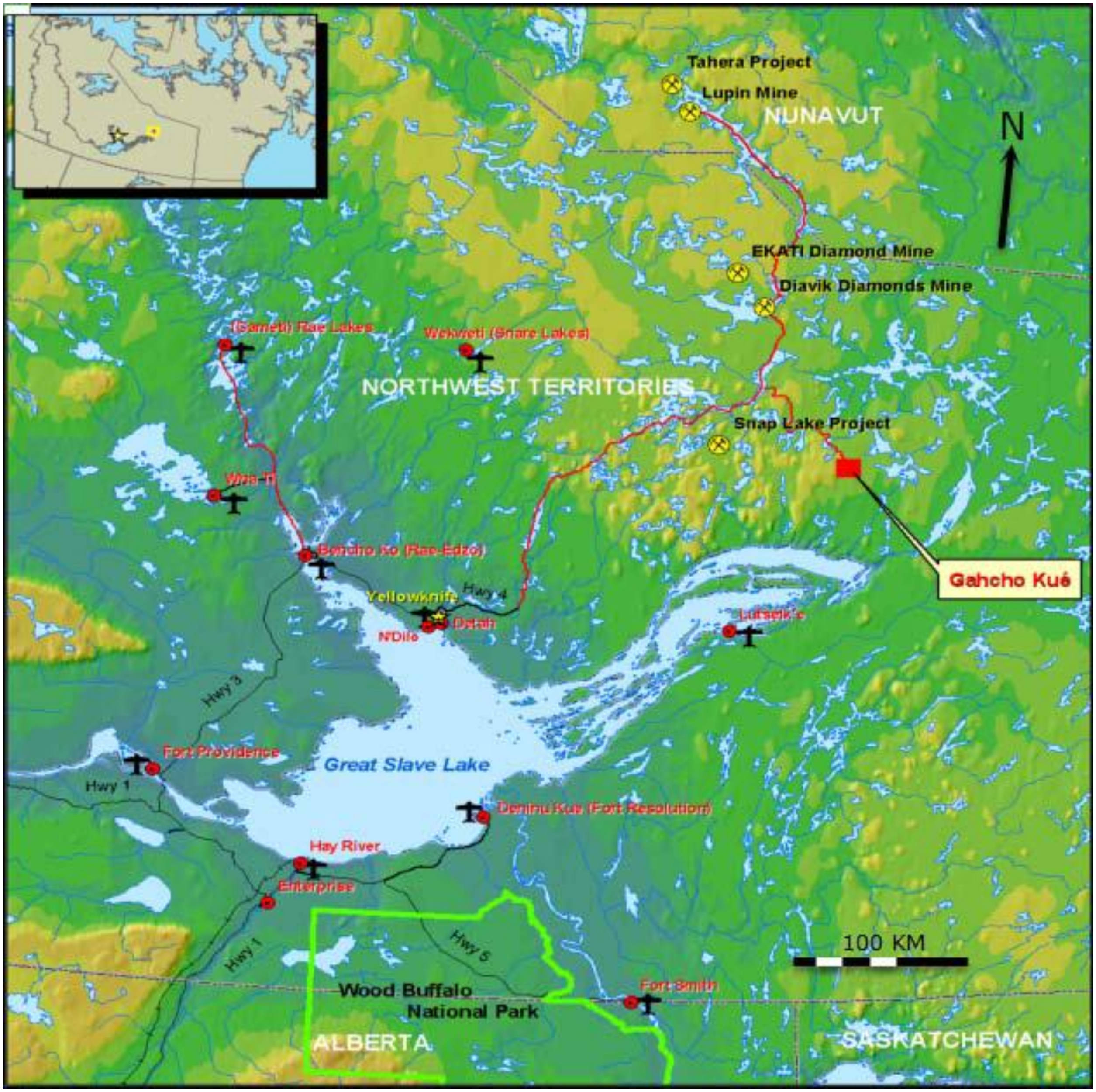
The Gahcho Kué (GK) Mine is a joint venture (JV) of the De Beers Group (De Beers) and Mountain Province Diamonds Inc. (MPD), with ownerships of 51% and 49%, respectively. The property is located in the Northwest Territories (NWT) of Canada, 280 km east-northeast of Yellowknife. The Mine lies on the edge of the continuous permafrost zone in an area known as the barren lands. The surface is characterised as heath / tundra, with occasional knolls, bedrock outcrops, and localised surface depressions interspersed with lakes. A thin discontinuous cover of organic and mineral soil overlies primarily bedrock, which typically occurs within a few metres of surface. Some small stands of stunted spruce are found in the area along with myriad lakes. Kennady Lake, under which the kimberlite pipes lie, is a local headwater lake with a minimal catchment area.

Due to its location, the Gahcho Kué Mine is a fly-in / fly-out operation with access by winter road during February and March for freight deliveries. Access by air is currently via Yellowknife and Calgary.

The winter road (Figure 1-1) functions under a Licence of Occupation by the winter road JV partners who operate the Ekati, Diavik and Gahcho Kué mines. In 1999, a 120 km road spur was opened connecting the GK mine site to the winter road at Mackay Lake and has been open each year since 2013 to support on-going mine operations.

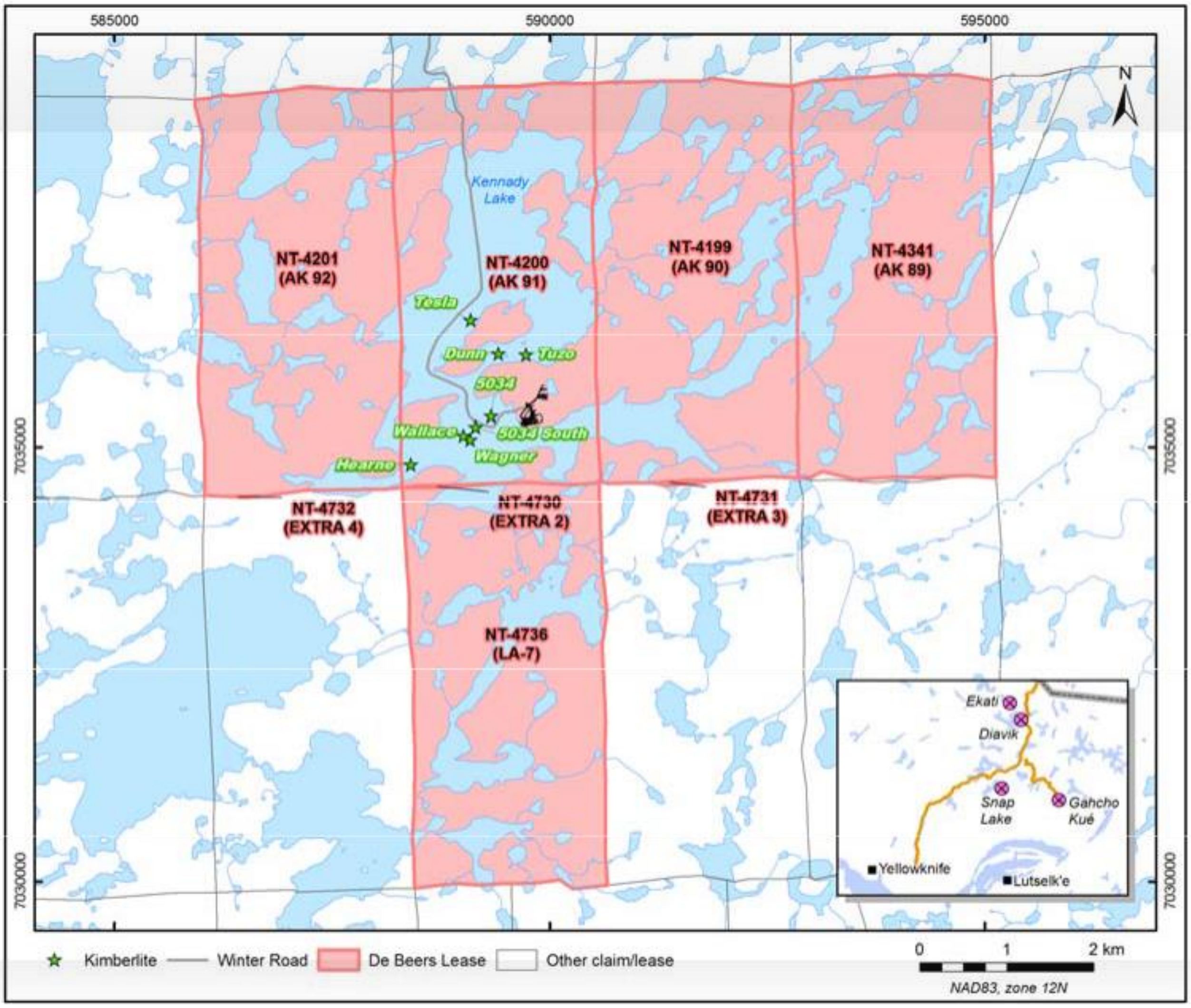
The Gahcho Kué kimberlite deposits are located within a series of mineral leases shown in Figure 1-2. Surface rights (land leases) were issued by the Government of the Northwest Territories (GNWT) to De Beers in 2015 and are presented in Figure 1-3.

Figure 1-1: Location of Gahcho Kué Mine



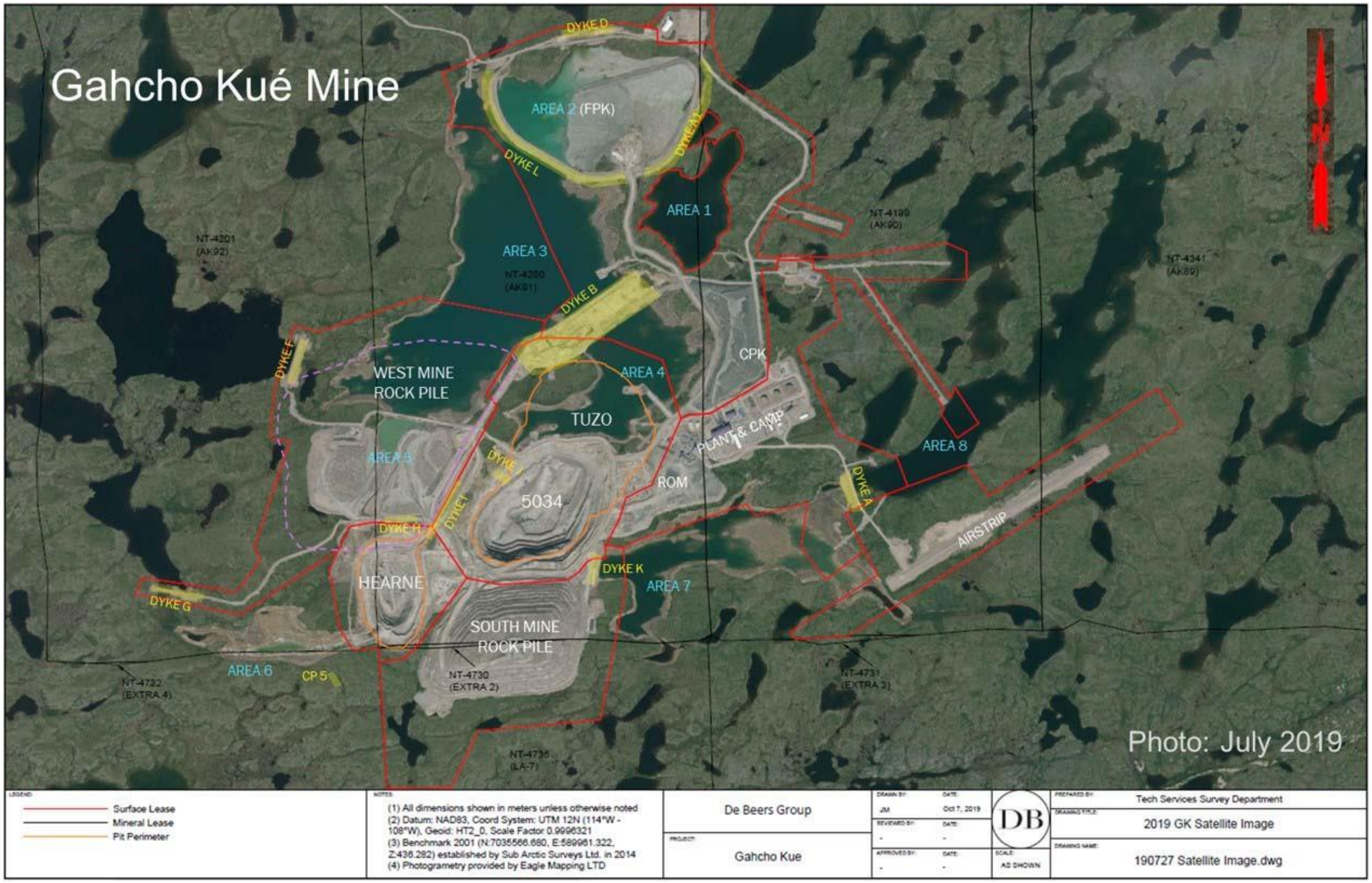
Source: DeBeers, 2013

Figure 1-2: Mineral Lease Boundary Map



Source: DeBeers, 2019

Figure 1-3: Land Lease Boundary



Source: DeBeers, 2019

1.2 Geology, Resources & Reserves

The baseline estimation and classification of the mineral resources was completed by AMEC (now AMEC Foster Wheeler), summarized in the “Gahcho Kué Kimberlite Project NI 43-101 Technical Report” (AMEC 2009). As a result of an additional Tuzo deep drilling program undertaken in 2012, additions / modifications to the AMEC mineral resource for the Tuzo Deep mineral resources more than 300 metres below surface (mbs) elevation were summarized in the “Update of the Mineral Resource Estimate for the Tuzo Kimberlite, Gahcho Kué Project, Northwest Territories, Canada NI 43-101 Technical Report” (Mineral Services, 2013). The baseline resource (AMEC 2009) and the Tuzo Deep Resource (Mineral Services, 2013) were compiled by JDS for the 2014 Gahcho Kué Technical Report and Feasibility Study (JDS, 2014). Additional drilling has allowed classification of 5034 Southwest Corridor and 5034 northeast Extension.

The estimation and classification of the mineral resources has since been updated to reflect operations as of 2019. These resources are exclusive of material processed prior to this report. Resources which were mined and stockpiled at the time of this report are summed separately from the remaining in-situ resources.

The Gahcho Kué Mine resources are summarized in Table 1-1. JDS has reviewed the resources and compared to those stated in the 2017 NI43-101 Technical Report (JDS, 2018) and believes that depletion, modifying factors applied, and additional classified material used to generate the updated resource estimate are reasonable and provide an accurate and complete basis for state of the resource (December 31, 2019). Stated Resources are exclusive of Mineral Reserves.

Table 1-1: Mineral Resource Summary (December 31, 2019)

Resource	Classification	Tonnes (Mt)	Carats (Mct)	Grade (cpt)
5034	Indicated	1.3	1.8	1.36
	Inferred	1.3	2.3	1.76
Hearne	Indicated	0.2	0.4	1.58
	Inferred	1.3	2.2	1.69
Tuzo	Indicated	0.7	0.6	0.93
	Inferred	11.0	14.9	1.36
Summary (In-Situ)	**Indicated**	**2.2**	**2.8**	**1.26**
	Inferred	**13.6**	**19.4**	**1.43**
Stockpiles	Indicated	0.0	0.0	0.00
	Inferred	0.0	0.0	0.00
Grand Total Exclusive Resource	**Indicated**	**2.2**	**2.8**	**1.26**
	Inferred	**13.6**	**19.4**	**1.43**
	Total	**15.8**	**22.1**	**1.40**

Notes:
(1) Mineral Resources are reported at a bottom cut-off of 1.0 mm. Incidental diamonds are not incorporated in grade calculations.
(2) Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
(3) Tonnage quoted as dry metric tonnes.
(4) Resources are exclusive of indicated tonnages converted to Probable Reserves.
(5) Resources have been depleted of any material that was processed prior to and including Dec 31, 2019. Q4 2019 depletion is based on forecasted values and may differ slightly from actual values.

Source: De Beers, 2019

Table 1-2: Mineral Reserve Estimate

Pipe	Classification	Tonnes (Mt)	Carats (Mct)	Grade (cpt)
5034	Probable	13.0	26.3	2.02
Hearne	Probable	3.4	6.4	1.91
Tuzo	Probable	16.1	19.4	1.20
In-Situ Total	**Probable**	**32.6**	**52.1**	**1.60**
Stockpile	Probable	0.5	0.9	1.74
Total	**Probable**	**33.0**	**53.0**	**1.60**

Notes:
(6) Mineral Reserves are reported at a bottom cut-off of 1.0 mm
(7) Mineral Reserves have been depleted to account for mining and processing activity prior to Dec 31 2019.
(8) Q4 2019 depletion is based on forecasted values and may differ slightly from actual depletion.
(9) Mineral Reserves are based upon the updated resource model (2019) and therefore reflect any changes to the estimation of tonnes, grade and contained carats within that resource. Details on resource changes are summarized in Section 14.
(10) Prices used to determine optimal pit shells have been escalated by factors varying by pit, which are indicative of the respective pits timing and duration.
Source: De Beers, 2019

Table 1-2 was reviewed by JDS Energy & Mining Inc. and complies with CIM Definitions and Standards for a National Instrument (NI) 43-101 for an Operating Mine. Detailed information on mining, processing, metallurgical, and other relevant factors are contained in subsequent sections of this report.

The economic viability presented in Section 22 confirms that the probable reserve estimates meet and comply with CIM definitions and (NI) 43-101 standards. At the time of this report, the mine is economically viable using current diamond prices and prevailing long-term price estimates.

1.3 Mining

The mine design and subsequent mine plan considers Indicated Mineral Resources of the 5034, Hearne, and Tuzo kimberlite pipes. Conventional truck and shovel mining is employed utilizing 29 m^3 bucket diesel hydraulic front shovels, a 17 m^3 front-end loader and 218 t class haulage trucks to mine kimberlite and waste. This fleet is augmented by 12 m^3 bucket front-end loaders, scaling excavators and 90 t haul trucks. Production drill and blast activities are supported by a fleet of 251 mm rotary drills. Pre-shear drilling is supported by 171 mm down the hole percussion drills.

Updated pit designs were completed in 2019 by De Beers. The design updates incorporate revised geotechnical criteria for all three pits. These pit designs were used to prepare the updated mine production plan and schedule. The plans were optimized to smooth waste stripping, while ensuring adequate kimberlite availability to meet feed requirements. The plan has been optimized with consideration to waste storage, including the mine rock piles, and in-pit waste storage at Hearne and 5034.

Pre-stripping began on land in the northern half of the 5034 pit in 2014, with the majority of the granite waste being used for road, dyke, and infrastructure construction. The full extent of the 5034 pit, including the lake bottom, was opened in 2016. Mining of the 5034 pit has consisted of an internal phase, which was developed to assess and manage the geotechnical issues experienced in 2016 / 2017, and a push back to the revised final pit design. Ore and waste mining at the 5034 pit is currently planned to continue until Q2 2024.

Mining of Hearne pit started in December 2017 and will be completed in mid-2022. Priority has been placed on Hearne in these years to open up in-pit waste storage capacity. Once Hearne is complete, fine processed kimberlite will be diverted from the FPK storage facility to the empty pit.

In Q2 2020, equipment will begin stripping the 5034 NEX Pushback which also incorporates the first phase of Tuzo. Tuzo ore from this first phase that will be mined with the NEX Pushback will be released starting in 2021 and will continue through to mid-2023. In mid-2024, NEX ore will be released and it will be the primary kimberlite production source until mining in the NEX Pushback is complete in Q1 2026. At this stage in the mine life, the combined mined-out area of the NEX Pushback and the 5034 pit will be used for Tuzo mine rock storage. Waste stripping in the third and final phase of Tuzo pit will begin in Q3 2023 and ore release will start at the end of 2025. Kimberlite production in Tuzo will be sustained until mid-2030.

1.4 Recovery Methods

The Gahcho Kué Mine extracts kimberlite resources from three different deposits over the planned mine life: 5034, Hearne, and Tuzo. In the process plant, this material is treated via crushing, screening, dense media separation and x-ray sorting, to produce a diamond rich concentrate that is hand sorted on site with the resulting diamond product sent to Yellowknife for final cleaning and GNWT valuation. The processing plant is targeting the recovery of liberated diamonds in the 1 to 28 mm size range. Diamond recovery processes are largely automated to allow efficient production with minimal human intervention.

1.5 Site & Infrastructure

The Gahcho Kué Mine is typical of many northern Canadian mining operations that lack local and regional infrastructure such as permanent road access, navigable shipping routes and ports, and external utilities. Therefore, the mine requires site specific infrastructure to sustain operations, including power generation, sewage and water treatment, personnel accommodation, storage facilities for materials delivered on the limited annual winter ice road, and an aerodrome to provide year-round cargo, food and passenger aircraft access. The existing process complex is shown in Figure 1-4.

The majority of supplies during construction and operation are shipped to site during a 10-week winter road season. A 120 km winter access spur road is constructed each year to connect the mine site to the Tibbitt-to-Contwoyto winter road at km 271, just north of Lake of the Enemy.

The layout of the site is based on several criteria:

- All major structures are founded on bedrock;
- Compact footprint for minimal land disturbance and maximum site operations efficiency;
- Compact building sizes and layout for maximum energy efficiency;
- Efficient facility access for personnel and vehicles during operations; and
- Minimal impact of winter road truck traffic around the site.

Figure 1-4: Gahcho Kué Mine Site

Source: De Beers, 2017

1.6 Environmental & Socioeconomic

A Class A Land Use Permit (LUP) and Type A Water License (WL) were issued by the Mackenzie Valley Land and Water Board (MVLWB) on September 30, 2014 for the Gahcho Kué Diamond Mine allowing full execution of the construction and operation of the mine. Additional details for licenses, permits and authorizations that have been issued for the mine are provided in Section 20.

Baseline biophysical information has been collected within the Gahcho Kué region since 1996. Following the environmental assessment and permitting phase, data collection is focused on monitoring programs that identify potential effects, evaluate impact predictions and monitor the efficacy of mitigations.

Multiple environmental monitoring and management plans have been prepared to track and mitigate impacts that the mine may have on the environment. The Gahcho Kué water management plans are adaptations of plans used successfully at other NWT diamonds mines. At Gahcho Kué mine, potentially contaminated water is kept within a controlled management basin formed by natural drainage patterns. Excess storage capacity allowances created by initial lake dewatering activities provide for operational flexibility and contingencies. The mine incorporates, where possible, a program of progressive reclamation that minimizes costs and allows timely monitoring of performance. The mined-out 5034 and Hearne pits will be used for waste storage during the later years of the mine life providing ample time for completion of the reclamation of the waste storage areas.

A Socio-Economic Agreement (SEA) for the Project was signed with the GNWT on June 28, 2013. The SEA establishes hiring priorities and employment incentives for the Project, training and employment objectives, business procurement objectives and it outlines how De Beers and the GNWT will work together to ensure the health and cultural well-being of NWT residents.

Additional employment will be created by the multitude of service providers to the project. In addition, property and payroll taxes will add significant tax revenues to the local municipality. Impact and Benefit Agreements (IBAs) are in place with six Indigenous groups.

2 Introduction

JDS Energy & Mining Inc (JDS) has prepared this technical report on Gahcho Kué Mine and its associated mineral resources and mineral reserves. The report is intended to serve as an update to mineral resources and reserves at the Gahcho Kué Mine.

This technical report is prepared for Mountain Province Diamonds Inc. and is intended to be a Form 43-101F1 Technical Report (updated November 2019) for the purposes of National Instrument 43-101 to provide updated background and supporting information on the mineral resource and mineral reserve at the Gahcho Kué Mine as of December 31, 2019.

The mine is operated through the Gahcho Kué Joint Venture (GKJV) agreement between Mountain Province Diamonds Inc. (49%) and the De Beers Group (51%).

2.1 Qualifications & Responsibilities

Two Qualified Persons (QPs), as defined by NI 43-101, were responsible for the preparation of this Technical Report. Table 2-1 lists the qualifications for each QP, as well as the section(s) of the report for which they are responsible.

Table 2-1: Gahcho Kué NI 43-101 Qualified Person Responsibility

Qualified Person	Company	Report Section(s) of Responsibility
Daniel Johnson, P.Eng	JDS	Overall author, all sections except 15 & 16
Dino Pilotto, P.Eng	JDS	Sections 15 & 16 (Mining and Reserves)

2.2 Site Visits

- Daniel D. Johnson, P. Eng. (JDS):
  - Multiple site visits during the mine development and operating phase between 2013 and 2018

2.3 Units, Currency and Rounding

The units of measure used in this report are as per the International System of Units (SI) or “metric” except for Imperial units that are commonly used in industry (e.g., ounces (oz.) and pounds (lb.) for the mass of precious and base metals).

All dollar figures quoted in this report refer to Canadian dollars (C$ or $) unless otherwise noted.

Frequently used abbreviations and acronyms can be found in Section 26.

This report may include technical information that requires subsequent calculations to derive sub-totals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, JDS does not consider them to be material.

2.4 Sources of Information

This report is based on information supplied by the De Beers Group and Mountain Province Diamonds throughout the course of JDS's investigations. JDS has no reason to doubt the reliability of the information provided. Other information was obtained from the public domain. This technical report is based on the following sources of information:

- Discussions with De Beers and Mountain Province personnel;
- Inspection of the Gahcho Kué Mine Site area;
- Review of production, planning, and exploration information collected and provided by De Beers; and
- Additional information from public domain sources.

3 Reliance on Other Experts

The QPs, authors of this report, state that they are Qualified Persons for the areas as identified in the certificates of Qualified Persons. The Authors have relied upon information provided from De Beers and MPD. The QPs have taken reasonable measures to confirm information provided by others and take responsibility for the information.

3.1 Diamond Valuations

JDS has reviewed MPD sales data from 2019 to determine the diamond price (US$/ct) for 5034 and Hearne. Tuzo pricing is based on the revaluation of the Tuzo bulk sample parcel which was completed in March 2018. JDS reviewed the data, methodology and process used by MPD to update these prices and is of the opinion that the modeled estimates are a reasonable estimate for the calculation of reserves.

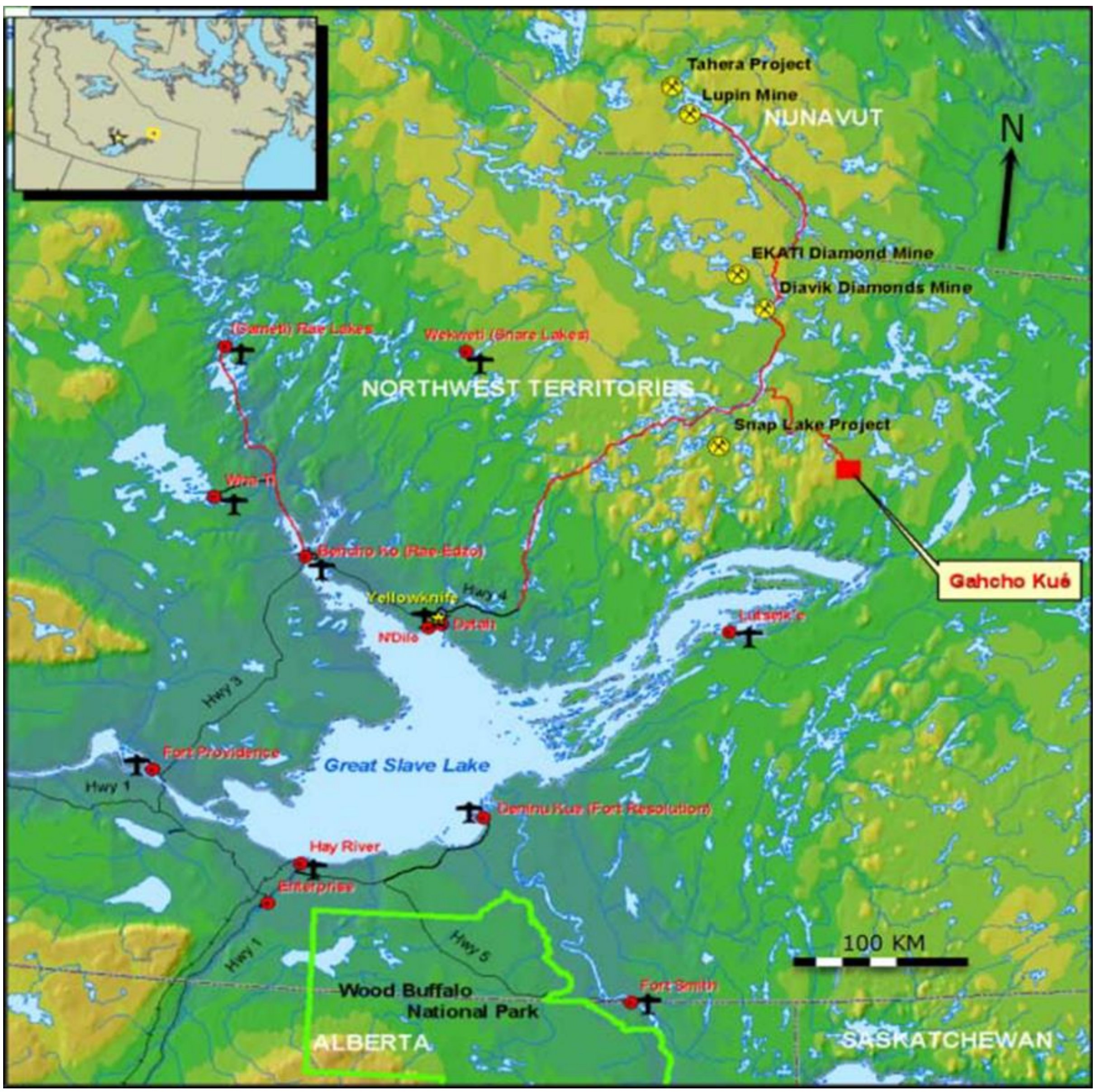
Similarly, JDS has relied on MPD for the diamond price escalation estimate. MPD has determined that a 2.5% real growth rate in USD diamond prices be used in the financial analysis which has been accepted as reasonable for the current market projections based on comparable estimates used by industry experts and other diamond producers.

4 Property Description & Location

4.1 Location

The Gahcho Kué Mine is located at Kennady Lake, approximately 280 km east-northeast of Yellowknife in the District of Mackenzie, Northwest Territories, Canada, at the approximate latitude 63.26.16N and longitude 109.12.05W (NAD83 Zone 12 coordinates 7035620N, 589735E Figure 4-1).

Figure 4-1: Location of Gahcho Kué



Source: De Beers, 2013

The Project is located 150 km south–southeast of the Diavik and Ekati operating diamond mines operated by Diavik Diamonds Inc. (Rio Tinto) and Dominion Diamonds respectively at Lac de Gras.

4.2 Tenure History

The Gahcho Kué Mine was part of a larger group of mining claims, known as the AK Property, which now consists of five remaining mining leases (Figure 4-2). The AK Property was initially staked in 1992 by Inukshuk Capital Corp., and optioned to Mountain Province Mining, Inc. (now Mountain Province Diamonds Inc.) later the same year.

On staking, the Project covered roughly 520,000 ha, and included the AK and CJ claims. The CJ claims substantially lapsed in November 2001, and the remaining CJ claims lapsed on August 17, 2002, leaving only the AK claims as current at that time.

Additional partners in the AK Property included Camphor Ventures Inc. (Camphor Ventures), and 444965 B.C. Ltd., a subsidiary company of Glenmore Highlands Inc. (Glenmore Highlands). At the time, Glenmore Highlands was a controlling shareholder of Mountain Province Mining Inc. as defined under the Securities Act of British Columbia. The Glenmore Highlands subsidiary amalgamated with MPD in 1997, and Camphor Venture's interest in the AK Property was acquired by MPD during 2007.

In 1997, Monopros (now De Beers Canada) joint ventured the property. The currently applicable agreements between the partners are summarized in Section 4.4. Surrounding claims / leases were dropped and the remaining leases comprising of the Gahcho Kué Mine are described below.

4.3 Mineral Tenure

The Gahcho Kué Mine comprises five mining leases (4199, 4200, 4201, 4341, and 4736) covering a total area of 5,216 ha (12,889 acres). The mining leases are 100% owned by De Beers who holds them on behalf of the GKJV. The participating interest of each of the GK joint venture parties is governed by the 2009 amended joint venture agreement, which is registered against the mineral leases (see Section 4.4).

There are three "extra" mining leases (4730, 4731, and 4732) immediately to the south and contiguous with the mining leases (Figure 4-2). These additional leases cover a combined area of 11.52 acres and are held 100% by De Beers Canada Inc. on behalf of the GKJV.

Annual lease payments, payable to the Receiver General Canada (Northwest Territories, c/o Mining Recorders Office), comprise $1.00 per acre for the duration of the 21-year lease period (note that fees are payable on acres, not hectares, in the NWT and Nunavut). Payments increase to $2.00 per acre if a second 21-year term is granted after application to the Northwest Territories Mining Recorder for the extension.

All mining leases were legally surveyed by licensed surveyors.

JDS is of the opinion that the leases are valid at the effective date of this report and until the expiry dates in Table 4-1. Four of the current leases expire between July 15 to 17, 2023 with the remaining four requiring renewal as of April 1, 2026.

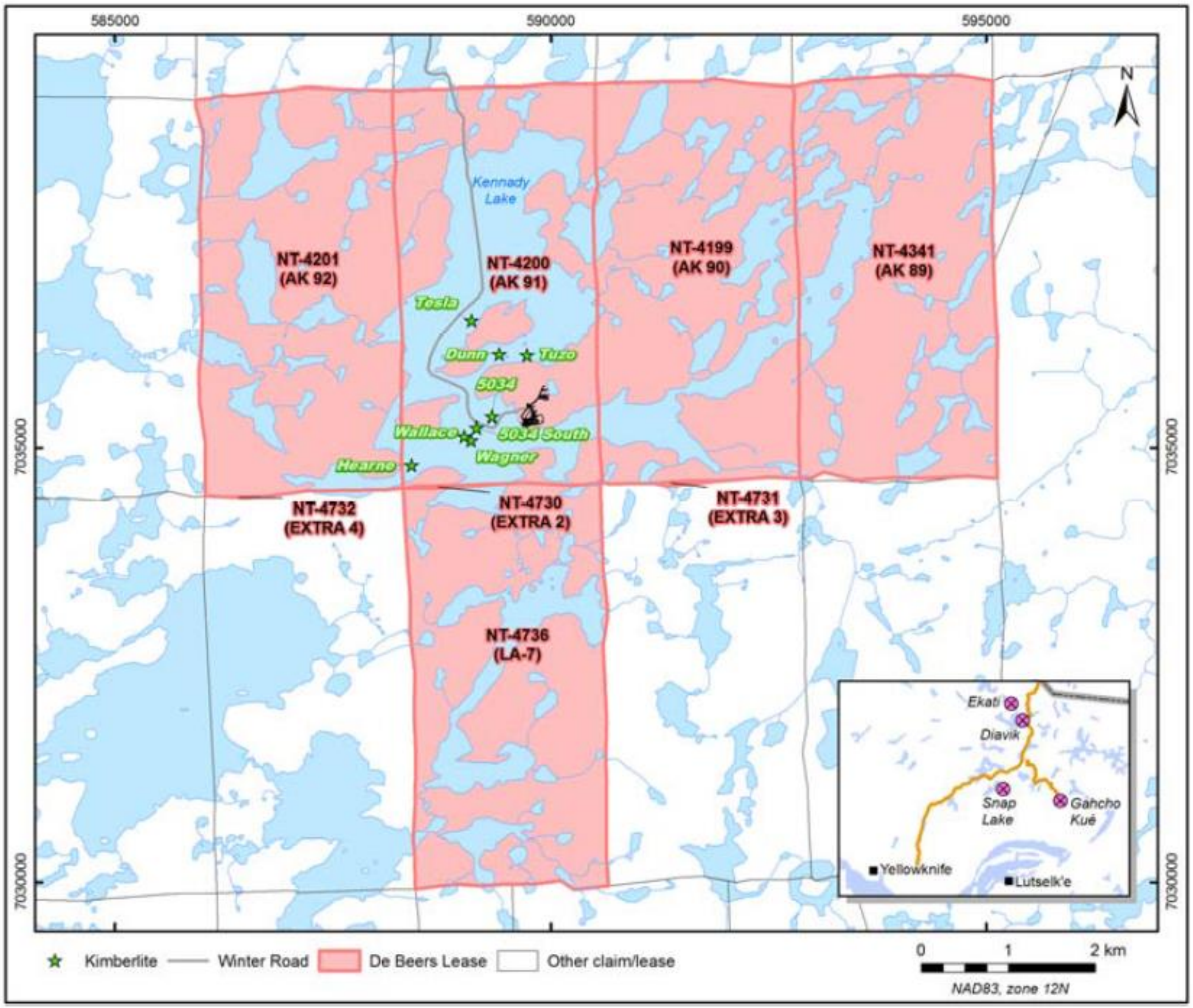
Table 4-1: Mineral Tenure Summary

License/Permit Type & Number	Expiry Date	Ownership
Lease No. 4199 (F28440)	July 15, 2023	De Beers Canada Inc (51%), Mountain Province Diamonds (49%)
Lease No. 4200 (F28441)	July 15, 2023	
Lease No. 4201 (F28442)	July 15, 2023	
Lease No. 4341 (F28439)	July 17, 2023	
Lease No. 4730 (F55365)	April 1, 2026	
Lease No. 4731 (F55366)	April 1, 2026	
Lease No. 4732 (F55367)	April 1, 2026	
Lease No. 4736 (F51169)	April 1, 2026	

Source: De Beers, 2019

Immediately to the south, and contiguous with the Project mining leases are three smaller claims; mining leases 4732, 4730 and 4731 (Figure 4-2). The leases have a total area of 11.52 acres.

Figure 4-2: Gahcho Kué Mineral Tenure



Note: Mining lease boundaries for 4732, 4730, and 4731 are approximate at this scale.
Source: De Beers, 2019

4.4 Agreements

The Monopros Ltd. Joint Venture Agreement, dated March 6, 1997, was entered into between Monopros Ltd. (Monopros; a wholly-owned Canadian subsidiary of De Beers Consolidated Mines (now known as the De Beers Group), MPD, and Camphor Ventures. The parties amended the Monopros Ltd. Joint Venture Agreement in 2000.

An updated and expanded JV Agreement between De Beers and MPD became effective on January 1, 2002, was signed October 24, 2002. This agreement provides that De Beers could earn up to a 55% interest in the Project by funding and completing a positive definitive feasibility study. The agreement also provides that De Beers could earn up to a 60% interest in the Project by funding development and construction of a commercial-scale mine.

MPD acquired Camphor Ventures' interest in the joint venture in 2007.

A further updated and amended JV agreement between De Beers and MPD was executed effective July 3, 2009. The JV agreement superseded the previous JV agreements. The agreement maintains the Project ownership at 51% De Beers and 49% MPD. Each party responsible for funding their respective share of the project development costs from January 1, 2009 onward, and each party shall receive a proportional share of the diamond production.

The amended agreement also sets forth the amount of "allowable" expenses of exploration work between March 8, 2000, and December 31, 2008 previously funded by De Beers, and sets forth a repayment schedule by MPD to De Beers for their 49% share of the allowable expenses. The repayment schedule is triggered by milestone events with the final payment being made on the due date, which is defined as 15 months after the start of commercial production.

On March 16, 2018, De Beers signed a memorandum of understanding with MPD that contemplates incorporating properties owned by Kennady Diamonds Inc. into the Gahcho Kué Joint Venture, in the event that MPD successfully acquires Kennady Diamonds. Kennady was successfully acquired by MPD on April 13, 2018.

4.5 Surface Rights

Crown lands are lands owned by the federal, territorial or provincial governments. Authority for control of these public lands rests with the Crown, hence their name. Crown land and Commissioner's land are both types of public lands. The Federal Government manages and administers Crown land in Canada. In the Northwest Territories, Aboriginal Affairs and Northern Development Canada (AANDC) is responsible for the majority of Crown land. Effective April 1, 2014 the responsibility for public land, water and resource management in the Northwest Territories shifted from AANDC to the Government of the Northwest Territories (GNWT). Public land is managed and administered by the GNWT, and specifically, by the Department of Municipal and Community Affairs (MACA).

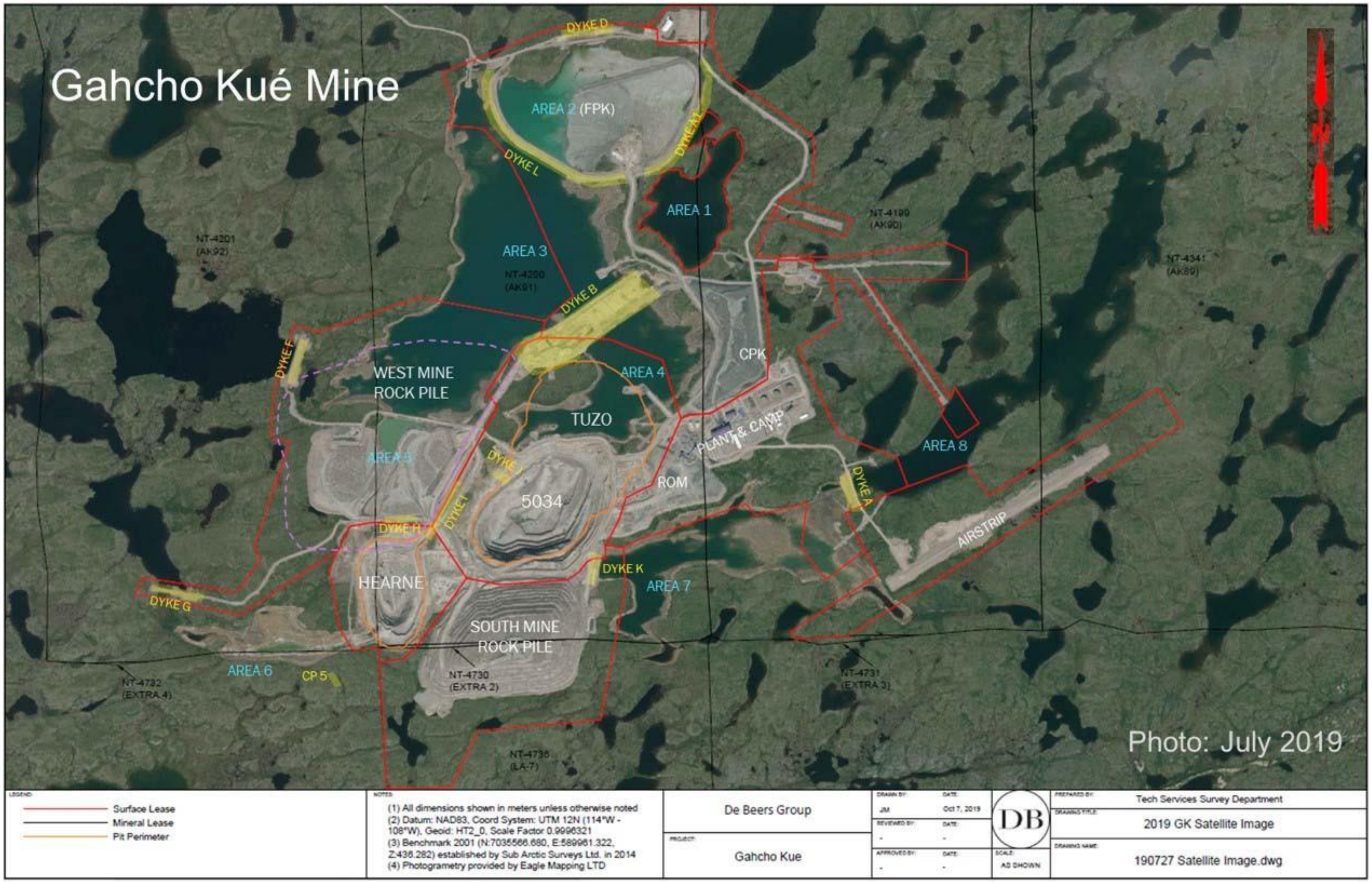
Administration of Crown lands, including minerals for the Northwest Territories and Nunavut, is based on the Territorial Lands Act (TLA) and its regulations. The Regulations under the TLA that deal with mineral tenure, leasing and royalties are the Northwest Territories and Nunavut Mining Regulations (NTNMR), formerly known as the Canada Mining Regulations (CMR). Under the current NTNMR, a party may prospect for minerals and stake mineral claims on any Crown lands covered under the TLA, including lands in and around the area of the Mackenzie Valley.

A surface lease is required under the Territorial Lands Act if a project will require the use of Crown land anywhere in the NWT for longer than two years. A surface lease does not convey ownership to the minerals on or under the leased property. Those minerals require a mineral lease (refer to Section 4.3). The first step to acquire a surface lease is to submit an application for use of Crown land. Activities taking place on Crown land in the Mackenzie Valley require applications that are made to the Mackenzie Valley Land and Water Board. The Mackenzie Valley, as defined in the Mackenzie Valley Resource Management Act, includes all of the Northwest Territories, with the exception of the Inuvialuit Settlement Region and the Wood Buffalo National Park. JDS has confirmed that De Beers has filed applications for the surface leases, however there is no guarantee that surface leases will be issued in a timely manner or will contain terms and conditions that are acceptable to the GKJV partners. The leases applied for are depicted in Figure 4-3.

Surface rights for construction of a diamond mine, including the plant, access roads, airstrip, and accommodations, have not yet been granted.

The Gahcho Kué Mine is currently operated under by authority of land use permits and water licenses. JDS has confirmed that valid licenses are currently in place for Gahcho Kué Mine. JDS has verified that a Class A Land Use Permit (permit number MV2005L2-0015, expiry date August 10, 2021) and a Type A Water License (permit number MV2005L2-0015, expiry date September 30, 2028) are current valid and in place. A detailed list of permits, licenses and authorizations for the GK Mine is provided in **Error! Reference source not found.**.

Figure 4-3: Land Use Lease Map



Source: De Beers, 2019

4.6 Water Rights

The water license for the Gahcho Kué Diamond Mine (Type "A" Water License (MV2005L2-0015)) sets out several conditions with respect to alteration, diversion or otherwise use water for the purpose of mining. The water licence was issued in 2014 has a term of 16 years and will require a renewal on or before September 30, 2028. The Gahcho Kué Diamond Mine is subject to the Authorization for Works or Undertakings Affecting Fish File No SC98001 ("Fisheries Authorization") issued by Fisheries and Oceans Canada (DFO 2014). The Fisheries Authorization outlines reporting requirements and approvals, compensation requirements for the "serious harm" to fish. The finalization of options for fish habitat compensation to account for serious harm to fish associated with the Project has been developed in consultation with regulatory agencies. The current draft Offsetting Plan (formerly "No Net Loss Plan") (Golder Associates Ltd., 2012) for Gahcho Kué includes the development the Redknife Bridge Culvert rehabilitation to allow for the passage of fish to the upstream reaches of the Redknife River. The rehabilitation of the culvert has the ability to provide more fish habitat than is being lost by the Mine.

4.7 Permits

The Gahcho Kué Diamond Mine is in full compliance with all existing permits, authorizations and licenses. **Error! Reference source not found.** provides a summary of the regulatory permits, licenses and authorizations applicable to the Gahcho Kué Mine.

Table 4-2: Major Regulatory Permits, Licenses & Authorizations for the Gahcho Kué Mine

Permits, Authorizations and Agreements	Legislation	Agency	Expiry and Tenure
Archaeological Research Permit 2020-002	*NWT Archaeological Research Act*	Prince of Wales Northern Heritage Centre, Department of Education, Culture and Employment, GNWT	• Issued annually as needed for archaeological monitoring of the identified archaeological sites near the winter road and the mine site.
Wildlife Research Permit WL500669	*NWT Wildlife Act*	Department of Environment and Natural Resources, GNWT	• Expiry December 31, 2021 • Permit will be needed for each phase of mine life for a wildlife monitoring plan. • Permits are issued every three years.
Scientific Research Licence 16682	*NWT Research Act*	Aurora Research Institute	• Expiry December 31, 2020 • As needed for Socio-economic and Traditional Knowledge field work and investigations, and aquatic and wildlife effects monitoring plans. • Licences are issued annually.

Permits, Authorizations and Agreements	Legislation	Agency	Expiry and Tenure
Surface Leases: 75N/6-2- 2, 75N/6-3-2, 75N/6-5-2, 75N/6-7-2, 75N/6-8-2	*Territorial Lands Act* and Regulations	GNWT, Lands Department	• Expiry August 31, 2035 (in approval process). • Maximum 21 year lease for winter access road then renewal to cover final years.
Mineral Leases: 1. NT-4199, NT-4200, NT-4201 2. NT-4341	*Territorial Lands Act* *Northwest Territories and Nunavut Mining Regulations*	Mineral and Petroleum Resources Directorate, Aboriginal Affairs and Northern Development Canada	• Expiry: 1. July 15, 2023 2. July 17, 2023 • Initially issued from AANDC for 21 years; renewable for a further 21 years.
Type A Water Licence MV2005L2-0015	*Mackenzie Valley Resource Management Act* *Northwest Territories Waters Act* *Northwest Territories Waters Regulations*	Mackenzie Valley Land and Water Board	• Expiry September 30, 2028. • Renewable for additional years to cover remaining phases of mine life (Licence tenure in renewals may be variable as dictated by the MVLWB).
Class A Land Use Permit MV2005C0032 (Mining and Milling Activities)	*Mackenzie Valley Resource Management Act* *Mackenzie Valley Land Use Regulations*	Mackenzie Valley Land and Water Board	• Expiry August 10, 2021. • Permits generally issued for five years, with a 2-year extension.
Class A Land Use Permit MV2018C001 (Exploration Activities)	*Mackenzie Valley Resource Management Act* *Mackenzie Valley Land Use Regulations*	*Mackenzie Valley Resource Management Act* *Mackenzie Valley Land Use Regulations*	• Expiry August 10, 2023. • Permits generally issued for five years, possibility for a 2-year extension.
Fisheries Authorization no. 03-HCAA-CA6- 00057.1 for the destruction of habitat associated with the following activities: 1. Dewatering of Kennady Lake and Lake D1 2. Construction of dykes	*Fisheries Act*	Fisheries and Oceans Canada, Fish Habitat Management	• Completion of habitat destruction and compensation by December 31, 2020. • Further authorization needed at each stage of renewal of Water Licence or Land Use Permit, if fish habitat is harmfully altered, disrupted, destroyed.
Licence to Fish for Scientific Purposes S-19-20-3012-YK	*Fisheries Act* *NWT Fisheries Regulations*	Fisheries and Oceans Canada, Fish Habitat Management	• Renewed annually. • Granted for annual fish monitoring programs.

Permits, Authorizations and Agreements	Legislation	Agency	Expiry and Tenure
Approval for Constructing Works in Navigable Water 14-1087	*Navigable Waters Protection Act*	Transport Canada, Canadian Coast Guard	• Project completed through dyke construction in 2015.
Approval of Waste Dump, Dam, or Impoundment Plan	*Mine Health and Safety Act (Territorial)*	GNWT, Chief Inspector, Workers Compensation Board.	• Granted, no expiry indicated.
Hazardous Waste Generation, Transport and Storage Permit NTG537	*Canadian Environmental Protection Act*	Department of Environment and Natural Resources Canada	• Granted, no expiry indicated.
Hazardous Waste Storage Permit NTR138	*Canadian Environmental Protection Act*	Department of Environment and Natural Resources Canada	• Granted, no expiry indicated.
Explosive Storage, Explosives Handling, Magazine Permits 2015-0105-0106-0107 Permit to Store Detonators 2015-0104	*Mine Health and Safety Regulations (Territorial)*	GNWT, Chief Inspector, Workers Compensation Board.	• Expiry December 31, 2020. • Long-term authorization needed for all phases of mine until closure is complete.
Registration of Fuel Storage Tanks	*Canadian Environmental Protection Act*	Environment Canada with cooperation from Aboriginal Affairs and Northern Development Canada	• Granted, no expiry indicated.
Ni Hadi Xa Agreement		Tlicho government, North Slave Métis Alliance, NWT Métis Nation, Lutsel K'e Dene First Nation, Deninu Kué First Nation, and Yellowknives Dene First Nation.	• Expire after two year after the end of active closure.

Source: De Beers, 2019

4.8 Environmental Liabilities

The latest closure and reclamation security estimate for the Gahcho Kué Mine was included in the updated water licence (MV2005L2-0015) and land use permit (MV2005C0032) in December 2018 by the MVLWB. The MVLWB is authorized to set the security deposit amount by subsection 35 (1) of the Waters Act and the regulations promulgated under the act. The purpose of the security deposit is to ensure funds are available to complete reclamation of the site, inclusive of the closure and post-closure phases.

The financial security estimate is divided into land and water, where the land securities are held under the land use permit (MV2005C0032) and the water securities are held under the water licence (MV2005L2-0015). The payments are further divided into milestones, being:

- Prior to initiating construction activities;
- One year following the initiation of construction activities;
- Prior to Year 1 of operations;
- Prior to Year 5 of operations;
- Prior to Year 7 of operations; and,
- Prior to Year 12 of operations.

These milestones were selected as they represent time periods where key operational changes occur that affect reclamation. These operational changes are the beginning of mining and milling (Year 1), the end of mining Hearne Pit (Year 5), the end of mining 5034 Pit (Year 7) and the end of operations (Year 12). There is a clear spike in financial security in Year 5 as it marks the end of Hearne pit, as well as the beginning of pre-stripping and mining Tuzo Pit.

As of 2018, the maximum reclamation lability of the Gahcho Kué Mine was C$97.3 M.

5 Accessibility, Climate, Local Resources, & Infrastructure

5.1 Site Access

Primary personnel access to the site is via the all-weather gravel airstrip which is routinely serviced by RJ85 and 737 Jet aircraft from Yellowknife and the southern provinces, including regularly scheduled personnel flights from Calgary International Airport. Additionally, the airstrip is serviced by smaller turbo-prop aircraft from Yellowknife, transporting the Northern based workforce and smaller freight shipments.

A winter road connects Yellowknife to the Snap Lake, Ekati, and Diavik mines during February and March each year and is used to deliver materials and supplies to the mine (Figure 1-1). The road is operated under a Licence of Occupation by the winter road JV Partners that includes Dominion Diamonds, Rio Tinto and De Beers. The road passes within 70 km of the Gahcho Kué site, at Mackay Lake. A 120 km winter road spur has been established from Mackay Lake to the project site and has been open continuously each year since 2013 to support construction and on-going mine operations.

5.2 Climate

The Gahcho Kué Mine lies in an area known as the “barren lands”, on the edge of the continuous permafrost zone. This region is characterized by tundra with occasional knolls, outcrops, and small lake filled depressions. The mine is located 230 km south of the Arctic Circle where the climate is extreme and semi-arid. Temperatures range from -45°C to +25°C over a twelve-month period. Winter normally lasts from November to May and has average temperatures of -20°C. Summer temperatures prevail from early July to mid-September, and average roughly 18°C. Freeze-up and ice break-up occur in November and June, respectively.

The climatic data for the project site over the past seven years is summarized in Table 5-1. The average annual precipitation for Gahcho Kué between 1959 and 2005 is 338 mm, with 50% received as snow. A frequency analysis of total precipitation at Kennady Lake, concluded that the 100-year wet event had an annual precipitation of 553 mm and a 100-year dry event had an annual precipitation of 228 mm (De Beers, 2011). The predominant wind direction is from the east.

Table 5-1: Key Climate Data

Description	Units	2013	2014	2015	2016	2017	2018	2019
Maximum Recorded Temperature	ºC	26	28	25	28	28	27	26
Minimum Recorded Temperature	ºC	-39	-40	-40	-39	-42	-43	-42
Mean Temperature	ºC	-2	-1	-14	-8	-4	-7	-8
Maximum Average Barometric Pressure	kPa	104	105	105	105	105	105	105
Minimum Average Barometric Pressure	kPa	99	99	98	99	99	98	99
Average Barometric Pressure	kPa	102	101	102	102	102	102	102
Maximum Wind Speed	Km/h	71	95	89	85	72	87	76
Average Prevailing Wind Speed	Km/h	15	15	14	12	18	17	17

Description	Units	2013	2014	2015	2016	2017	2018	2019
Prevailing Wind Direction: Winter		E,W	NE	S,SSE	E,ESE	SSW	N,NW	SSW
Prevailing Wind Direction: Summer		NE	NE,S	N,SE	SE,SSE	SSE	E,NW	SSE

(1) Data calculated from 1 hr data at the Gahcho Kué Project weather station.
(2) Summer is defined as May 1 to September 30. Winter is defined as October 1 to April 30.
(3) The Gahcho Kué weather station did not collect w eather data from 2012 to November 2014. The weather data for 2013 and 2014 is from the nearby Bob Camp.
(4) 2019 data reported to Sep 1, 2019
Source: De Beers, 2019

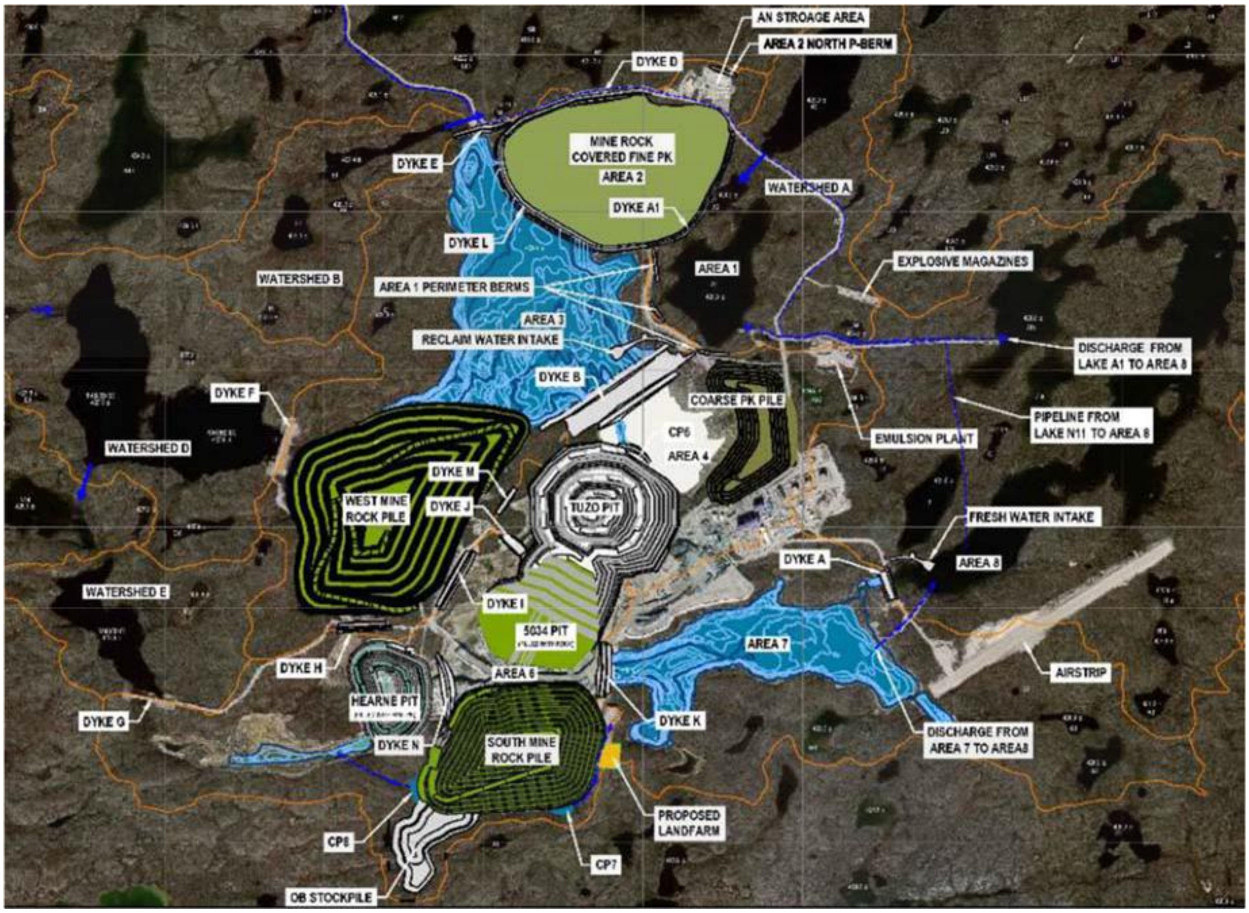
5.3 Local Resources & Infrastructure

The Gahcho Kué site (Figure 5-1) is typical of many northern Canadian mining operations that lack local and regional infrastructure such as permanent road access, navigable shipping routes / ports, and external utilities. Therefore, the Gahcho Kué site requires extensive infrastructure to sustain operations, including power generation, sewage and water treatment, personnel accommodation, storage facilities for materials delivered on the limited annual winter ice road, and an aerodrome to provide year-round cargo, food and passenger aircraft access.

The design approach for the Gahcho Kué site infrastructure incorporates features common to other northern mining developments:

- All weather gravel airstrip;
- Full camp accommodation and administrative complex capable of housing 300+ employees year-round;
- 50+ Million liters of diesel fuel storage capable of storing a full year's operational requirement;
- Standalone diesel fired power station;
- Water and sewage treatment facility;
- Enclosed processing plant and maintenance shop;
- Arctic corridor system connecting accommodations with plant, shop and power stations;
- Warehouses;
- Explosives manufacturing and storage facilities;
- Waste heat recycling systems;
- Heat traced and where applicable, enclosed piping and electrical infrastructure to endure harsh winter climates; and
- Microwave communications tower supplemented by satellite.

Figure 5-1: Gahcho Kué Site Map



Source: De Beers, 2019

5.4 Physiography

The site lies on the edge of the continuous permafrost zone in an area known as the barren lands. The surface is characterised as heath / tundra, with occasional knolls, bedrock outcrops, and localised surface depressions interspersed with lakes. A thin discontinuous cover of organic and mineral soil overlies primarily bedrock, which, occurs typically within a few metres of surface. Some small stands of stunted spruce are found in the area. There are myriad lakes in the area. Kennady Lake, under which the kimberlite pipes lie, is a local headwater lake with a minimal catchment area.

6 History

In the early 1990s, Gahcho Kué, previously known as the Kennady Lake Project, was staked by Mountain Province Diamonds. Canamera Geological Ltd. was contracted to conduct the original exploration, which led to the discovery of the 5034 kimberlite pipe in January 1995. A brief history of the project is presented below.

6.1 Historical Timeline

- 1990s: Exploration by Canamera Geological on behalf of Mountain Province Mining Inc. and partners. 5034 pipe discovered.
- 1997: Letter agreement entered into with Monopros Limited (now De Beers Canada) in terms of which they could earn a 51% interest in the Project. Hearne, Tuzo and Telsa pipes discovered in mid-1997.
- 1998: Mini bulk sampling of 5034, Hearne, Tuzo and Telsa by Monopros. Preliminary scoping study by MRDI (now AMEC Foster Wheeler).
- 1999: Bulk sampling by large diameter drilling of Hearne, Tuzo and Telsa by Monopros.
- 2000: De Beers Canada conducts Desktop Study.
- 2001: Further resource drilling of 5034, Hearne and Tuzo by De Beers Canada.
- 2002: Joint Venture agreement entered into between Mountain Province (44.1%), De Beers Canada (51%) and Camphor Ventures (4.9%).
- 2003: Technical (pre-feasibility) Study commences.
- 2004 / 2005: Further hydrological, geotechnical design and resource drilling. Engineering and environmental baseline studies completed.
- 2005: Completion of the C$25 M Technical Study. Commencement of the C$38.5 M advanced Exploration Program and filing of applications for construction and operating permits.
- 2006: Mountain Province acquires controlling interest in Camphor Ventures. Independent valuation of Gahcho Kué diamonds completed. Tuzo and 5034 North Lobe delineation and geotechnical drilling completed.
- 2007: Mountain Province acquires 100% of Camphor Ventures thereby increasing interest in Gahcho Kué to 49%. Core drilling program completed at Tuzo to upgrade the Tuzo resource. Infill drilling program completed at the 5034 kimberlite. 5034 North Lobe bulk sampling program completed.
- 2008: Tuzo bulk sampling program completed. 25.14 carat gem quality diamond recovered from Tuzo drill program. Updated independent valuation completed; actual price per carat of bulk sample diamonds recovered increases 63% to $135 per carat.
- 2009: Updated mineral resource statement completed. Revised and restated joint venture agreement concluded between Mountain Province and De Beers.

- 2010: Feasibility Study completed. Updated Environmental Impact Statement (EIS) under preparation for filing in December.
- 2011: Environmental impact review process commences. Updated independent diamond valuation completed ($185/carat). Feasibility study approved by GKJV. Decision to build approved by GKJV partners. Tuzo Deep resource drilling commences.
- 2012: Environmental impact review continues. GKJV approves initial C$32 M capital budget for early mobilization. Updated independent valuation completed ($186 per carat). Public hearings under environmental impact review concluded.
- 2013: Environmental impact review public record closes. Supplies to mine site commence on winter road.
- 2013: Mackenzie Valley Environmental Impact Review Board recommends project.
- 2013: October 22nd – Ministerial approval received for the Gahcho Kué Project.
- 2013: November 29th – Pioneer Land Use Permit Issued.
- 2014: Winter Road installed and 634 truckloads of material delivered to site.
- 2014: Revised and Updated Gahcho Kué 2014 Feasibility Study Report completed.
- 2014: Class A Land Use Permit and Type A Water Licence issued for the construction and operation of the mine.
- 2015: Structural steel erection and mechanical assembly commences for major facilities. Airstrip expansion for 737 aircraft complete.
- 2016: March 23rd – First ore exposure 5034 Pit; June 20th – First ore through processing plant.
- 2016: September 20th – Official opening of Gahcho Kué Mine.
- 2017: March 2nd – Gahcho Kué announces commercial production.

6.2 Historical Ownership

- Early 1990s – 2002: Mountain Province Mining Inc. and Partners.
- 2002 – 2007: Mountain Province Diamonds, Inc. (44.1%), De Beers Group of Companies (51%) and Camphor Ventures (4.9%).
- 2007 – Present: Mountain Province Diamonds, Inc. (49%), De Beers Group of Companies (51%)

6.3 Historical Mineral Resource and Reserve Estimations

The previous basis for mineral resource estimate for the property was compiled by AMEC (2009) and Mineral Services (2013).

Re-estimation of grades in two lobes of 5034 and depletion modelling have been conducted by De Beers since production commenced at the 5034 pit in 2016. As well, updates in grade estimates have been a result of the additional drilling to extend the resource to the Southwest Corridor in 2018 and the Northeast Extension and Hearne Corridor in 2019.

JDS has included information from these reports in the Sections 7 through 15 below. In the opinion of JDS, the current mineral resource estimates are adequate to support a technical report on the Gahcho Kué Mine.

6.4 Historical Mining

Prior to quarrying of the 5034 pit commencing in 2013, and subsequent mining in 2015 onward, no previous mining activity had been conducted on the Gahcho Kué property.

7 Geological Setting & Mineralization

7.1 Geological Setting

7.1.1 Regional Geology

The Gahcho Kué kimberlite cluster occurs in the southeast Slave Craton, a small Achaean nucleus within the North American Craton (Figure 7-1), which contains rocks ranging in age from 4.05 Ga to 2.55 Ga (Bleeker et al., 1999). The oldest rocks of the Slave Craton are small remnants of felsic granites and gneisses (2.8 Ga to 3.2 Ga; Beals, 1994), and the Acasta gneisses (3.6 to 4.0 Ga; Bowring et al., 1989) located in the western part of the craton. Several supracrustal series (metasedimentary rocks with less common metavolcanic rocks) crop out in the central and eastern parts of the Slave Craton, forming the Yellowknife Supergroup (circa 2.7 Ga). The Yellowknife Supergroup is intruded by an extensive series of pre- to post-deformational (2.69 to 2.60 Ga) felsic plutons.

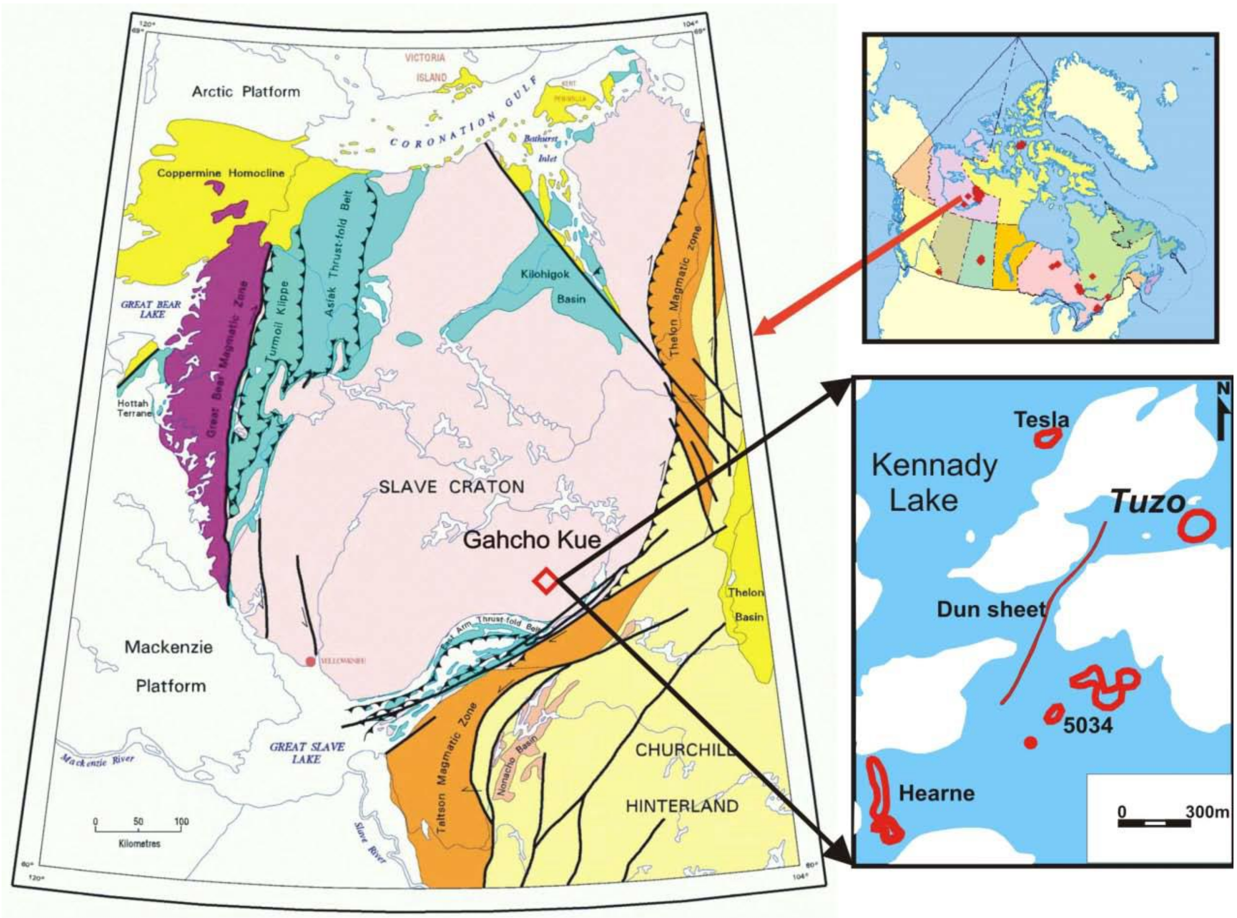
The eastern portions of the Slave Craton are Late Achaean island-arc complexes (magmatic arcs and accretionary prisms) accreted to the margin of an older continental fragment to the west (Griffin et al., 1999).

Several swarms of Early-Mid Proterozoic (2.0-2.3 Ga; see LeCheminant et al., 1995) basaltic dykes occur in the Lac de Gras area, with a suggested source for the Lac de Gras dyke swarm beneath the Kilohigok Basin.

The north–northwest trending Mackenzie dyke swarm (1.27 Ga; LeCheminant and Heaman, 1989) extends over 2,300 km from a focus, interpreted as a plume head (Fahrig, 1987), and located west of Victoria Island.

At the mine site, the dominant lithologies are felsic granites and gneisses that have been subjected to diabase dyke emplacement as described above. The Gahcho Kué kimberlite intrusions are Cambrian age (530-540 Ma), some of the oldest economic kimberlites in Canada.

Figure 7-1: Regional Setting, Gahcho Kué Kimberlite Cluster



Note: Red diamonds on the plan map of Canada represent a number of other kimberlite occurrences in Canada. The inset shows the relationship between the individual kimberlites that comprise the Gahcho Kué cluster; Dun = Dunn in this Report. Source: Caro and Kopylova, 2004

7.1.2 Project Geology

7.1.2.1 Basement

Basement lithologies mapped from limited areas of outcrop in a 16 km^2 area surrounding the Gahcho Kué cluster include granite, granitic gneiss, minor granodiorite, and diorite that have undergone regional amphibolite-facies metamorphism retrograded to greenschist facies (Baker, 1998). The most common rock type, granite, varies from a medium-coarse grained, equigranular facies to highly foliated granitic gneiss.

Two distinct northwest- to north–northwest-trending, linear, magnetic highs in the eastern quadrant are interpreted to be part of the regional Mackenzie diabase dyke swarm. Two east–northeast-trending diabase dykes were identified from linear aerial photo-features occurring south of Kennady Lake and proximal to the Tesla kimberlite. These dykes can be traced in outcrop but do not have strong magnetic expression.

They are considered to belong to the Mallay dyke swarm by Baker (1998) and to predate the interpreted Mackenzie dykes.

7.1.2.2 Quaternary

The Gahcho Kué area was glaciated repeatedly during the Pleistocene epoch, most recently by the Laurentian ice sheet. The Laurentian ice sheet began to recede 18,000 years ago, and the ice front retreated past the Gahcho Kué area between 9,000 and 9,500 years ago (Dyke and Prest, 1987). However, there is no stratigraphic evidence that represents deposits from previous glaciations; the Quaternary geology of the Gahcho Kué area appears to be related only to the last glacial event, the Wisconsinian glaciation (Hardy, 1997). Glacial-related sedimentation is quite thin, with only scarce patches of till blanket and large glaciofluvial outwash fans (Hardy, 1997).

Till veneer, till blanket, and outwash sediments characterize the Quaternary deposits in the Gahcho Kué area. The areas of till blanket contain abundant mud boils and no bedrock exposure. Areas of level sands and reworked till are classified as outwash sediments. Till veneer and till blanket cover most of the area except for small areas to the east of the campsite; outwash sediments occur west of Kennady Lake. Outwash sediments and a large esker that extends along a portion of the southern edge of the mapped area dominate the area south of Kennady Lake.

The stratigraphic record overlying the till is younger than the last glaciation and is composed mainly of pro-glacial sediments (glaciofluvial and glaciolacustrine deposits). As the Gahcho Kué area occurs over a relatively flat terrain, many swamps, ponds and peat deposits are present (Hardy, 1997).

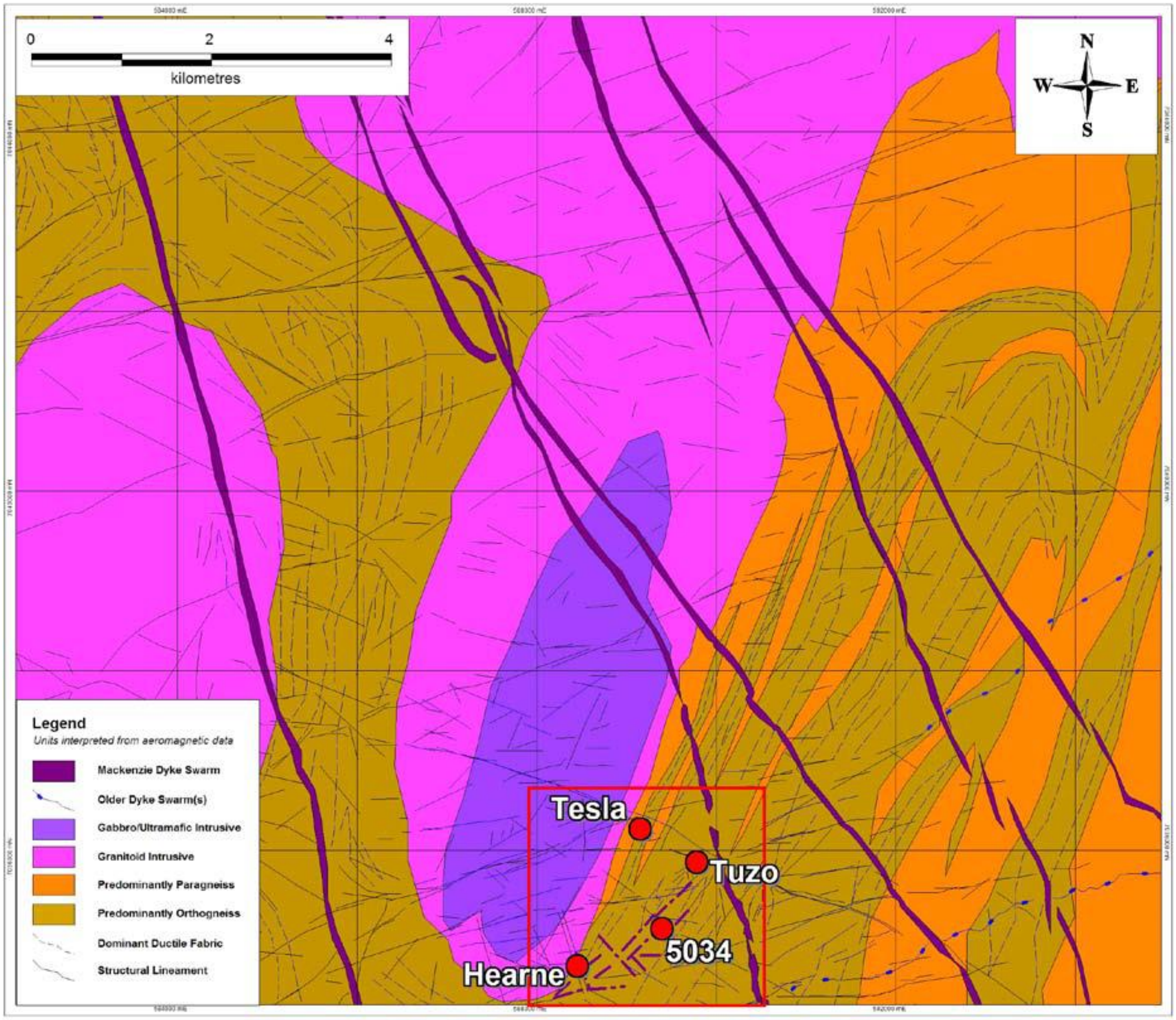
7.1.2.3 Structural Setting

Granite–gneiss terrane intruded by a series of dykes (Figure 7-2) characterizes the Gahcho Kué area. There are several granitic intrusions surrounded predominantly by gneisses; the gneisses display a clear structural pattern of being metamorphosed by the granitic intrusions. Along the eastern edge of the area, a marked geological boundary is interpreted to represent contact with meta-sediments that extend eastwards. The central portion is a structurally complex zone of folding and possible shears.

There are several groups of demagnetised lineaments with weak, negative magnetic expression; these demagnetised lineaments could be dykes or demagnetised country rock resulting from dyke intrusion or faulting. They are grouped as:

- a regular, pervasive northeast-trending set;
- a regular, pervasive northwest-trending set; or
- an east–west-trending set in the south of the area.

Figure 7-2: Litho-structural Interpretation of the Gahcho Kué Area



Note: Major first order structures trend northeast–southwest, and are parallel to the circa 2.0 Ga to 1.8 Ga Great Slave Shear Zone; second order (often younger) structures trend primarily northwest–southeast.
Source: SRK, 2004

The 5034, Hearne, Tuzo, and Tesla kimberlites all occur at the eastern edge of an interpreted south-closing fold-nose that has developed a radial fold-nose cleavage. The apparent south-closing fold is interpreted to open to the north–northeast; the dip direction is not known. The core of the fold is composed of granite and minor granodiorite. Northeast-trending axial-planar foliation associated with the fold is developed in gneiss.

7.1.2.4 Country Rocks

The country rock contacts along the margins of the pipes are generally variable and can be grouped broadly into five main types:

- sharp contact zones;
- brecciated contact zones;
- chemically-altered contact zones;
- chemically-altered and disaggregated contact zones; and
- thermally metamorphosed contact zones.

Sharp Contact Zones

Present between kimberlite and country rock, these are characterised by minimal broken zones or altered country rock surrounding the kimberlite. Sharp contacts are associated with all textural varieties of kimberlite present within the pipes.

Brecciated Contact Zones

Brecciated contact zones are characterised by fractured country rocks that do not contain any kimberlitic component. The country rock fragments range between 0.5 mm to 15 cm. The brecciated zones can be subdivided into two main groups: massive brecciated zones (MBZ) and pulverised brecciated zones (PBZ).

MBZ consists of coarser fragments typically greater than 2 cm in diameter. MBZ are often associated with pre-existing joints with fragments in these zones typically loose and not cemented. The distribution and extent of these broken zones is highly variable and generally increases in intensity as the pipe contact is approached. However, at a distance from the pipe contact, there are contacts without brecciated zones directly adjacent to contacts with brecciated zones. This apparent haphazard distribution of the brecciated zones may be related to the interconnectedness of the country rock joints. The angular country rock fragments can often be fitted back together, with no evidence of rounding by movement.

PBZ consists of a mixture of larger particles 2 cm to 15 cm in diameter with a matrix composed of finely pulverised country rock < 2 mm in diameter. These breccias are typically cemented. The PBZ can be either clast or matrix supported, and there is often evidence of particle rounding. The proportion of fine pulverised material present within these zones is highly variable. Often the larger fragments contain smooth edges and show slight alteration or bleaching along the margins. The PBZ zones are not as common as the MBZ. These breccia zones are interpreted to represent pre-conditioning processes of the country rock in the early emplacement of the kimberlite. Once the kimberlite has breached the surface, it is thought that the subsequent explosion and violent degassing of the magma column likely incorporated the weak brecciated zones into the pipe. Large xenoliths of this material are present within the Tuzo Pipe.

Chemically-Altered Contact Zones

These are characterised by typically minor (< 5 cm) zones of alteration along joint surfaces without significant disaggregation. The intensity of this alteration is variable; however, this decreases in intensity with increasing distance from the pipe contact. Chemically altered contact zones are most often developed in contacts of country rock with hypabyssal kimberlite. These zones can also contain brecciated country rock. The altered zones typically are pale yellow in contrast to the pink granitoids, and may be porous due to the chemical removal of quartz.

Chemically-altered & Disaggregated Contact Zones

These zones are considerably weaker and more extensive than the chemically altered contact zones. They are characterised by extensive chemical alteration that, in extreme cases, can result in extensive disaggregation of the country rock. These zones are also characterised by minor brecciation, but without evidence of transport or cementation. This type of contact zone is most extensively developed in areas around hypabyssal kimberlite and, in particular, within the granite cap over the 5034 North lobe. The most extensive zones are present over the thicker intersections of kimberlite. The altered zones consist of a brittle core that appears bleached (particularly along joints). Feldspars are typically orange in appearance and in thin section appear sericitised. Chlorite and dolomite can be present along joint surfaces.

Thermally Metamorphosed Contact Zones

These zones are only associated with hot contacts related to HK, and are typically less than 50 cm wide. Weakest adjacent to the kimberlite, the country rock displays less reaction to the intruding kimberlite with increasing distance from the contact. The country rock within these zones is often grey or white in colour in contrast to the typically pink granitoids, and can contain significant green serpentine as well as carbonate veins.

7.1.2.5 Country Rock Xenoliths

Country rock xenoliths within the Gahcho Kué kimberlite pipes are dominated by granitoid xenoliths with lesser diabase, gneiss, and rare volcanic rocks. No sedimentary-rock xenoliths are present. Xenolith contents of the kimberlites are variable, particularly in the TK units. For logging purposes, the following terms are used to describe the kimberlite texture.

- K = kimberlite:
  - B = breccia; and
  - m = micro- breccia.

The following terms are used in indicated xenolith abundance:

- K: < 15% (not a breccia);
- KB: 15% to 50% (breccia);
- KBB: 50% to 75% (breccia);
- KBBB: >75% (breccia); and
- KmB: >15% xenoliths 5 mm to 10 mm (microbreccia).

7.1.2.6 Gahcho Kué Kimberlites

The Gahcho Kué kimberlite cluster occurs in the southeast Slave Craton, a small Archaean nucleus within the North American Craton ranging in age from 4.05 Ga to 2.55 Ga. The most common rock type, granite, varies from equigranular medium-coarse grained granite to highly foliated granitic gneiss. Granitic pegmatite dykes intrude all of the identified country rock types.

The main Gahcho Kué kimberlite cluster comprises four kimberlite bodies: Hearne, 5034, Tuzo, and Tesla. Hearne, most of the 5034 Pipe, and the Tuzo and Tesla occur under Kennady Lake (refer to Figure 7-3), which has an average depth of 8 m. The Tesla kimberlite body is not part of the current declared resources or reserves. The 5034 kimberlite was Rb–Sr isotopically dated (phlogopite) as Middle Cambrian (542.2±2.6 Ma: Hetman et al. 2003). Ages for the Tuzo, Tesla and Hearne kimberlites, based on Ar40–Ar39 dating on phlogopite, are 542±6, 531±6 and 534±11 Ma, respectively.

Gahcho Kué kimberlites are overlain by varying thickness of glacial boulder outwash and lake sediments (averaging 10 m thick), and have a combined water and sediment cover as much as 25 m thick.

Drill information suggests that Tuzo and 5034 are located on an inclined feeder dyke system, the GK dyke, which dips roughly 25 degrees NNE. A vertical feeder dyke, as it is common for most maar-diatreme volcanoes, was not identified. Hearne is located on another feeder dyke system which dips to the North. The feeder dyke systems were repeatedly active during emplacement, resulting in a complex facies architecture of the kimberlite bodies rising from the feeder dykes.

The kimberlite bodies are steep-sided comprising of several texturally distinct phases of kimberlite in which the textures vary from hypabyssal kimberlite (HK) to diatreme facies tuffisitic kimberlite (TK). TK displays many diagnostic features including abundant unaltered country rock xenoliths, pelletal lapilli, serpentinized olivine and a matrix composed of microlitic phlogopite and serpentine without carbonate. HK contains common fresh olivine set in a groundmass composed of monticellite, phlogopite, perovskite, serpentine and carbonate. A number of texturally hybrid kimberlite rocks display a textural gradation from TK to HK, which is characterized by a decrease in the proportion of pelletal lapilli and country rock xenoliths and an increase in groundmass crystallinity, proportion of fresh olivine and the degree of xenolith digestion (Hetman et al., 2004).

Texturally there are four main kimberlite types recognised:

Tuffisitic Kimberlite (TK)

Tuffisitic kimberlite (TK) is olive green to light brown in colour. These rocks are relatively soft and can swell on contact with water due to the presence of hygroscopic clay minerals. The TK rocks are characterized by clast to matrix-supported volcaniclastic textures with variable country rock dilution.

Transitional Tuffisitic Kimberlite (TKt)

Rocks classified as transitional tuffisitic kimberlite (TKt) are broadly similar to TK but are more competent and darker in colour. The TKt rocks have a uniform olivine distribution but the breccia matrix displays inhomogeneous textures dominated by volcaniclastic textures.

Transitional Hypabyssal Kimberlite (HKt)

Rocks classified as transitional hypabyssal kimberlite (HKt) are broadly similar to HK rocks but are characterized by inhomogeneous textures dominated by a magmatic groundmass with less common patches of volcaniclastic-looking kimberlite. These rocks are dark in colour and competent.

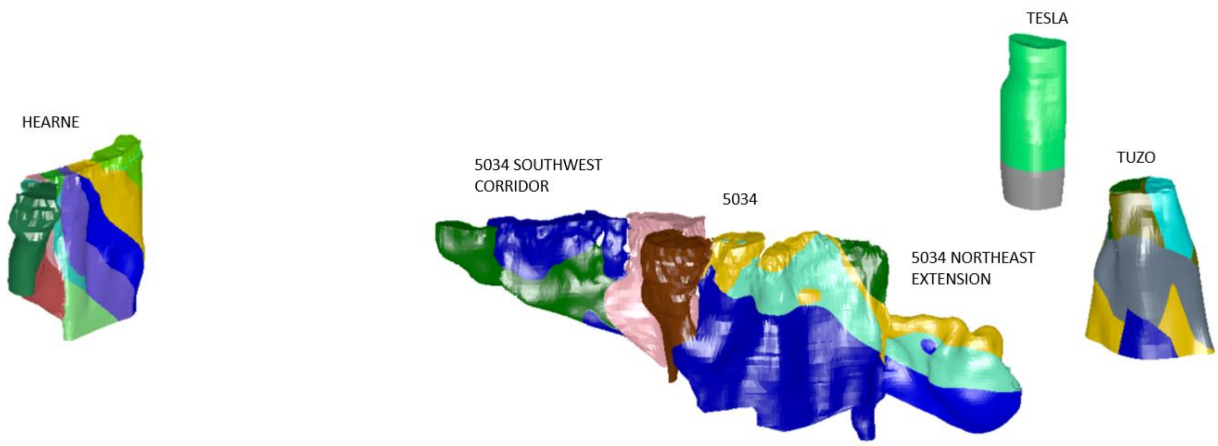
Hypabyssal Kimberlite (HK)

Hypabyssal kimberlite (HK) is mainly fresh, competent, black to dark green, and characterized by uniform macrocrystic textures. The rocks are composed of two generations of olivine consisting of anhedral, medium- grained, often fresh, olivine macrocrysts, and smaller subhedral to euhedral olivine microcrysts. The well-crystallised groundmass consists of monticellite, phlogopite, spinel, primary carbonate, serpentine, and perovskite. Mantle xenocrysts, in addition to olivine macrocrysts, include rare garnet and clinopyroxene.

7.1.2.7 Hearne Kimberlite

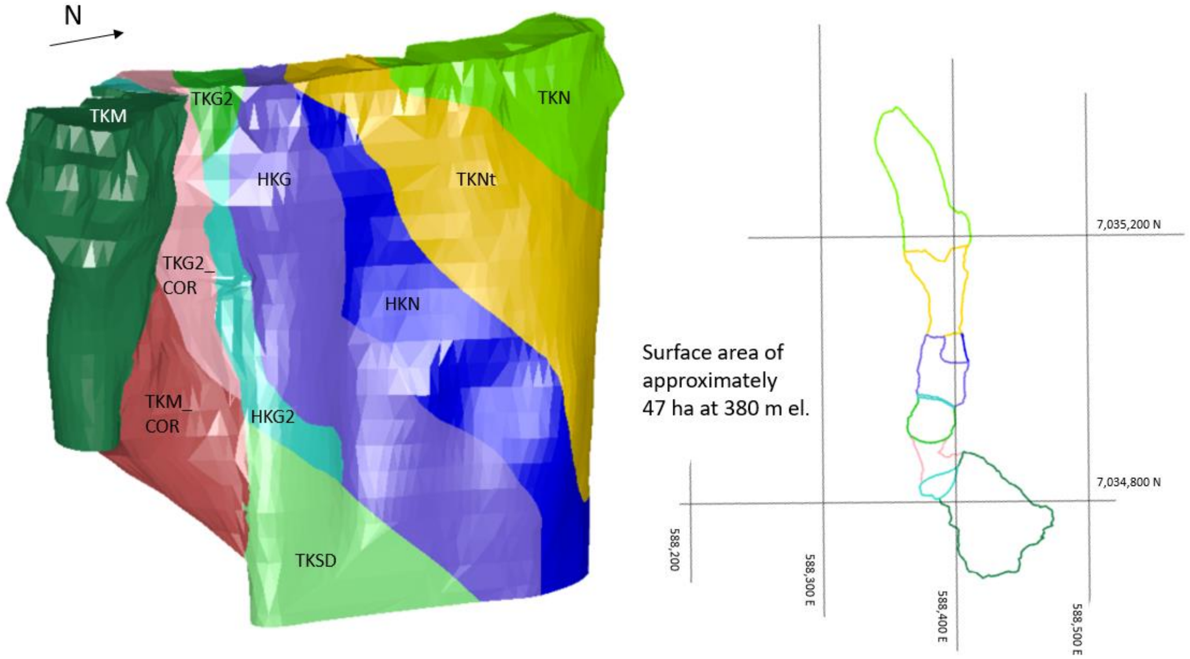
Scott Smith (2005) modelled two bodies to comprise the Hearne kimberlite, Hearne South and Hearne North (Figure 7-4). Further analysis and additional drilling in 2018 has shown that these bodies connect as lobes of a single kimberlite body (Fulop & Pell, 2019). The Hearne kimberlite has smooth, steep-sided walls, and covers an area of about 1.5 ha. At surface, Hearne measures a maximum of 380 m x 90 m from north to south with its largest width occurring at the south end in the former south pipe. Average widths are approximately 40 m at surface. The south lobe is dominantly TK, and the north lobe consists of approximately equal amounts of HK and TK. The present pipe geological model for the Hearne South extends to 125 masl. Additional drilling has proven that the body does not extend beyond this depth; Its limited depth is most likely controlled by a steep N-dipping feeder dyke system. The north lobe narrows to less than 10 m width in the centre of the body at approximately 130 m depth below lake-surface. There is also evidence that the north lobe extends below 100 masl.

Figure 7-3: 3D View of Gahcho Kué Kimberlite Bodies Looking Northwest



Source: De Beers, 2019

Figure 7-4: Hearne Kimberlite Geologic Shape

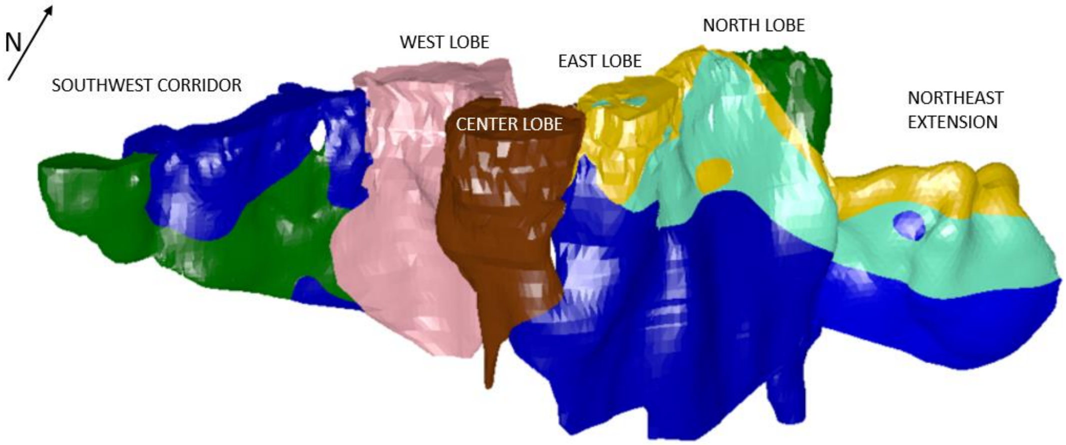


Source: De Beers, 2019

7.1.2.8 5034 Kimberlite

The 5034 kimberlite is a highly irregularly-shaped pipe and dyke complex that is comparable to kimberlite root zones elsewhere and has a surface area of approximately 2.1 ha (see Figure 7-5). The 5034 kimberlite is modelled as a semi-continuous occurrence composed of discrete kimberlite bodies, of which some are modelled as joined at the sub-crop to form one main continuous body. At their base the 5034 kimberlite bodies, or lobes, are fed from the NNE dipping GK feeder dyke (Kurszlaukis et al., 2019).

Figure 7-5: 3D View of 5034 Looking Northwest



Source: De Beers, 2019

The four modelled kimberlite bodies included in the resource are referred to as follows:

- 5034 Southwest Corridor;
- 5034 “Main” West Lobe;
- 5034 “Main” Centre Lobe; and
- 5034 “Main” North-East Lobe (i.e., East Lobe, North Lobe, and North Lobe Extension);

The main part of the 5034 occurrence that reaches the surface occurs under Kennady Lake and can be divided into four lobes: West, Southwest Corridor, Centre and East. These lobes are joined at the surface, but separate at depth. The Centre and East lobes are modelled separately at shallow depth, but rejoin at greater depth producing what appears to be a window of granite within the kimberlite. The East and North lobes are joined at depth, geologically continuous, and are collectively referred to as the Northeast Lobe, now including the Northeast Extension (Kurszlaukis et al., 2019). The surface measurements of the four lobes of the 5034 Main Pipe are approximately as follows:

- West Lobe – 125 m x 45 m;
- Centre Lobe – 125 m x 80 m;
- North-East Lobe – 85 m x 65 m; and
- Southwest Corridor – 330 m x 40 m

Delineation drilling completed in 2017-2018 allowed for the classification and modelling of the Southwest Corridor extending southwest from the West Lobe. The 5034 Southwest Corridor extends as deep as 305 masl where there is information defining the cut-off depth. With this additional information, the former Southwest Corridor and South Pipe have been incorporated into the 5034 Southwest Corridor body. The Southwest Corridor geological model is summarised in Kurszlaukis (2018).

The northern portion of the 5034 North-East lobe, the North Lobe, does not reach present day land surface and occurs under 60 m to 90 m of granite rock cap. Approximately half of this northern lobe lies below the lakebed and half is beneath the main peninsula. The North Lobe measures 240 m in length and varies from approximately 20 to 50 m wide, averaging 30 m. The Northeast Extension also does not reach present day surface and occurs under a depth of 210 m to 230 m of granite cap rock. The Extension measures approximately 220 m in length and varies from 40 m to 120 m in width. This addition to the Northeast body surrounds and replaces the former “North Pipe”, and was identified and classified in recent delineation drilling directed from the north of the 5034 body. A combined internal geology model is developed for the 5034 Northeast Lobes on the basis of petrography, mineralogy, and whole rock chemistry (Kurzlakis, 2018). The model confirmed that there are four major kimberlite types in the North Lobe, three of which extend into the northeast extension.

In general, a systematic arrangement of lithofacies types was recognized in 5034. HK textured kimberlites are typically located in deeper levels of the pipe, followed by transitional textured kimberlites (HKt and TKt) until fragmental textured kimberlites (TK) dominate in the uppermost portions of the kimberlite body. TK and TKt textured kimberlite are present in the West and Northeast Lobes, as well as in Northeast Extension. The Centre Lobe is dominated by HK.

Four main textural kimberlite units are identified in the 5034 North Lobe: TK, TKt, HKt, and HK (Kryvoshlyk, 2006). The spatial distribution of those rock varieties creates an antiformal structure located approximately in the geographical centre of the lobe. The most important rock types in the North Lobe are HK and HKt, which are present in the deeper levels of the lobe. Center Lobe is comprised of HK and comprises the saddle of the antiform. TK and TKt rock types are mainly present in the shallow levels of the flanks in the North and South of the antiform and are overlying the HK units. This facies arrangement is consistent at the greater depth of the Northeast Extension. A selected suite of kimberlite rocks from the East and North Lobe was examined, and the samples were concluded to show well developed petrological similarities suggesting a close genetic relationship of the two lobes (Kryvoshlyk, 2007).

Kryvoshlyk (2008) showed that the Northeast Lobe and likely West Lobe have an overall layered internal structure, comprising gradual kimberlite textural changes from coherent HK at depth to fragmental TK at shallower levels. Transitional rocks in between these end members of coherent or fragmental rocks are either called HKt or TKt, depending on their dominant textural association. In contrast to the layered structure of most lobes, the Centre Lobe is composed exclusively of HK, which could not be subdivided with available petrological or geochemical data despite the variable diamond counts in this lobe. The HK found in all four lobes is geochemically and petrologically similar, suggesting a close genetic relationship between all four lobes.

Kryvoshlyk (2008) concluded that the quality of the geological model is strongly dependent on the data density (drill core and reference samples) and on sample collection protocols. The highest data density is present in the Northeast Lobe, which results in a relatively high-confidence model. The West and Centre Lobes have a lower data density (both with respect to drill density and number of reference samples) and rather poor sample control (difficulties connecting micro-diamond and heavy mineral samples with geology). It is therefore not possible to produce a high-confidence geological model for West Lobe or to explain the diamond data variability in Centre Lobe without additional data. The Centre Lobe is composed almost entirely of HK, and minor HKt. With the dataset available in 2008, the HK rock types cannot be separated in 3D space; thus, Kryvoshlyk (2008) recommended that they be modelled as one unit. The West Lobe is, to some extent, similar to the Northeast Lobe in that the sequence HK–HKt–TKt is present, and these rocks are petrologically similar. The West Lobe is divided into three petrological units, a Main Lower HK unit, a Main Upper HKt unit, and a Secondary Upper TKt unit; however, significant uncertainty is associated with the contacts between those units, and the resource model considers the pipe to be undifferentiated kimberlite.

7.1.2.9 Tuzo Kimberlite

Seghedi and Maicher (2007) presented new petrographical, geochemical and micro-diamond data for Tuzo (0-300 mbgl – Tuzo Indicated) with the purpose of developing a 3D internal geological model. The 2007 study refined the previous internal geology model (Hetman et al., 2004) and reassessed the diamond distribution model. The overall surface area of the Tuzo body is roughly 1.2 ha, which is covered by as much as 25 m of water of and glacial overburden. The kimberlite body comprises various fragmental and coherent kimberlites, and it contains abundant inclusions of the surrounding granitic country rock. The 2007 drill program results improved the definition of the shape of the kimberlite body, which is unusual as it widens towards depth from 125 m in diameter near the surface to roughly 225 m diameter at 300 m depth (Figure 7-6).

Seghedi and Maicher (2007) reported that the internal geology of Tuzo is very complex. Abundant country rock xenoliths, ranging from a few mm in diameter up to blocks of several tens of meters in size, are hosted within the body. The highest degree of dilution is concentrated along a belt-like zone at about 120 to 200 m depth and under the roof of the widening body. The distribution of lithologies follows, very generally, a trend from top to bottom: TK, TK-TKt, and TKt as well as HKt+TKt, HKt, and HK. On a more detailed scale, however, the different lithologies occur as several metre to tens of metre thick intercalated sections, and HK as well as HKt are found at all levels within the kimberlite, although they are more abundant at depth. Contacts in between the kimberlite rock types are mostly gradual. The lithological units show limited horizontal extent. Instead, they appear steeply to sub-vertically oriented, which gives the Gemcom® internal geology model a rugged shape. Volcanological evidence for mixing and mingling processes combined with the general facies architecture strongly suggest the occurrence of multiple eruptive events that modified the pipe infill extensively.

Seghedi and Maicher (2007) stated that the geochemical signature of the lithologies is strongly influenced by the variable but generally high degree of country-rock contamination. Fragmental kimberlite units are geochemically and petrologically very similar, suggesting a close genetic relationship. However, the coherent kimberlite types HK and HKt are slightly discordant to the geochemical trend defined by the fragmental kimberlites.

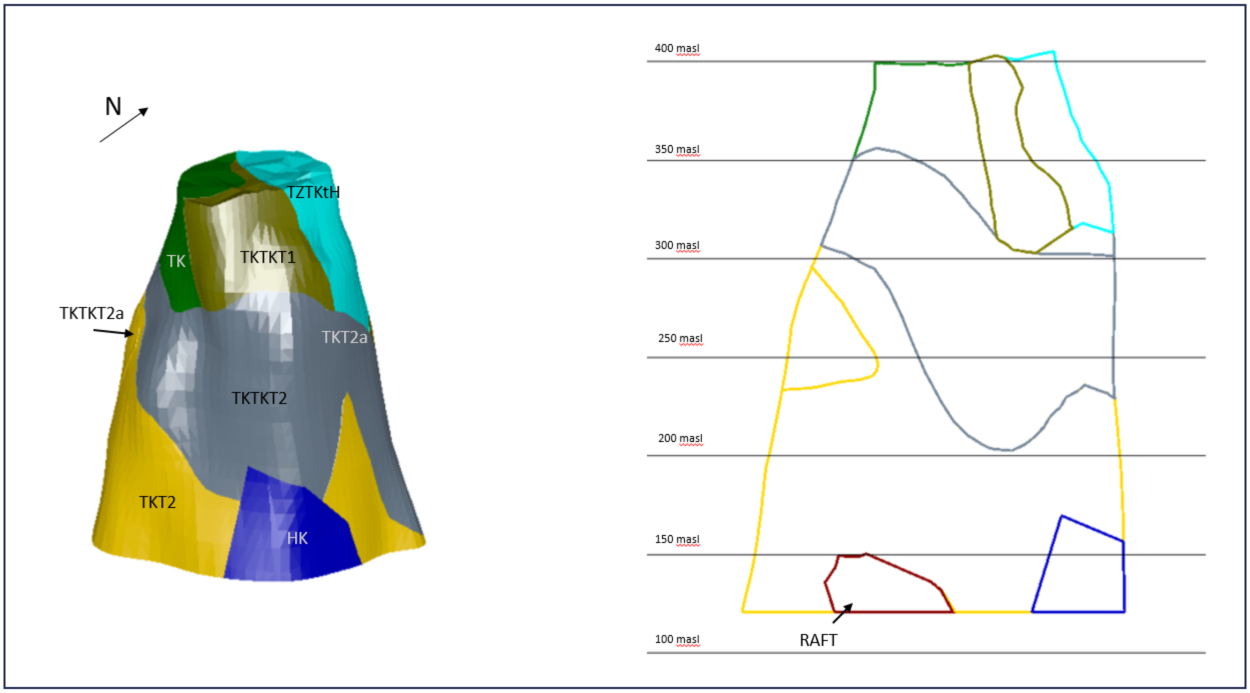
In its shallow levels the pipe contains a zone that is characterized by a higher diamond grade and lower dilution compared to the surrounding fragmental rock units. This high grade zone (TK-TKtH) was originally identified in 1998 from large diameter drilling (LDD) data due to a zone of higher macro-diamond grade (Williamson and Hetman, 1998).

The deep section of the Tuzo pipe extends from 300 to 564 mbgl (Tuzo Deep). The 2011-2012 drill program improved the definition of the pipe shape at depth, which slightly constricts towards depth. For Tuzo Deep the TKt is the most voluminous unit, followed by the HK and lastly the country rock breccias with a kimberlite matrix (CRX bx w/K). The TKt forms a vertical column in the eastern portion of Tuzo Deep, which expands into a massive section midway up the pipe, slightly constricting as it reaches the surface. The TKt model code captures a wide range of dilution from 5 – 74 modal percent. The HK occurs mainly in the deep and marginal parts of the pipe and is interpreted as an intrusion that slightly postdates the main fragmentation phase of the kimberlite magma that produces the TK's. The country rock breccia with kimberlite matrix is observed along the western to south-western portions of the pipe. The geochemical signature of the lithologies is strongly influenced by the variable country rock contamination (Mann, 2013).

Groundmass spinel chemistry suggests that the majority of the TKt, HKt and HK units are of the same magma batch suggestive of a voluminous, rapid emplacement. The Tuzo pipe formation begins with the emplacement of a fragmental kimberlite (initially a TK) which is soon after intruded by a coherent magma, the HK. These texturally different kimberlites are still of the same magma batch, only the fragmentation behaviour of the magma changed during emplacement likely due to external factors, such as the interaction of the first intruding kimberlite with ground water leading to magma fragmentation. The depletion of ground water supply leads to non-fragmental emplacement of kimberlite into earlier fragmented tephra. The intrusive kimberlite forms a massive pillar along the eastern margin of Tuzo Deep and has a complex interface with the hosting fragmental kimberlite tephra. Close to the kimberlite intrusion the interface is defined by an abundance of irregular dykes and veinlets, as well as spalling and agglutination of magma droplets, which intrude and inject the hosting tephra to form a complex peperite network of coherent and fragmental textured rocks. In addition, the intrusion of low viscosity kimberlite melt into the porous tephra framework in wide areas enhances the generation of coherent-looking rocks at this interface. The resulting rock type is a transitional hypabyssal kimberlite that has a mostly coherent appearance with local patches of the original fragmental nature of the host rock. Further away from the intrusive coherent kimberlite, the influence of the intruding HK becomes less apparent and the original fragmental texture of the host tephra prevails – a TKt is generated. The granite country rock breccia with kimberlite matrix is interpreted as a contact breccia eroded from the weakened kimberlite wall during emplacement (Mann, 2013).

The investigation suggests 1) that the TKt unit identified in Tuzo Indicated is the same TKt unit identified in Tuzo Deep and 2) the HKt and HK units observed in Tuzo Deep are from the same magma batch as the TKt. The geology is complex and integration of core logging, petrology, whole rock chemistry and groundmass spinel chemistry was important in developing a 3D model (Mann, 2013).

Figure 7-6: Tuzo Kimberlite Geologic Shape



Source: De Beers, 2019

7.1.2.10 Satellite Kimberlite Bodies within the GK Property

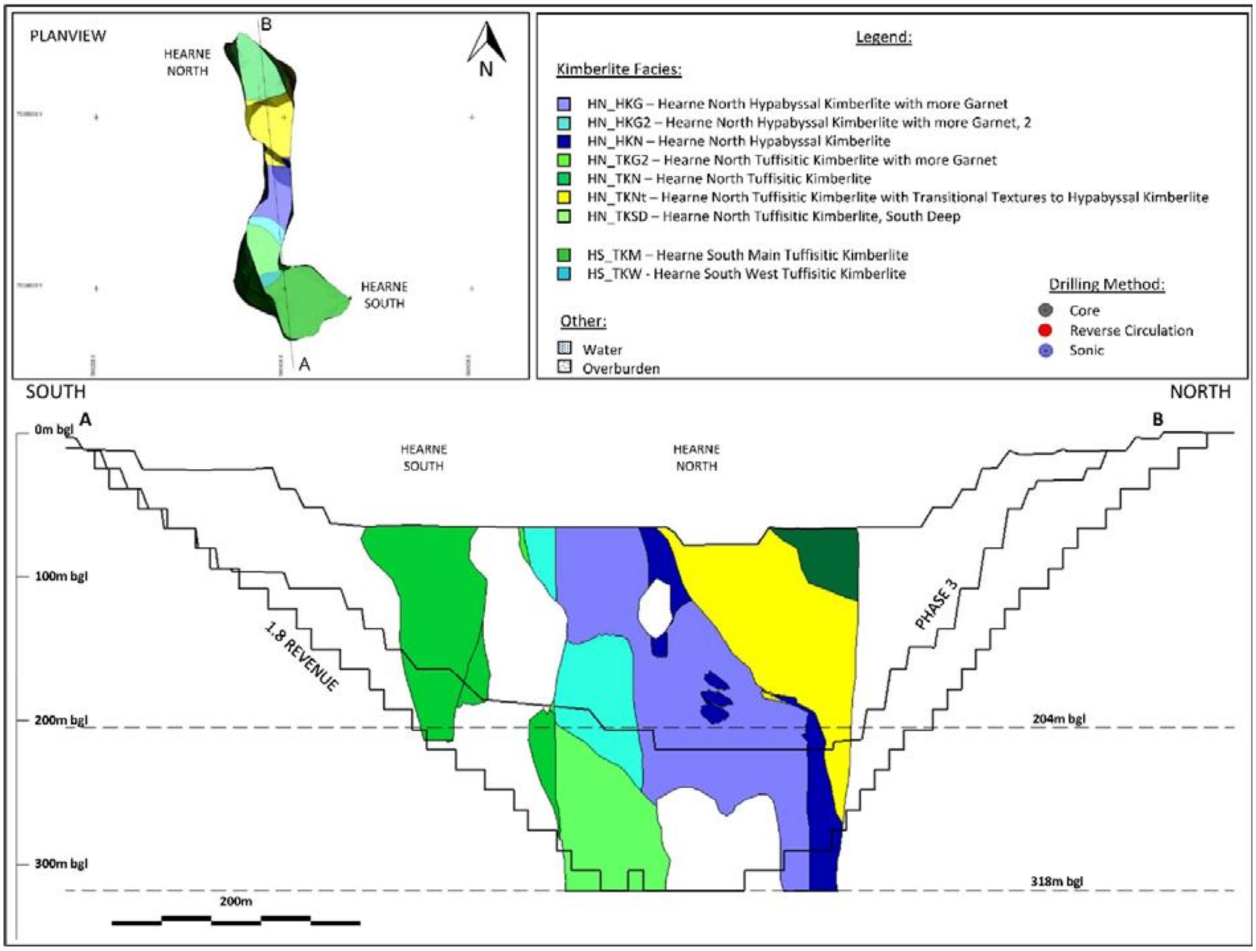
Several small kimberlite occurrences were intersected during exploration drilling programs following up geophysical and diamond indicator anomalies. These bodies include Tesla, Curie, Wilson and Wallace occurrences as well as the Dunn Sheet, and GK dyke that comprise part of the Gahcho Kué kimberlite field; the contemporaneous Faraday and Kelvin kimberlites are located about 8-13 km northeast of the Gahcho Kué kimberlite cluster and are outside the mining lease. None of the satellite kimberlites is currently considered sufficiently economic, but on-lease Resource Exploration Program is underway.

7.2 Mineralization

7.2.1 Hearne Kimberlite

Five different phases of TK were recognised within the Hearne kimberlite (Figure 7-7).

Figure 7-7: Hearne Kimberlite Cross Section



Source: De Beers, 2019

Each TK phase can be geologically distinguished using features such as varying proportions of garnets, magmaclasts, autolith-like bodies, xenoliths, and clay minerals. The names of the different TK units are based primarily on their location within the two pipes. The green–brown, partly altered TK units are easily distinguished from the fresh black HK in both core and reverse circulation drill cuttings. Different phases of kimberlite within the black HK units are very difficult to distinguish from one another. The total HK was sub-divided into three units based primarily on macro-diamond grade with some support from geological differences and spatial positions in the pipe.

7.2.1.1 Hearne North Lobe

A major TK unit in Hearne North is the HNTKN that occupies the upper northern part of the main pipe. This TK contains <15% of granite xenoliths, but does contain autolith-like bodies and magmaclasts. The TK grades with depth into transitional textures resembling HK. The transition zone was termed HNTKNt. This unit was geologically modelled using the upper limit of HK and the lower limit of TK textures logged in both core and reverse circulation holes. Below the transition zone is HK, some of which appears to be of the same phase of kimberlite as the overlying TK and TKt. The internal contact separating the TKN and TKNt is sub-parallel to the contact with the underlying HK. Both internal contacts dip at approximately 50° to the north. The HK immediately underlying the HNTKNt is thought to be part of the same phase and was termed HNHKN. This interpretation is supported by the similarity in macro-diamond grade between the textural varieties of kimberlite. These three textural units (HNTKN, HNTKNt, and HNHKN) represent the transition from the diatreme to the root zone within a single phase of kimberlite.

Two smaller TK units, which are unrelated to those discussed above, are present in Hearne North. HNTKG2 is located near the surface at the southern end of the pipe. This unit also seems to grade into an underlying HK, termed HNHKG2. One of the main features that distinguish the two smaller TK units from the main HNTKN is the presence of fresh garnets in the former. The HNTKSD is interpreted to be a completely different, and probably earlier, phase of kimberlite partly because the HNTKN and HNTKG2 exhibit gradational changes to HK at shallower levels in the pipe than the HNTKSD.

Although the HNHKN, discussed above, is interpreted as being related to the HNTKN, other HK units appear to be unrelated. Geologically, the latter HK units seem to contain more garnets than the HNHKN. There also appears to be sharper contacts rather than gradational changes between these and the overlying TK units. The volumetrically largest of these HK units, HNHKG, is correlated with the low- grade areas within the HK found in many of the large diameter holes. The HNHKG2 is nearly indistinguishable from the HNHKG in core.

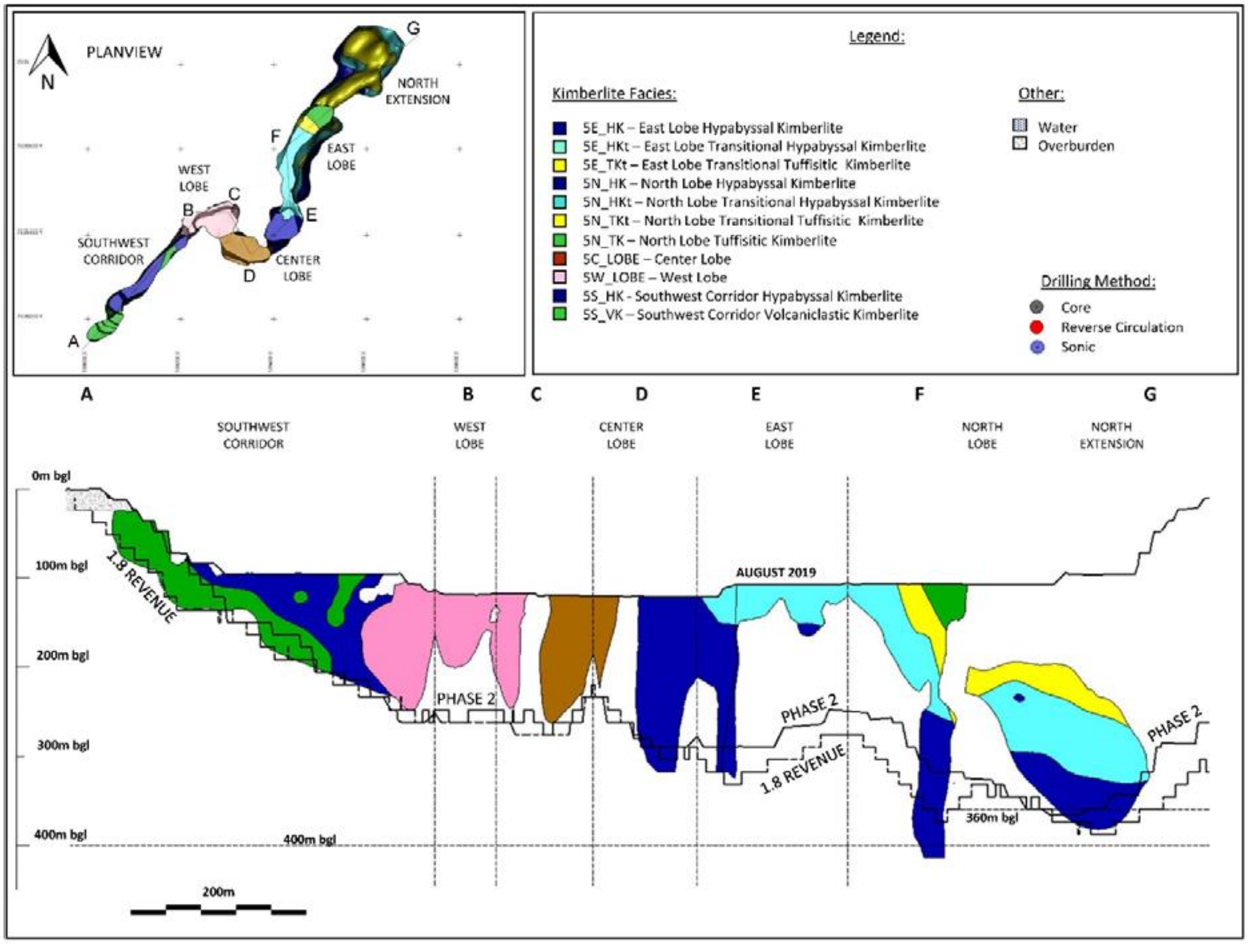
7.2.1.2 Hearne South Lobe

Based on geological interpretations from limited core drilling, this body appears to be composed mainly of uniform diatreme-facies TK, containing as much as 50% granite xenoliths. The TK unit was named HSTKM. A separate transitional HK/TK was proposed and named HSTKW. The macro-diamond grades in both of the above units are similar.

7.2.2 5034 Kimberlite

Kryvoshlyk (2008) reported that the diamond distribution in the 5034 North Lobe appears to follow the layered character of the kimberlite overall (refer to Figure 7-8). Maximum concentrations of diamonds appear often located close to the “Orange Marker” — a specific petrological layer generally found between the two units comprising the majority of the pipe infill: the upper HKt and the lower HK units. Diamond count maxima in the East Lobe appear to create a lens-like body at a depth of 85 to 131 m towards its flanks and 107 to 211 m in its centre.

Figure 7-8: 5034 Kimberlite Cross Section



Source: De Beers, 2019

Limited diamond and geological data for the Centre and West lobes did not allow Kryvoshlyk (2008) to produce high-confidence 3D models. The Centre Lobe macro-diamond distribution is highly variable and poorly supported by petrology, even between relatively closely spaced drill holes. The Centre Lobe micro-diamond distribution showed the presence of high-grade zones, which did not correlate with petrological changes. The resource model considers the West Lobe to be undifferentiated kimberlite and the Centre Lobe to be composed entirely of undifferentiated HK.

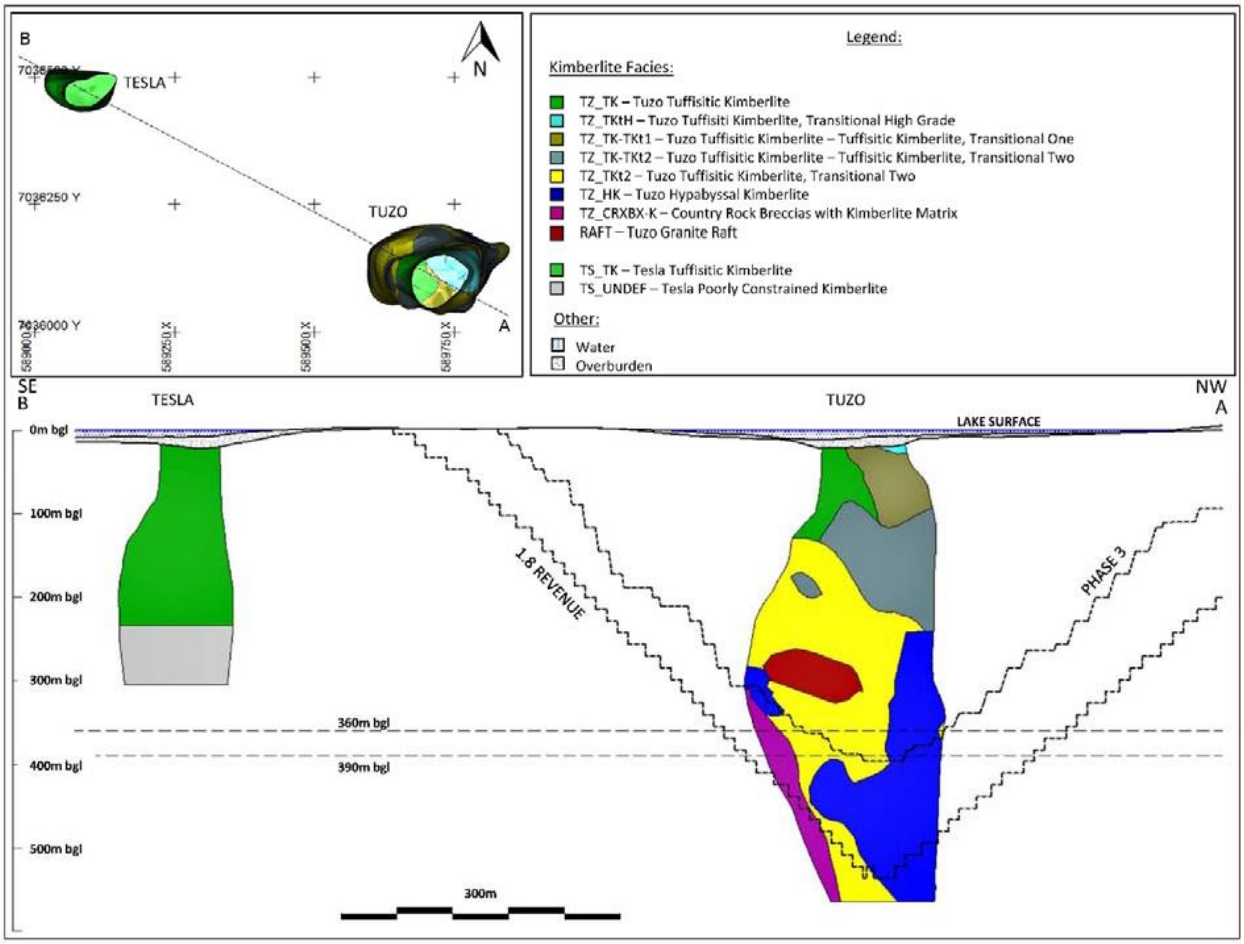
Kryvoshlyk (2008) concluded that the generation of the transitional kimberlite rock textures at 5034 is still poorly understood. If the transitional rock types are in-situ differentiates of HK magma, Kryvoshlyk (2008) maintains that they should play only a minor role in understanding the diamond distribution.

7.2.3 Tuzo Kimberlite

Seghedi and Maicher (2007) reported that the kimberlite units of the Tuzo kimberlite pipe are characterised by a large variation of diamond counts in both micro as well as macro grain size classes, likely due to varying levels of dilution within the kimberlite (Figure 7-9). One of the aims of the 2007 drill program was to better delineate the pre-2007 established high-grade and low-grade units.

Volumetrically significant lithologies with elevated diamond counts are found in the coherent HK and HKt units at depth. The fragmental lithologies in contrast have the lower stone counts, which seem to correlate negatively with country rock dilution. Seghedi and Maicher (2007) maintained that overall, the diamond distribution appears to be unrelated to spatial or depth levels, but more correlated with the abundance of dilution in an area. This in turn confirms the geological observations and geochemical data.

Figure 7-9: Tuzo Kimberlite Cross Section



Source: De Beers, 2019

A previous interpretation of the emplacement mechanism of the Tuzo Pipe by Hetman et al (2004) proposed that the pipe is a transition zone representing a "frozen" degassing front of a single phase of intrusive kimberlite. Based on kimberlite texture and diamond studies, Seghedi and Maicher (2007) concluded that the emplacement of the Tuzo pipe was a process extended over a period with repeated eruptions of variable magnitude and nature, with resedimentation and recycling of volcaniclastic material being evident.

Micro-diamond stone counts per sample were found by Seghedi and Maicher (2007) to be highly variable, both within and in between geological units. The abundance of xenoliths within a sample correlated negatively with total stone counts, and thus the highly variable degree of country rock dilution is thought to contribute to the large range of counts. According to Seghedi and Maicher (2007), the pre-2007 high-grade unit could not be confirmed with micro-diamond data obtained from the 2007 core program. The pre-2007 high-grade unit was found to have, on average, a lower degree of dilution than the surrounding lower grade unit. For the high-grade unit, no criterion was found by Seghedi and Maicher (2007) to consistently discriminate the unit.

It was concluded by Seghedi and Maicher (2007) that:

- The kimberlite units of the Tuzo kimberlite pipe are characterized by a large variation of diamond counts in both micro and macro grain size classes.
- There are distinctive differences in the absolute value of diamond stone counts of fragmental vs. coherent units, which appears partly related to their degree of dilution, but also to possibly different batches of magma.
- The stone counts are strongly affected by the degree of dilution. However, no distinctive separation of or internal homogeneity within a unit is found by eliminating the dilution. Outliers occur in country rock xenolith rich breccia zones.
- A distinct correlation of stone ratios is not found for any of the lithologies. (Ratios of diamond grain size classes are expected to be constant within a unit, irrespective of various effects that alter the absolute numbers of stones, including the degree of dilution. Thus, individual batches of magma that have sampled different areas of the mantle for diamonds are expected to have different stone size ratios).
- Geochemically, some of the element versus micro-diamond data plots indicates a subtle correlation of the major model codes distinguished in Tuzo kimberlites, although extensive scatter prevents the definition of a distinct criterion.
- For the pre-2007 high-grade unit, there was no criterion to consistently discriminate this unit or even confirm its existence as a separate unit.

Stiefenhofer (2008b) reported an investigation to attempt to clarify the apparent existence of a high-grade unit in the Tuzo Pipe, and commented on the validity of retaining this unit in the geological model. The investigation focused on a review of observations by past workers, reappraisal of new geochemical data generated in 2007, the methods used to calculate crustal dilution, distribution of granite dilution within the pipe, distribution of diamond grade within the pipe, and lastly, consideration of the potential role that volcanic processes may have played in the generation of the high-grade feature. Stiefenhofer (2008b) concluded that geological evidence for the existence of a high-grade zone was circumstantial at best. Stiefenhofer (2008b) stated that ultimately, however, it appears that the High Grade zone was derived from magma with similar rare earth element (REE) chemistry compared to the remaining fragmental units. It should be noted that the 2008 RC drilling mini-bulk sampling program did confirm the high macro-diamond grade zone delineated by the 1999 RC drilling mini-bulk sampling program.

The possibility of a temporary obstruction during the course of the eruption and emplacement of the Tuzo Pipe was considered by Stiefenhofer (2008b) to be the most likely explanation for the High Grade zone. He speculated that the introduction of the granite raft, combined with the additional smaller blocks and fragments of granite, proved to be too voluminous for the volcano to eject at once. The feeder was forced to deviate around this obstruction, and the eruption continued. The 3D orientation of this zone of granite debris (defined largely by unit TKTKt_2) suggested to Stiefenhofer (2008b) that the new vent position was located along the eastern wall of the pipe. It is possible the proximal position to the vent will have locally influenced the diamond stone size and grade, thereby defining the High Grade zone.

Tappe (2009) reported on a preliminary groundmass spinel chemistry study to support the evaluation of a reconciliation of a high-grade unit with the 2007 Tuzo geological model. Tappe stated the data suggested that the High Grade zone of unit TK-TKt_1 and the low-grade unit TK-TKt_2 are derived from a common magma batch and that the difference in diamond grade is primarily a function of country rock dilution. The analyzed low-grade units contain multiple spinel populations, some of which are not observed in the High Grade zone. This suggests that mixing of different magma batches occurred.

According to Tappe, there appears to be an affinity of the TKt_1 model code, which is part of the high-grade material close to the surface, to HKt material at greater depths. Further groundmass spinel studies completed by Mann (2013) support the continuity between the geological units in Tuzo Deep with the upper regions of the kimberlite. There is compelling evidence that the TKT units in Tuzo Upper are the same as the TKT at depth, similarly the HK at depth is the same as the HK in mid-levels of the kimberlite.

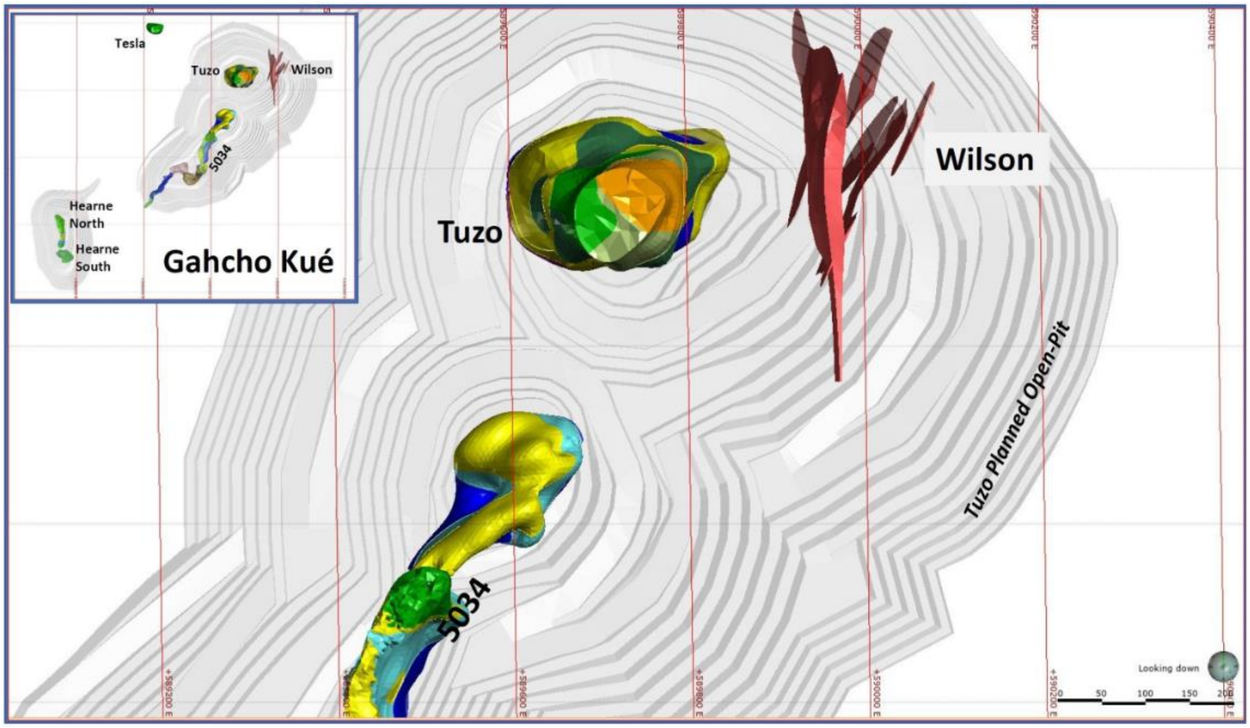
7.2.4 Other Kimberlites

Several small kimberlite occurrences were intersected during exploration drilling programs following up geophysical and diamond indicator anomalies. These bodies include the Tesla Pipe and Dunn Sheet that comprise part of the Gahcho Kué kimberlite cluster. The Faraday and Kelvin kimberlite discoveries are located about 8 km northeast of the Gahcho Kué kimberlite cluster and are outside the present mining lease.

A ground gravity survey completed in 2018, spanning the Southwest Corridor area and stretching north to the Tuzo and Tesla pipes, had identified an exploration target in the corridor between the Tuzo and Tesla pipes (Curie). Drilling commenced at the Curie target in 2018, and identified a kimberlite body that is likely a blowout of the Dunn kimberlite sheet. The full extent of all the additional kimberlite still to be determined. The Curie kimberlite lies within the proposed open pit mine plan for the Tuzo kimberlite, and midway between Tuzo and the Tesla kimberlite.

In 2019, the discovery of the Wilson kimberlite was announced, which is the first kimberlite to be discovered in the GKJV area in over 20 years. Wilson was discovered during drill testing of geophysical and geological anomalies in the area. In contrast to the Curie kimberlite, drilling at Wilson shows no connection to the nearby Tuzo kimberlite, and as such the Wilson kimberlite is a distinct, new discovery. Located roughly 200 meters east of the Tuzo kimberlite, the Wilson kimberlite lies within the open pit mine plan for the Tuzo pit as shown in Figure 7-10. Both HK and TK are present but their internal relationships are not yet resolved. Wilson is elongated north-south and has roughly vertical contacts with country rock along its length. A greater volume of kimberlite is present to the north, and the kimberlite also remains open to the north. The latest drilling confirmed that several ancillary kimberlite sheets exist east of and adjacent to the Wilson body.

Figure 7-10: Plan View of the Wilson Deposit



Source: Mountain Province, 2019

8 Deposit Types

The composite geological model of the Gahcho Kué kimberlite pipes (from Hetman et al., 2003) is shown in Figure 8-1. The shape and infill of the individual kimberlite pipes is similar to that of the kimberlites located in the Kimberley area of South Africa, and to the 630Ma Renard kimberlites in Quebec (Fitzgerald, 2009). They differ considerably from many other Canadian kimberlites that have been mined or developed, such as those found at Fort à la Corne, Attawapiskat, and Lac de Gras (Field and Scott Smith, 1999). In general, these kimberlites comprise the upper levels of the pipes. The Fort à la Corne pipes are preserved as craters with kimberlite pyroclastic aprons around the craters. The Lac de Gras pipes are preserved as diatremes below the surficial craters and above the root zones. Gahcho Kué pipes preserve minor pyroclastic kimberlite attributed to the diatreme, but largely contain root-zone materials.

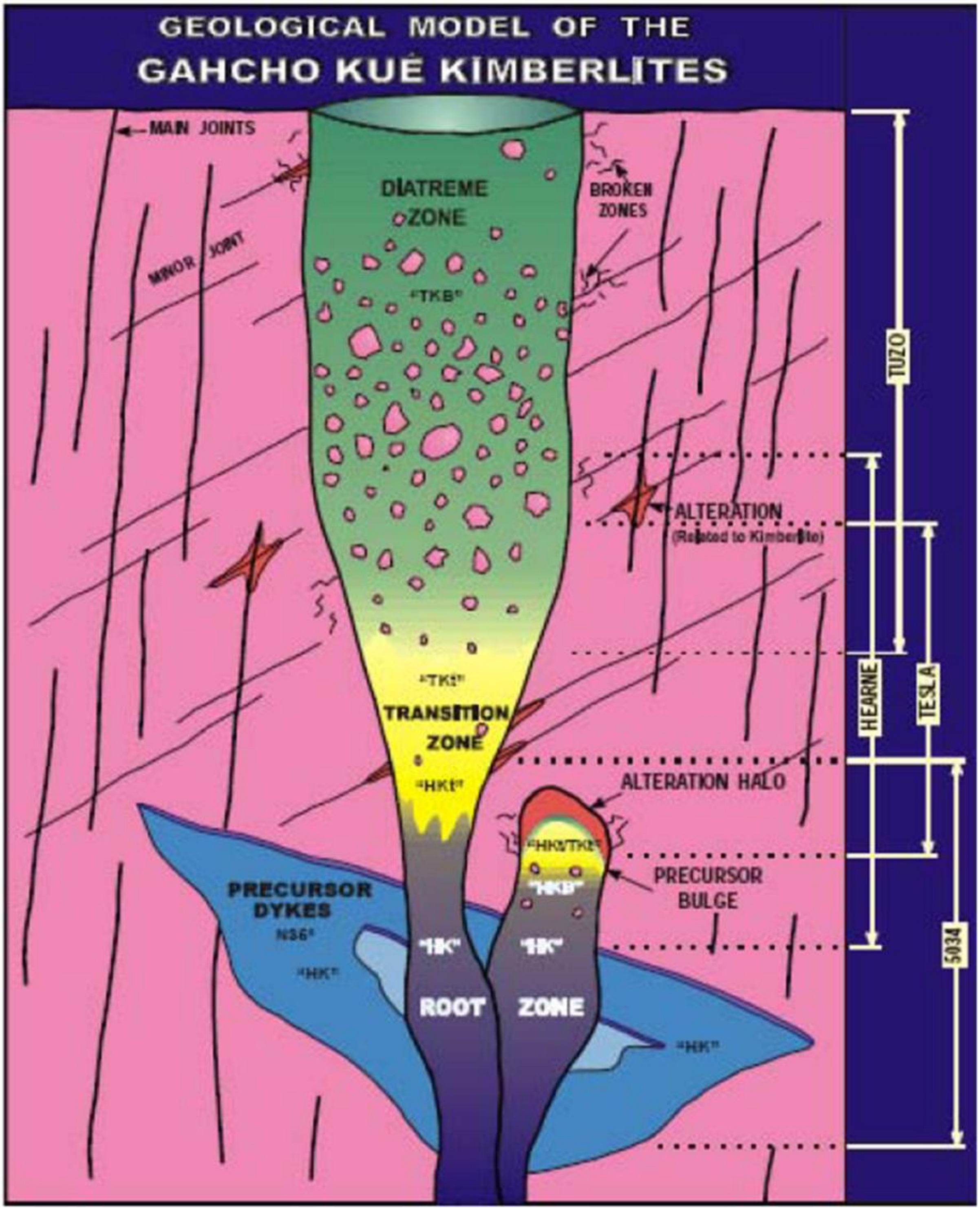
Hetman et al (2003) interpreted the Gahcho Kué pipes to be similar root-to-diatreme transition zones to those described by Clement (1982) and Clement and Reid (1989). According to Hetman et al (2003), the variations in pipe morphologies and infill displayed by the Gahcho Kué kimberlites reflect varying depths of diatreme development and are not a function of different depths of erosion for each of the pipes according to Hetman et al (2003).

With respect to emplacement, Hetman et al (2003) stated that the observed gradational TK to HK textures at Gahcho Kué are consistent with the interpretation by Clement (1982) and Clement and Reid (1989) in which the degassing of an intrusive magma column produces the diatreme zone, with the underlying transition diatreme root zone representing a “frozen” degassing front, as discussed by Field and Scott Smith (1999).

Kryvoshlyk (2008) considered that the diamond distribution in the 5034 North–East Lobe appears to follow the layered character of the kimberlite overall. Maximum concentrations of diamonds are often located close to the “Orange Marker” — a specific petrological layer generally found between the two units comprising the majority of the pipe infill: the Upper HKt and the Lower HK units. Kryvoshlyk (2008) further maintained that the diamond count maxima specifically in the East Lobe appear to create a lens-like body at a depth of 85 to 131 m towards its flanks and 107 to 211 m in its centre.

Seghedi and Maicher (2007) reported that, overall, the diamond distribution at Tuzo appears to be unrelated to spatial or depth levels, but is more related to the abundance of dilution in an area. This in turn confirms the geological observations and geochemical data. The pre-2007 established Tuzo high-grade unit could not be confirmed as separate using the micro-diamond data obtained from the 2007 drill program. However, the 2008 LDD program confirmed that higher macro-diamond grades occur in this zone, and the High Grade zone was re-incorporated into the 2007 resource model. The Seghedi and Maicher (2007) investigation demonstrated that the Tuzo Pipe is geology is complex.

Figure 8-1: Composite Geological Model of Eroded Gahcho Kué Kimberlites



Composite geological model of eroded Gahcho Kué kimberlites
Source: Hetman et al, 2003

9 Exploration

The information contained in this section is based on the "Gahcho Kué Kimberlite Project NI 43-101 Technical Report" (JDS 2014) and has been updated to include descriptions of ongoing exploration work during operations. While the information is historical in nature, it has been incorporated in the Exploration section for continuity and completeness. Exploration at Gahcho Kué has included drilling, surveying, geological mapping, geophysical surveying, geochemical sampling and hydrological / geotechnical work.

All recent exploration was implemented directly by De Beers or was subcontracted out under direct supervision of De Beers as the Project operator. Exploration / delineation drilling, as well as all related sampling and processing of drill material, is described in Section 10.

9.1 Survey Control

The Gahcho Kué site was surveyed by GKJV in 1998 using the North American Datum (NAD) 27 coordinate system, with elevations recorded in height above ellipsoid (HAE).[1]

All pre-2004 drill hole collars at Gahcho Kué were surveyed using UTM NAD 27 Zone 12. Pre-existing survey control for the Base Station at the site references a First Order Geodetic Monument located near the Hoarfrost River. This coordinate was established by global positioning system (GPS) survey between 1996 and 1998 by GKJV. A surface grid tied to the UTM system was established during 1997– 1998 over each of the kimberlites. Several permanent reference points within each grid were established on land using a Trimble 4800 series GPS. These reference points were re-occupied by GKJV in 1998 with a Trimble 4800 series GPS, which confirmed the accuracy of the original locations (Hodgkinson, 1998).

From November 2003 to January 2004, GPS determination of Canadian Active Control Network (CACS) NAD 83 coordinate values with elevations in masl for the GPS Base Station at Gahcho Kué was performed using two independent methods (Hewlko, 2004). The first method involved the processing of CACS data and satellite data collected at the base station in November 2003 and January 2004. The resulting six positions agreed within 3 cm in the northing direction, 3 cm in the easting direction, and 9 cm in elevation. The second method of determining the position of the base station was to process the data observed at the base station by single point positioning. The six positions agreed within 0.6 m in the Northing, 1.1 m in the Easting and 1.7 m in Elevation. All drill hole collars surveyed for the 2004 – 2008 drilling programs utilised real time GPS CACS NAD 83 coordinates.

Unless otherwise noted, drawings and coordinates are based on the NAD83 coordinate system, with elevations in masl, and are referenced to the CACS benchmark located in Yellowknife.

The following shifts were used to convert the NAD27 HAE system to CACS NAD83 masl:

- Northing Shift: +221.619 m
- Easting Shift: - 64.211 m
- Elevation Shift: +16.917 m

[1]The term above mean sea level (amsl) refers to the elevation (on the ground) or altitude (in the air) of any object, relative to the average sea level datum. As sea level can vary depending on air pressure, an alternative can be used, where base height measurements are referenced to an ellipsoid of the entire earth. HAE is the base reference for all GPS instruments.

The shifts noted above differ from the theoretical shift between NAD27 HAE and NAD83 masl because of the enhanced survey accuracy achieved by tying into a CACS benchmark.

9.2 Geological Mapping

A 16 km^2 area near Kennady Lake was selected in 1998 for geological mapping (at 1:2000 scale) using air photo bases. The purpose of the mapping project was to document the bedrock geology, structural geology, surficial geology (overburden type), and drainage patterns within the area.

9.3 Exploration Programs

No work was conducted by the original claim staking company, Inukshuk. Exploration between 1992 and 1996 was conducted by Canamera Geological Ltd. (Canamera) as the operator for MPD and its predecessor company Mountain Province Mining. From 1997 forward, the GKJV was responsible for all exploration, with De Beers as “project operator” performing the work as directed.

9.3.1 Canamera Geological Ltd.

Canamera acted as the operator for Mountain Province Mining Inc. prior to the joint venture with Monopros Ltd. (De Beers). Exploration work carried out by Canamera between 1992 and 1994 comprised 993 reconnaissance and follow-up glacial-till samples and an airborne electromagnetic survey. From 1995 to 1996, additional exploration included bedrock and surficial mapping, airborne and ground geophysical surveys, and collection of 1,842 sediment samples.

In January 1995, the AK5034 (5034) kimberlite was discovered, and from 1995 to 1996 it was tested by 68 exploration and delineation NQ core holes. In addition to the core drilling, geotechnical investigations of the kimberlite were completed by Canamera and Bruce Geotechnical Consultants Inc. Data collected included core recovery, rock quality designation, lithological information and alteration, point load tests, preliminary determinations of rock mass types, strength ratings, and preliminary determinations of slope requirements for rock mass types.

In 1996, a 105.2 tonne mini-bulk sample of the 5034 kimberlite was obtained by PQ core drilling of 43 holes for macro-diamond recovery. Material from NQ delineation holes completed in 1996 contributed an additional 10.2 tonnes to the mini-bulk sample.

9.3.2 GKJV Pre-Production

Initial exploration by the joint venture in 1997 comprised a low-level airborne magnetic and five-frequency electromagnetic (EM) survey over the AK property. Geophysical anomalies generated from the surveys were followed by 2,211 sediment samples, 652 m of NQ core in five holes, and 85.35 m of reverse circulation drilling in four holes. Eight targets were identified in the AK property from this work, and included the discovery of three additional kimberlites: Tesla in May 1997; and Tuzo and Hearne in August 1997. Delineation drilling on the four kimberlites (including 5034) comprised nine NQ diamond holes for 2,658.89 m.

During 1998, exploration stage sediment sampling (945 samples) and diamond drilling programs (664 m in four holes) were performed. Thirteen drill holes (2,673 m) were completed in 1999 on geophysical targets from airborne and ground geophysical surveys. A total of 708 sediment samples were collected primarily in the southern portion of the AK property. The sediment samples included material for geochemical analysis collected from a detailed grid up- and down-ice of the Gahcho Kué kimberlites.

The 2000 exploration program included airborne and ground geophysical surveys, and collection of 670 20-litre indicator mineral samples and 385 geochemical samples. Sample collection was primarily from the southern portion of the AK property.

Detailed electromagnetic surveys at 40 m line spacing and 20 m station spacing were conducted at Kennady Lake near 5034, Hearne, Tuzo, and Tesla, and 12 km to the northeast over the Kelvin kimberlite intrusion. The electromagnetic data collected during this survey completed full coverage of Kennady Lake south of Tesla, and mapped the full extent of the Dunn dyke.

A total of 23 geophysical targets were drill-tested, one NQ core hole was drilled at the Hearne kimberlite, and three holes tested the Dunn anomaly, located about 250 m west of the 5034 and Tuzo kimberlites, for a total 543 m drilled.

Six ground gravity surveys and four extensions to grids were completed in the AK Claims in 2003. In addition, glacial sediment sampling was undertaken (21 samples).

A total of 1,198 line kilometres of airborne gravity survey was completed in October of 2011, covering the extent of the project area.

Delineation drill programs were undertaken from 1997 to 2008. Drilling and sampling of the deeper portions of Tuzo was undertaken from 2010 to 2013.

In conjunction with the Tuzo deep drilling programs, additional drilling was conducted to delineate geophysical anomalies identified during geophysical surveys conducted during 2012. These programs consisted of a flown 1037 line-km survey followed by 3230 ground gravity surveys. 12 holes, totalling 1064.8 m of drilling, were drilled to delineate the anomalies identified during geophysics surveys; however, no new kimberlites were identified.

9.3.3 GKJV Production

From commencement of operations several focused mining samples have been completed in order to better define grade, size frequency distribution (SFD), and revenue. In 5034, five focused mining samples were taken, one from each of the Center, East, West, Southwest Corridor, and North lobes. Three samples have been completed in Hearne. These samples were each run through the main process plant over a period of several days. Results from the Center, North, East, West, and Hearne bodies are used to update the grade, SFD, and revenue models. Centre and East were applied in 2017, West, Southwest corridor, and Hearne in 2018, and Hearne updated again in 2019 (Ellemers et al., 2017a; Ellemers et al., 2017b; Dankowski, 2017; Dankowski, 2018; Donovan, 2018a, Donovan, 2019 a to c). The Southwest Corridor sample has also contributed to classification of the indicated resource. An additional focused mining sample has been completed in Hearne to further define SFD resulting in an update.

9.3.3.1 Petrography, Mineralogy & Other Studies

Detailed petrography and mineralogy is an integral part of GKJV's exploration process. Reports include Caro and Kopylova (2004), Hetman et al. (2004), Kryvoshlyk (2007), Seller (2008), Kryvoshlyk (2008), and Mann (2013). Details of methodologies are discussed in Webb et al. (2006), Field and Ferreira (2006), Seghedi and Maicher (2007), Stiefenhofer (2007), Kryvoshlyk (2008) and Mann (2013). Methods include abundant use of thin sections and polished slabs, detailed mineral counts, and whole-rock geochemistry.

9.4 Hydrology & Geotechnical

Golder Associates (Eichenberg, 1999) trained GKJV personnel in the geotechnical aspects of core logging, and in 1999 a geotechnical study was performed by Golder Associates (Eichenberg, 1999). The Laubscher rock mass classification system was used to assess the geotechnical data. Geotechnical units identified were based on fracture frequency, rock strength, and joint conditions, in country rock and in kimberlite. The following work was performed:

- core orientation, fracture frequency, rock strength and joint conditions were measured; and
- rock mass rating and rock mass strength for each unit was calculated.

Point load testing of kimberlite and country rock xenoliths from the Tuzo 2002 HQ core specimens was performed (Charlebois, 2003). The aim of this exercise was to obtain fresh point-load strength index data for comparison against possible future rock-strength classification by ore dressing studies (ODS).

Geotechnical and geohydrology consultants were employed on site during the 2004 drilling program for detailed logging. A standard geotechnical logging template developed by SRK Consulting Services (SRK) was used to record field drill hole data, including geotechnical logs, field geological log, density sample results and down-hole survey measurements. A site-specific geotechnical discontinuity atlas was produced. SRK supervised a geotechnical drilling program in the area of proposed open-pit mining, comprising geotechnical logging and an assessment of geological structures, rock strength, and hydrogeology for pit design and slope optimization.

An assessment of uniaxial compressive strength and elasticity of 66 kimberlite and country-rock samples collected from the 2011/2012 core drilling campaign was carried out by Mirarco (Suorineni, 2012). Instrumented unconfined compressive strength testing was carried out on all intact core specimens.

Additional geotechnical drilling was commissioned in 2016/2017 to further assess the impact and continuity of the J5 joint set after the magnitude of the joint set was confirmed during the mining of 5034. These drill programs were supervised by Piteau Associates and conducted during mine operations. The field investigation was conducted by Aurora Geosciences and consisted of twelve boreholes which were used to obtain rock mass characteristics through oriented core logging.

Following the 2017 Piteau Associates work, an additional field investigation commenced from 2017 to 2018 to address data gaps and target potential adverse structural orientations that could not be analyzed in detail from previous work. In total, 15 geotechnical holes were drilled. Photogrammetry mapping data of the temporary and final pits walls, as well as surface mapping data of the outcrops and the upper west, north and east walls of the 5034 pit were also collected.

Hydrology and geothermal drilling programs were also completed in 2004, supervised by HCI Hydrologic Consultants, Colorado, USA. Work comprised hydro-structural drilling of faults and potential lake dewatering dykes. Hydrological data for hydrological modelling were tied into environmental baseline studies. Packer testing was undertaken at 3 m and 9 to 12 m, for a total of 141 test intervals. Sub-permafrost sampling was undertaken, as was water sampling of the 5034 proposed pit, where 12 airlift tests at 30 m intervals were completed. To collect geothermal data for modelling to tie into environmental baseline studies, thermistors were installed at a depth of 250 m.

10 Drilling

The property was the subject of several drilling campaigns since the initial work by Canamera in January 1995. In 1995, small diameter core drilling (47.6 mm NQ core) by Canamera discovered the 5034 kimberlite while drilling geophysical anomalies at the head of a kimberlitic indicator mineral dispersion train.

Following on the 5034 discovery, small-diameter NQ core drilling was used extensively to test geophysical and kimberlite indicator mineral dispersion-train targets peripheral to the 5034 cluster (Tuzo and Hearne were discovered in 1997), as well as to delineate the shape of the kimberlite bodies and to provide data (including micro-diamonds) for geological and mineral resource modelling.

In 1996, large diameter core (LDC) drilling was used to collect small mini-bulk samples from 5034, using PQ-sized core (85 mm diameter), and in 2007 the GKJV obtained 149 mm diameter LDC samples. These LDC samples provide additional information regarding the commercial diamond content of the pipes.

Large diameter reverse-circulation (RC) drilling (LDD) was used to collect kimberlite mini-bulk samples by the GKJV. LDD programs have included smaller scale 140 mm (5.5 inch) diameter drill holes in 1998 and 1999; 311 mm (12.25 inch) drill holes in 1999; to the largest employed, the 610 mm (24 inch) diameter drill holes in the 2001, 2002, and 2008 mini-bulk sampling programs. The LDD mini-bulk sample programs obtained macro-diamonds for grade and revenue estimation.

In 2011, 2012 and 2014 small diameter (HQ) drilling was conducted on the Tuzo pipe to collect kimberlite samples at depth.

Further drilling and sampling programs in 2017 through 2019 have focused on defining the Southwest Corridor, Northeast Extension and anomalies east of Tuzo.

10.1 5034

Canamera's 1995 and 1996 drilling of the 5034 kimberlite comprised 69 NQ core holes to obtain geological and pipe volume data and 43 PQ core holes to obtain macro-diamonds for a preliminary estimate of diamond grade. An additional 11 NQ core holes and 17 RC holes of various sizes were drilled by GKJV between 1998 and 2002. Mini-bulk sampling conducted between 1998 and 2002 to determine diamond grade and revenue has included 140 mm (5.5 inch) diameter drill holes in 1998, 311 mm (12.25 inch) diameter drill holes in 1999, and 610 mm (24 inch) diameter holes that were drilled in 2001 and 2002. The 1998 and 1999 drilling focused on the 5034 West, Centre and East lobes. In 2001, the East Lobe and the west neck of the Centre Lobe were drilled. In 2002, work focused on the narrow corridor drilled previously in 1999 through the West and Centre lobes. There was one delineation NQ core hole drilled by GKJV at 5034 in 2003.

In 2004, 13 core holes drilled into the 5034 kimberlite as part of pit geotechnical, hydrogeology, and ore dressing studies (ODS). In 2005, a single core hole for hydrogeology studies was drilled through the East Lobe of 5034, and two core holes were drilled at the North Lobe of 5034 to provide additional geological data. A substantial core program followed this in 2006 that comprised 11 HQ core holes for pit geotechnical, pipe volume delineation, and geological investigations. A campaign of core drilling was conducted in 2007 with five HQ core holes being drilled to provide geological data from the 5034 East Lobe and five LDC holes (149 mm, 5.875 inch) drilled into the 5034 North Lobe to obtain a small parcel of macro-diamonds for comparative purposes.

The Southwest Corridor area lies between the 5034 and Hearne pipes, and has been recognized as containing diamondiferous kimberlite over the course of mining activity. During 2017 additional resource drilling was conducted to further define and extend the Southwest corridor. Six drill holes were completed by December 31, 2017 with an additional 10 holes in early 2018. A geophysical program was carried out in the fall, and was comprised of a ground gravity survey centred on the Southwest Corridor area as well as other nearby areas, including between the Tuzo and Tesla pipes.

The 2017-2018 exploration drill program in the Southwest Corridor, originally planned for 17 holes and subsequently increased to 18 holes. A total of 15 holes were designed to cross-cut the projected southwestward extension of kimberlite from the 5034 pipe that would likely be included in the Gahcho Kué mine plan. Another two holes were directed down-dip and along strike of the kimberlite body to define the internal geology and to maximize metres of drilled kimberlite for micro diamond sample collection. A final cross-cutting hole, designed to test the extension of the unit at a depth of 275 metres, did not intercept kimberlite.

During 2018 and 2019, a total of 17 HQ core holes were drilled in the corridor between 5034 and Tuzo. The initial focus has been the zone between the 5034 pipe and the North pipe, and the zone extending immediately northeast of the North pipe. Drilling confirmed kimberlitic material between extending north of the 5034 north lobe and North pipe, with true intercepts up to 72 meters in thickness and extends vertically to depth from 248 meters to 350 meters.

10.2 Hearne

A total of 25 core holes were drilled in and around the Hearne kimberlite by GKJV during 1997 – 2003:

- 17 in Hearne North.
- 6 in Hearne South (1 that intersected both pipes).
- 2 of which did not intersect kimberlite.

In 1998, 19 LDD holes (140 mm diameter) were drilled into the Hearne kimberlite to test the diamond grade:

- 16 were located at Hearne North.
- 1 in Hearne South.
- 2 holes intersected only granite.

In 1999, eight LDD (311 mm diameter) holes were drilled into Hearne North and two were drilled into Hearne South to obtain macro-diamonds for initial revenue estimation. In 2001, three LDD (610 mm diameter) holes were drilled into the northern half of Hearne North, and five more LDD (610 mm diameter) holes tested Hearne North in 2002 to increase the parcel of macro-diamonds available for revenue estimation.

In 2004, 14 NQ core holes were drilled into the Hearne kimberlite as part of pit geotechnical and ODS programs. In 2005, a single core hole was drilled for hydrogeological studies; and in 2006, a single core hole was drilled to support pit geotechnical studies.

In 2018, six HQ core holes were drilled in the Hearn deposit. The objective was to test the potential extensions of the Hearne pipe, particularly between the north and south lobes, as initial results of the program confirmed the presence of kimberlite at depth. The drill program confirmed that the north and south lobes of the Hearne body are connected by a kimberlite breccia. The kimberlite breccia is present vertically 40 m deep from surface, and extends vertically to at least 220 m from surface.

10.3 Tuzo

Between 1997 and 1999, eight NQ core holes were drilled into Tuzo. All of these were angle holes collared outside the kimberlite body and drilled into, and sometimes through, the kimberlite. In 2002, seven vertical HQ core holes were drilled into the pipe. LDD mini-bulk sample drilling took place in 1998 and 1999. Drilling to a maximum depth of 166 m, 17 LDD holes (140 mm diameter) were completed in 1998, and an additional 11 LDD holes (311 mm diameter) were completed in 1999 to a maximum depth of 300 m.

In 2004, two HQ core holes were drilled at Tuzo as part of a pit geotechnical study. This was followed by an 11-hole HQ core program in 2006 to provide pipe delineation and geological data. In 2007, a grid of 27 HQ core holes was completed to provide additional geological and pipe volume delineation data. The final resource drilling at Tuzo was an LDD mini-bulk sample program conducted in 2008 with nine holes (610 mm) completed to provide additional macro-diamonds for diamond revenue estimation.

An additional six HQ diameter core drill holes (4,127 m) were drilled in 2011/2012 with the purpose of further delineating the deep (300 – 564 mbs) portion of the Tuzo kimberlite and obtaining material for microdiamond sampling.

A three-hole drill program was completed in 2014 to test the Tuzo kimberlite to a depth of 750 mbs level.

10.4 Satellite Deposits

The Gahcho Kué Resource Extension Program (REP) includes both near-mine and greater lease area exploration. To date, focus has been on near mine targets, resulting in the successful discovery, definition, resource estimation, and classification of South West Corridor, Hearne Corridor, and the Northeast Extension of North Lobe (NEX). Additionally, two new kimberlites were discovered, Curie and Wilson.

10.4.1 Curie Target

Drilling commenced at the Curie target in 2018 with a total of four HQ core drill holes conducted. The Curie target has been confirmed to have kimberlite intersected at a vertical depth of only 18 meters, with the deepest intercept at 119 meters depth. The full extent of all the additional kimberlite still to be determined.

10.4.2 Wilson

Drilling to define Wilson consisted of 28 HQ core drill holes in 2019. The discovery drillhole intersected tuffisitic kimberlite beneath 18 meters of lake water and bottom sediments to roughly 137 meters, and hypabyssal kimberlite from 152 to 207 meters. A total of 1,702 kilograms of kimberlite were treated for microdiamonds, with 5,560 diamonds recovered from the +0.075mm size classes. Eighty-six +0.85mm diamonds recovered from the two drillholes weigh a total of 2.33 carats. Drilling and microdiamond data for the Wilson kimberlite are not sufficient to define a Mineral Resource. Therefore, the Wilson kimberlite is considered as Target for Further Exploration (TFFE). The estimate of a TFFE is conceptual and it is uncertain if future exploration will result in the estimate being delineated as a Mineral Resource.

11 Sample Preparation, Analyses and Security

Information contained in this section has been taken from AMEC's 2009 Technical Report (AMEC, 2009) and the Mineral Services' 2013 Report. JDS has reviewed the information contained in the previous Technical Reports and are of the opinion that sample preparation, analyses and security measures used meet industry standards and are adequate. Sections from these reports are included below.

11.1.1 Core Sample Preparation

11.1.1.1 Canamera (1994 – 1996)

The kimberlite intersections recovered by Canamera Geological Ltd. In Vancouver BC, where the core was split after detailed petrologic logging. Portions of the split samples were processed for micro-diamonds by caustic fusion at both the Canamera Geological Ltd. laboratory in Vancouver and at the Saskatchewan Research Council facility in Saskatoon (Clement et al., 1996).

11.1.1.2 GKJV (1996 – 2007)

Core samples recovered by GKJV over 1997-2007 core drilling programs were utilised for the following studies:

- Geology studies – slab and thin section analyses, petrology investigations, whole rock chemistry, heavy mineral analysis, and internal dilution estimation;
- Mineral Resource estimation – density determinations, micro-diamond estimation geotechnical studies – slope stability analysis, rock strength point load and uniaxial compressive strength tests, concrete aggregate suitability, weathering and slake testing;
- Process plant design – ODS;
- Environmental baseline – ARD; and
- Micro-diamond analysis.

Kimberlite core with corresponding country rock contact zones were shipped to Yellowknife, Vancouver, Toronto, or Sudbury for detailed logging by project petrologists. Core was kept intact during collection at the drill sites, and packed into labelled core boxes with depth markers placed between each drilled core run. Geotechnical logging was conducted at the drill sites. After detailed petrological logging was completed off-site, Project petrologists selected samples for geology studies including slab and thin section analyses, petrological investigations, whole-rock chemistry, heavy-mineral analysis, and internal-dilution estimation.

Samples removed for slab and thin section, micro-diamond, whole rock chemistry, heavy mineral analysis, uniaxial compressive strength, ore dressing studies, acid rock drainage and slake weathering tests were removed from the core boxes, processed, and are considered destroyed. Density and rock-strength point-load samples were returned to their respective core boxes after completion of processing. Kimberlite core sampled for geology studies from the 2007 program is the only core that was split.

All unprocessed kimberlite core, along with 30 m, more or less, of the country-rock contact zones, is currently stored at a De Beers warehouse in Sudbury, Ontario. Country-rock core is stored at the Gahcho Kué site.

11.1.2 Mini Bulk Sample Preparation

11.1.2.1 Canamera (1996 – 1998)

In 1996 a 105.2 ton mini-bulk sample of the 5034 kimberlite was obtained by PQ core drilling of 43 holes with an additional 10.2 tons from 30 NQ delineation holes contributing to the total of 115.4 tons. Reportedly, 103.7 tons were processed at the Canamera Geological Ltd. diamond recovery plant (Clement et al., 1996).

11.1.2.2 1998 GKJV – 150 mm (5.5-inch) RC Mini-Bulk Sampling Program

From the 1998 mini-bulk RC drilling program, a total of 73 x 150 mm diameter RC drill holes provided 222 tonnes of kimberlite (callipered mass) from the 5034, Hearne, Tuzo, and Tesla kimberlites for a total of 7,170.32 m of drilling. The screen aperture used was nominally 1.0 mm. Samples were collected on average every 36 m, but the actual interval ranged from 6 to 60 m. The 1998 mini-bulk samples were processed at the De Beers Grande Prairie treatment facility at a bottom cut-off of 1.0 mm (Williamson and Hetman, 1998).

11.1.2.3 GKJV (1999 – 2008)

The 1999 LDD bulk sampling program produced 1,820.3 t of kimberlite, measured by caliper, from the 5034, Hearne, Tuzo, and Tesla bodies in 43 boreholes for a total of 10,451.2 m of drilling (Grenon et al., 1999). A nominal 1.4 mm screen aperture size with tolerances between 1.35 to 1.52 mm was employed at the drill site (Grenon et al., 1999). Drill holes were processed by individual bulk samples collected between 18 m and 24 m intervals. The process plant lower cut-off used was 1.6 mm square aperture (Williamson et al., 1999).

During the 2001 bulk sampling program, a total of 968.5 t of kimberlite were measured by caliper from seven LDD holes drilled in the 5034 and Hearne North kimberlites. The total interval of kimberlite sampled was about 1,240 m. The bottom screen cut-off at the drill rig was 1.58 mm. A nominal 1.5 mm bottom screen cut-off was employed during sample processing that was conducted at the De Beers Grande Prairie plant (Skinner et al., 2001). Drill holes were processed by individual bulk samples collected at 12 m bench intervals.

A total of 1,919 m of kimberlite was RC drilled and sampled at the 5034 and Hearne kimberlites in 2002. The bottom screen cut-off at the drill rig was 1.58 mm. Based on caliper measurements, a total sample mass of 1,502 t was extracted. A nominal 1.5 mm bottom screen cut-off was employed during sample processing that was conducted at the De Beers Grande Prairie plant. Drill holes were processed by individual bulk samples collected at 12 m bench intervals. The 2002 LDD mini-bulk sample processing is reported in Skinner et al. (2002).

The LDC kimberlite intersection in 2007 of the 5034 North Lobe totalled 638 m, and an additional hammered kimberlite intersection of 45.4 m of kimberlite was processed. Geological logging of 5034 North Lobe LDD core determined geology units that were utilised for sample processing intervals. Sample processing was conducted at the De Beers plant in Grande Prairie, Alberta at 1.0 mm bottom cut-off, with a primary crush at -12.0 mm, and secondary crush of the -12 +6.0 mm fraction at -6.0 +1.0 mm (Skinner, 2007).

During 2008, the drilled Tuzo kimberlite intersection totalled 1,234.1 m in RC samples, and produced about 956.2 t as measured by caliper. A nominal 1.5 mm bottom screen cut-off was employed during sample processing that was conducted at the De Beers Grande Prairie plant (Thomson, 2008). Drill holes were processed by individual bulk samples collected at 12 m bench intervals.

Mini-bulk sample preparation procedures are typical of the industry and are adequate to support Mineral Resource estimation.

11.1.3 Analyses

11.1.3.1 Micro-diamond Samples

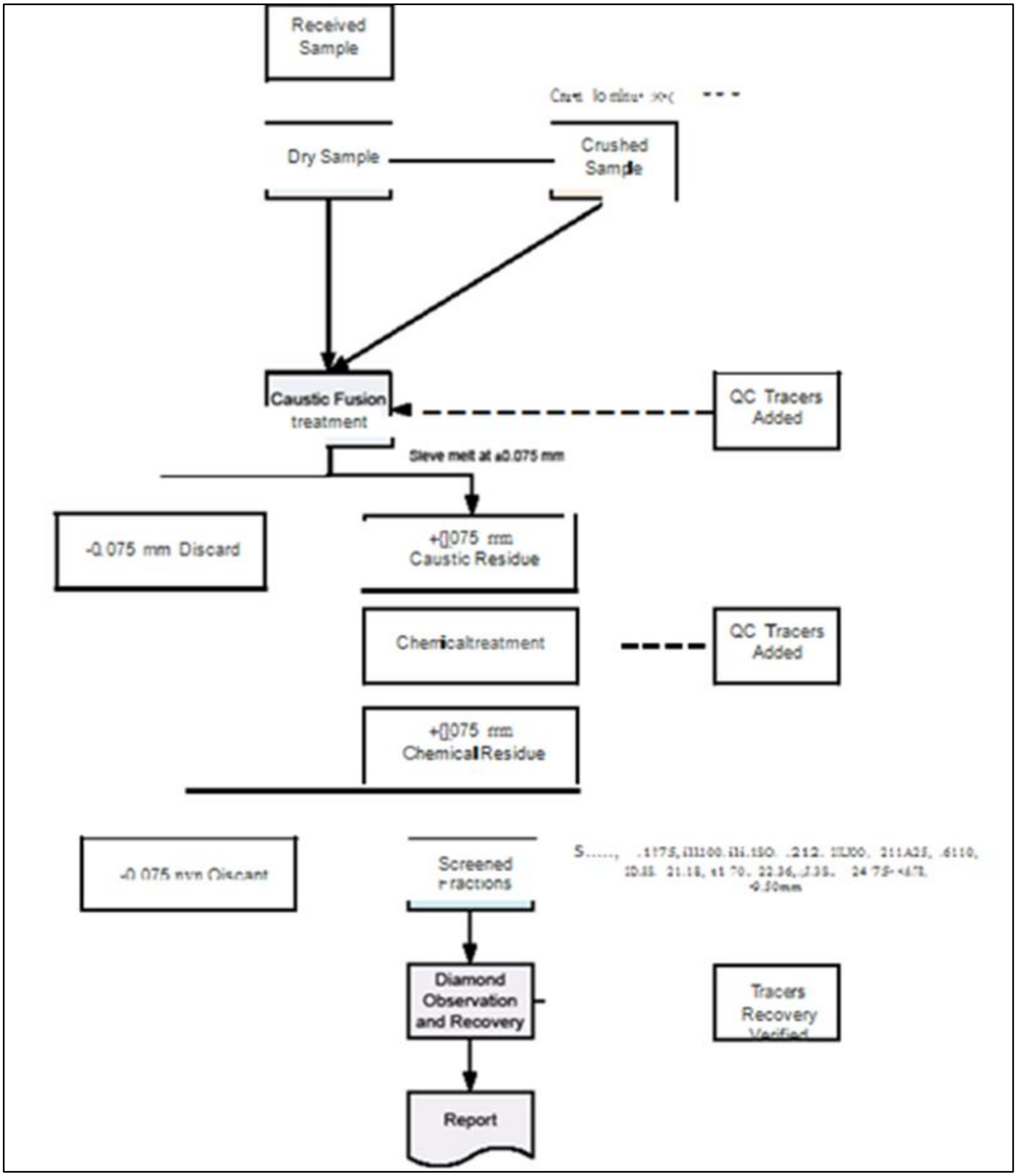
Micro-diamond samples were processed at De Beers Kimberley South Africa micro-diamond laboratory (De Beers Kimberley), SGS Lakefield Research Laboratories (SGS) and at the Saskatchewan Research Council (SRC) Geoanalytical Laboratories. Selected micro-diamond and residue samples recovered at SGS and SRC have undergone audits at the De Beers Kimberley Micro-diamond Laboratory as part of routine quality assurance and quality control (QA/QC) measures.

The following discussion of micro-diamond processing is based on a visit by AMEC to the Saskatchewan Research Council micro-Diamond recovery facility in Saskatoon, Saskatchewan. Figure 11-1 is a generic micro-diamond recovery flowsheet.

11.1.3.2 Sample Receiving & Preparation

Kimberlite samples are received by the laboratory, sorted, and assigned laboratory sample numbers. The samples are logged into the laboratory information system (LIMS) and are dried for 12 to 16 hours at 60°C. The samples are crushed, if necessary, to about -½ inch and split into 8 kg aliquots. The samples are removed from the oven and allowed to cool.

Figure 11-1: Generic Micro-Diamond Recovery Flow Sheet



Source: Hatch, 2013

11.1.3.3 Caustic Fusion Processing

The caustic fusion process begins with placing 75 kg of virgin caustic (NaOH) in an approximately 40 L furnace pot. The 8 kg sample is then loaded on top of the caustic. Bright yellow synthetic diamonds, 150 to 212 µm in diameter are loaded on top of the kimberlite sample as a spike.

The temperature is then ramped up to 550° C, and the sample is held at that temperature for 40 hours. After 40 hours, the pots are removed from the kilns and allowed to cool. The molten sample is then poured through a 75 µm screen. These screens are single-use screens that are discarded after use. Micro diamonds and insoluble minerals remain on top of the screen. Insoluble minerals are typically ilmenite and chromite. The pot is then thoroughly soaked with water to remove any remaining caustic and trapped diamonds and the water is again poured through the screen.

Because not all of the material dissolves, additional steps are required to clean ilmenite, chromite, and other materials from the concentrate. Samples are sent to the “wet” lab where acid is added to neutralize the solution. The residue is then rinsed and treated with acid to dissolve readily soluble materials from the residue.

The sample is transferred to a zirconium crucible along with an additional bright yellow synthetic tracer diamonds and fused with sodium peroxide to remove any remaining minerals other than diamond from the sample. The sample is allowed to completely cool, and the liquid is decanted from the beaker. The remaining residue is then wet screened to divide the recovered diamonds into micro-diamond size classes. Stones are stored in plastic vials containing methanol.

11.1.3.4 Sample Picking, Weighing & Data Recording

Samples are then sent to the observation room where they are handpicked by trained observers. Spikes are recovered first. After spike recovery is deemed complete, diamonds are picked from the residue and individually weighed. The weight of each stone in each size class is recorded. In GKJV’s case, stones smaller than 300 µm are not individually weighed, but the total parcel in each size class is weighed.

Stones are weighed on ultra-micro balances capable of accurately weighing 75 µg. Data are recorded on paper that is then manually entered into a spreadsheet by trained clerical personnel.

11.1.4 Mini-Bulk Samples

GKJV mini-bulk samples underwent dense media separation (DMS) concentration at the De Beers DMS facility in Grande Prairie. Sealed bulk sample concentrates were shipped under “Kimberley Process” chain-of-custody procedures to the De Beers Johannesburg, SA facility for final diamond recovery by x-ray fluorescence. The recovered microdiamonds were shipped under the same chain-of-custody procedure to the De Beers Diamond Trading Company (DTC) in London UK for appraisal and revenue analysis.

11.1.4.1 1999 GKJV Mini-bulk Sample Processing

Sample processing during 1999 was by gravity feed from the sample bag through a scrubber fitted with 12.5 mm square aperture a trommel screen, all +12.5 mm material was crushed to 10 mm and fed back into the scrubber. All -12.5 mm to 1.6 mm material was fed via a dropout box onto a 1.6 mm square aperture poly-panel pre-preparation screen, where this DMS feed was washed.

Following preparation, the sample was gravity fed into the mixing box from where the FeSi sample mix was pumped through a 200 mm diameter cyclone with a 46 mm spigot.

11.1.4.2 2001 – 2008 Grande Prairie Dense Media Separation (DMS) Circuit

A purpose-built 5 t/h (200 mm cyclone) DMS plant, with an integral scrubber, trommel screen, crusher, preparation screen and concentrate recovery system was installed at De Beers' processing facility in Grande Prairie, Alberta and used in 2001.

The sample material was gravity fed from the 2-ton sample bag into a 2-ton feed bin; from the feed bin the sample was fed onto a 9 m long feed-belt; feed speed was controlled by a gate in the front of the conveyor feed tray. From the conveyor, the material was gravity-fed into the scrubber, with the assistance of the crusher pump water. After scrubbing, the sample was discharged through a 14 mm trommel screen into a 4/3 Warman pump. This material was fed via the 4/3 Warman pump through a drop-out box onto the prep screen on the DMS unit. Material over 14 mm in size fell from the trommel screen lip into a 6 x 4 Masco jaw crusher, set to a 10 mm closed-gap setting. This crushed product was gravity fed into a 3/2 Warman pump and returned to the scrubber. In this way, the circulating +14 mm oversize material remained in closed circuit until reduced to below 14 mm in size. Due to the minimal amount of +14 mm material present in the samples, the jaw crusher could not be choke-fed during production; however, most of the oversize material preferentially, remained inside the scrubber during feeding. This material was choke-fed through the crusher when the scrubber was reversed during clean- out at the end of treatment of each sample.

During processing, fines (-1.5 mm material) are removed on the preparation screen, while the sample material is split into high- and low-density components in the cyclone. Sample concentrate reports to pails within a concentrate cage, and tails are collected in a per-numbered sample bag and stored on a per-sample basis. The single deck prep screen is fitted with 1.6 mm square aperture poly-panel screen panels and a set of spray bars. After washing on the prep screen, the sample material is gravity fed into the DMS mixing box, where the sample material is mixed with the dense medium (270D grade ferrosilicon (FeSi) and water mix). This mixture is pump-fed at a pressure of ~98 Kpa into a 200 mm DMS cyclone with a 46 mm spigot. Lights (sample tailings) from the cyclone are drained and washed across the lower deck of a double deck product screen to recover FeSi and discharged to a bulk-sample bag for weighing and storage. Spigot product from the cyclone (DMS concentrate) is similarly washed across the upper deck of the double deck product screen (1 mm square poly-panel) and gravity fed to a 20 litre concentrate pail, located within a secure cage.

DMS concentrates are collected into a pail within a cage that is secured by two padlocks and two single-use security seals. The pail is sealed while inside the glove-box equipped concentrate cage, before being removed from the cage and weighed. These concentrate drums were all sealed with uniquely numbered security seals and were then stored in a locked transport container prior to shipment.

A video camera was installed inside the transport container (which was also alarmed), and two cameras overlooked the treatment plant concentrate cage. Two seals, as well as two padlocks, seal both the cage and transport container. The plant supervisor and the operator each held a key to one of these padlocks; consequently, neither the cage nor the concentrate container could be opened without both the plant supervisor and the operator being in attendance.

Prior to export, concentrate pails were drained of water, weighed, and boxed within a palletised wooden crate, which was firmly screwed together and then strapped using metal bands. Uniquely numbered, tamper-evident seals were strategically placed on these straps to detect unauthorised opening the crates. Sample shipments were made on a regular basis. Shipments would be collected from the Grande Prairie premises by a Brinks Inc. armoured vehicle and driven with an armed escort, to the Edmonton airport, where they were air-freighted to Johannesburg via London.

Following DMS concentration, an overall concentrate percentage yield (concentrate mass divided by sample mass calculated from caliper measurements of hole diameter) was recorded. An overall sample recovery was calculated by dividing the headfeed sample mass by the sample mass calculated from caliper measurements of the hole diameter. All samples were subjected to similar processing, except for clay-rich samples, where small clay balls could still be found in the tailings following treatment. Such samples were re-processed.

Other measurements recorded during processing include moisture content and representative screening analysis of the tailings material. The treatment plant's operational parameters were recorded. This included measurement of operational time-and-motion information with discrimination of operational activities and downtime. Medium density was recorded regularly, as was the operating-medium pressure at the cyclone. Testing with density tracers was routinely undertaken, and the density cut-point and probable error (Ep) were determined.

Various measures were implemented to prevent sample contamination. The plant was cleaned after every sample. This involved a thorough cleaning of the scrubber, feed bin, pumps, screens, etc. A more thorough clean-out and a clean-up procedure was followed between processing material from the different kimberlite pipes.

In an attempt to avoid contamination, the scrubber was reversed and pressure-washed. Spillage was collected from beneath the plant and re-introduced into the process stream. All screens were hosed and un-blinded between samples. The cyclone-feed pump would be stopped and restarted, to dislodge any trapped grains. The plant was operated without load for 15 minutes between samples in order to flush out any entrained material, in an attempt to prevent contamination between samples.

Macro-diamond sample preparation and recovery was performed using industry-standard procedures. The resultant diamond populations are adequate for Mineral Resource estimation and mine planning.

11.2 Program Quality Assurance / Quality Control

11.2.1 Canamera Geological Ltd. 1992 – 1996 QA/QC

Monopros Ltd. undertook a due diligence study of the 5034 kimberlite and the AK and CJ claims in 1996 (Clement et al., 1996). The study encompassed:

- assessment of the information supplied by Mountain Province Mining Inc.;
- discovery history;
- local geological and topographic setting;
- Kimberlite discoveries;
- pipe location and general geology of the occurrence;
- petrological and mineralogical results and reports;
- borehole information;
- drill sampling information;

- geophysical surveys;
- details of micro-diamond samples;
- geochemical analysis of indicator minerals;
- macro-diamond sampling and diamond valuation;
- treatment procedures for macro-diamond samples; and
- access to diamonds for examination and valuation.

Kimberlite drill core received from Canamera was transported from Vancouver, BC and initially stored in the De Beers' warehouse in Grande Prairie, AB, moved to the De Beers' warehouse in Yellowknife, NWT and subsequently to De Beers' Sudbury warehouse facility where it is currently stored. The country-rock drill core remains on the Gahcho Kué site.

11.2.2 GKJV 1997 – 2003 Core Programs QA/QC

A surface grid tied to the Universal Transverse Mercator (UTM) system was established in the winters of 1997 and 1998 over each of the kimberlites. Several permanent reference points in each grid were established on land using the Trimble 4800 series global positioning system (GPS). These reference points were re-occupied later that year, again with a Trimble 4800 series GPS, which confirmed the accuracy of the original locations (Hodgkinson, 1998).

SRK Consulting conducted three quality assurance exercises during the 1998-1999 GKJV geotechnical program (Eichenburg, 1999), covering:

- hole collar locations and drill rig setup;
- core orientation (Pajari® tool and acid-test surveys); and
- Geotechnical measurements.

11.2.3 GKJV 1998 – 2002 Bulk and Mini-Bulk Sampling Programs QA/QC

In all cases, marked or synthetic diamond tracers were added to the samples to monitor recovery efficiency. Additional QA/QC measures are discussed below.

The coordinate grid established in 1997 to 1998 was re-established from previously laid-out permanent markers using a Trimble 4800 Series GPS system. The LDD hole collar locations were all established by measuring from the grid (Williams, 1999). A contractor independently surveyed about 50% of the collar positions (Valeriote, 1999).

An external audit of the procedures for the 1999 evaluation program at Kennady Lake was performed by a geologist and geostatistician from MRDI (now AMEC), during a site-visit lasting six days from 10 to 16 February 1999.

Conclusions and recommendations from that audit included but were not limited to:

- data entry and verification procedures should be reviewed to reduce data entry errors;
- manual sample logging prior to treatment at the Geological Sample Processing Services (GSPS);

- facility results in occasional errors such as duplicate sample numbering and incorrect seal numbers on sample manifests;
- more frequent field granulometry samples should be taken;
- an estimate of slimes lost during dewatering of the kimberlite should be made for each hole;
- security during all phases of the sample drilling and treatment is adequate and meets or exceeds industry standard;
- data collected during sample treatment in Grande Prairie should be consolidated into one central entry point, with formal back-up procedures in place;
- the sample treatment plant is adequate. However, the double-deck screen arrangement requires frequent monitoring during operation to ensure efficient diamond recovery;
- control of security seals at the Grande Prairie facility requires attention;
- DMS concentrate transportation should be reviewed to eliminate the road transport from Edmonton to Vancouver, en route to Johannesburg;
- a data acquisition program be initiated to provide engineering data for a future feasibility study;
- alternative containers for transporting DMS concentrate from Grande Prairie to Johannesburg should be investigated;
- process equipment at the GSPS facility should be reviewed to eliminate double screening and manual de-dusting steps;
- additional computer terminals should be considered at the GSPS facility to reduce waiting time and potential data entry errors; and
- random checks of samples revealed several discrepancies on the Geotrack sample tracking system in use at the GSPS facility.

Recommendations for improvements were implemented (Williams, 1999). Similar audits were undertaken at the Monopros Ltd. Grande Prairie, Alberta mini-bulk sample processing plant and the Geological Sample Processing Services (GSPS) diamond recovery plant in Johannesburg, SA.

Procedures during the 2001 to 2002 program included:

- 2001 program LDD hole collars were located using Real Time Kinematics GPS with the Leica system 500 tied in to a local GPS reference stations; collars were re-surveyed after hole completion.
- 2002 program LDD hole locations were determined using a Trimble 5700 series system GPS in Real Time Kinematics mode tied in to a local base station receiver (Rikhotso, Williamson and Podolsky 2002). Hole collars were re-surveyed after completion.
- Kimberley Process Chain-of-Custody documentation is used for all concentrate transfers.

11.2.4 GKJV 2004 – 2008 QA/QC

- Density samples were subjected to a procedure based on ASTM Designation – C 97-96; variations in electronic scale output were monitored with standard weights. Density samples underwent a 1%

external and 1.5% internal lab testing of duplicate density samples for verification of field density results.

- Kimberley Process Chain-of-Custody documentation.

11.3 Database

Drilling data collected from the 1999 to 2003 exploration and evaluation programs were captured for GKJV using Access®. During 2001, a major database validation was completed, and the earlier files were consolidated into one database. Drilling data collected from the 2004 to 2005 Advanced Exploration programs continued to be captured using Access®.

In 2005 to 2006, a Datamine® geological data management system was implemented and utilized for capturing drill program data. The Datamine® data management system configures a central geological database through a series of configurable tables, columns and pick up lists with a query builder function. In 2007, all Gahcho Kué Mine drilling and sampling data were transferred into MinSAMP System's SQL database and this system became the single source of geological data. Data stored includes collar survey, drilling (core and large diameter drilling), geological and geotechnical logging, sample collection and consignment, sample processing and plant configuration, diamond sorting and consignment data. The geological model is in Gahcho Kué GEMS SQL server project. The MinSAMP system database is currently stationed on a Microsoft Windows Server/SQL 2008-R2 (64-bit) in DBCi's mine sites (dynamic data) and corporate office (projects/sites in 'closed/inactive' and 'care and maintenance') data centres. Each have appropriate access security, are on daily, weekly and monthly backup schedules and on/off-site storage for disaster recoveries as per DBCi's IM/IT Policies and Procedures.

A number of audits and reviews were scheduled to review the data used in the estimate as well as the estimation results. Reviews on resources focused on the following areas:

- Systems audit;
- Data and database audit;
- Historic LDD data review; and
- Historic core data review.

Data was verified by the competent person prior to estimation and can be relied upon. Checks were also conducted on the data submitted for estimation by the estimation team. The estimation was completed by De Beers Canada Inc. and a third party.

The database was internally audited between April and July 2004. Line verification was undertaken on collar location, downhole survey data, geological logs and macro-diamond data. Drill hole folders were compiled for the Gahcho Kué data room in conjunction with the audit. A major restructuring of the GEMS project and associated database was completed by the mine resource geologist. The hard copy drill hole reports were compiled corresponding to the drill holes in the GEMS database and filed and indexed in the geology and resource data room. The geology and resource data room files are also digitally copied and stored in a mine "Electronic Data Management System" on a central server. AMEC, and its precursor MRDI, audited the database in 1999, 2003, 2005, 2007, and 2008 and found no significant errors or omissions (AMEC, 2008).

Spatial data has been collected using conventional survey techniques and different software which have evolved over time. The resource has been subjected to a number of sampling programs since discovery.

Spatial datasets exist for drilling and sampling information. All resource data is in a 3D secure spatial database (GEMS) in the SQL version. All drilling and sampling information at Gahcho Kué, including bulk sample data, is included in the GEMS SQL. Furthermore, drilling and sampling information is also stored in the MinSAMP database. Drill hole collar locations have been surveyed by a licensed surveyor. Down-hole surveys have been undertaken using a variety of instruments utilizing magnetic, optical and gyroscopic methods. Future survey control will continue to be undertaken in accordance with De Beers and AA plc standards.

Updates to the Gahcho Kué kimberlite GEMS model geological “solids” were carried out upon the completion of each drilling program and the data was verified by both internal and external audits prior to each model update. Additionally, an update including mining information occurred during 2018 (Waldegger, 2018) and 2019 (Donovan, 2019). This includes blast hole and face mapping data as well as drilling data from recent brownfields exploration.

The volume models were created using GEMS and Leapfrog. The volumes generated were quantified by running the volumetrics at a needling density of 9x9. Leapfrog® software was used to support the development of the 2018 and 2019 volume models, specifically the update to Southwest Corridor and Northeast Extension. In this case, Leapfrog® was used to develop the initial model shape, which was imported to GEMS for comparison to previous modelling and final completion/review (Waldegger, 2018 and Donovan, 2019).

During May 2017 an audit of the Resource and Reserve reconciliation was completed (SRK, 2017). The audit focused on the Processes, People and Systems involved in generating and reporting of the 2016 and 2017 Resource and Reserve Statements for Gahcho Kué Mine. There were only a few findings during the audit which required action and those items have been addressed.

11.4 Sample Security

Security procedures were in place during bulk and mini-bulk sampling drilling programs at the Gahcho Kué site during sample processing at the De Beers DMS facility in Grande Prairie; during diamond recovery at the De Beers Group Exploration Macro-Diamond Laboratory (GEMDL) in Johannesburg, RSA; and at the Saskatchewan Research Council Geoanalytical Laboratories.

The purpose of security procedures at the Gahcho Kué site was to set out the security duties, transportation and chain-of-custody processes around the handling, storage, documentation and overall security for the bulk sampling programs. Independent security contractors were employed at the Gahcho Kué site for the 2001, 2002, and 2008 large-diameter drill hole RC bulk sampling programs.

Mini-bulk samples collected during LDD RC programs were secured in closed bags with uniquely numbered single-use security seals at the Gahcho Kué site. The chain-of-custody was maintained through a series of consignment document sign-offs and tracking of the sample and security seal numbers from the initial collection of the sample, during transportation and to the final processing stages. Field consignment records of the bag and seal number, bag weight and condition were documented.

The mini-bulk samples were transported directly from Gahcho Kué to Grande Prairie in vans that were padlocked and affixed with uniquely numbered security tags via winter ice roads when possible, or flown by commercial aircraft to Yellowknife and then transferred to closed vans for shipment to Grande Prairie.

The De Beers Grande Prairie bulk sample DMS processing warehouse is a locked facility, monitored by multi-camera video surveillance by contracted security personnel. DMS concentrate is fed into a pail within a locked cage. Once a sample is completed the pail is sealed using a glove-box arrangement. Concentrate cages and storage areas are double sealed and locked, requiring the presence of one senior GKJV person and one contracted security personnel for access. Records are kept of visitors to the facility. DMS concentrates are locked into sealed 20-L containers, each of which has a uniquely numbered, single-use seal affixed. These containers are stored inside a class-three demountable vault until periodic shipments are made to Johannesburg using a security contractor.

At the Saskatchewan Research Council Geoanalytical Laboratory macro-diamond recovery facility, GKJV security staff reviewed the security procedures and systems and made recommendations for improved camera surveillance and hands-off microdiamond sorting by glove box. The recommendations were implemented.

The De Beers GEMDL facility in Johannesburg conforms to all the De Beers' Diamond Control Teams requirements for the secure processing of diamondiferous material. This involves access control, surveillance, hands-off processing and diamond control in accordance with the South African Diamond Act No. 56/86. JDS is of the opinion that the security procedures and measures undertaken during the Gahcho Kué sampling programs are adequate.

12 Data Verification

JDS has reviewed data verification processes undertaken in the previous Technical Reports. JDS is of the opinion that the data verification is adequate for use in the Report. A summary of data verification from these reports is provided below. Independent data verifications were undertaken on a number of occasions between 1999 and 2019:

- 1999, 2004, 2007 – independent consultants made site visits to review quality assurance / quality control (QA/QC).
- 1999 – external consultant audit of the 1999 evaluation program.
- 2000 – geology (petrological) peer review.
- 2004 – geotechnical and hydrogeology consultants QA/QC site visit, internal and external mineral resource evaluation data base audits, geology (petrological) peer review, Gemcom® three-dimensional (3D) model peer review.
- 2007 – internal and external petrological peer reviews; external verification of macro-diamond resource evaluation data set.
- 2008 – external review of 2003 Technical Report resource estimation and density (rock density) models.
- 2012 – peer review of updated geological models and Mineral Resource estimates; external consultant reviews of geological solid models and zonal estimate for Tuzo Deep Lower.
- 2017 – peer review of updated geological models and Mineral Resource estimates.
- 2019 – external review of updated geological models and 5034 NEX grade model and classification

Resource evaluation database verification included the following:

- audits of drill collar locations and lengths;
- down-hole survey data;
- geological logs;
- bulk density data; and
- macro-diamond data.

Data storage and verification procedures are adequate to support the geological interpretations and mineral resource estimation. All drilling and sampling data is stored in the MinSAMP system's SQL database. Geological models are stored in Gahcho Kué GEMS® SQL server project. The MinSAMP system database is currently stationed on a Microsoft Windows Server/SQL 2008-R2 (64-bit) on the GK mine site (dynamic data) and corporate office (projects/sites in 'closed/inactive' and 'care and maintenance') data centres. Each have appropriate access security, and are on daily, weekly and monthly backup schedules and on/off-site storage for disaster recoveries. Most paper files have been scanned and stored digitally. The project database undergoes periodic internal verification as well as periodic audits by external reviewers.

13 Mineral Processing and Metallurgical Testing

13.1 Metallurgical Testing

Mineral processing and metallurgical testing supports the mineral recovery and process plant design and was undertaken by ADP Projects (Pty) Ltd, Krupp Polysius AG and De Beers. Mineral processing and metallurgical test work undertaken on from the Gahcho Kué Kimberlites is summarized below. JDS is of the opinion that the metallurgical test work was adequate for use on the design of the process plant.

13.1.1 2002

Sample and mineralization characteristics were evaluated from a combination of the 2002 ODS results, and suitable information from the treatment of the LDD chips at the De Beers Grand Prairie facility during the 2000 (5034, Hearne, Tuzo and Tesla) and 2001 (5034 and Hearne) Gahcho Kué evaluation programs. This included dense media separation (DMS) and granulometry data.

Examination of the DMS operating parameters indicates that data derived from the sample treatment plant are reliable. The information is summarized in Table 13-1 and Table 13-2.

Preliminary data from both the ore dressing studies (ODS) and the LDD chip processing indicated that the kimberlite has a low DMS yield that should result in easy DMS operations and a relatively small recovery plant. The fines content presented in Table 13-2 is the total amount of fines produced during both drilling and scrubbing operations. As such, this is not considered representative of the fines that would be generated in a production plant.

Table 13-1: Mineralization Characteristics 2000 (Summary)

Pipe	Density (g/cm^3)	Total % (-1.0 mm)	DMS Concentrate (% of DMS Feed)	X-ray Yield (%)
5034	2.59	49.8	0.40	3.10
Hearne	2.59	49.8	0.38	2.61
Tuzo	2.40	65.7	0.31	4.05
Tesla	2.39	58.0	0.20	2.23
Average	**2.39**	**55.2**	**0.36**	**3.00**

Source: JDS, 2014

Table 13-2: Mineralization Characteristics 2001 & 2002 (Summary)

Pipe	Total % (-0.1 mm)	DMS Concentrate (% of DMS Feed)	
		2001 Grande Prairie	2002 ODS (Theoretical Yield Ep = 0.08)
5034	42.5	0.42	0.03
Hearne	54.7	0.28	0.09
Average	**46.7**	**0.37**	**Not Applicable**

Source: JDS, 2014

A significant amount of internal granite dilution can be expected at times. This could have an impact on liberation (granulometry) and result in accelerated wear.

The kimberlite content of the expected run-of-mine (ROM) feed based on these data is widely variable but on average is higher than 90%.

Information relating to the x-ray properties of diamonds was available from the evaluation programs and from the 2002 ODS. The ODS included magnetic susceptibility testing of the diamonds and gangue and the development of a luminescent profile of the gangue material. The recoverability of diamonds by x-ray sorting based on stones recovered during the evaluation programs, is summarized in Table 13-3. The number of stones larger than diamond sieve #12 was small, and the results were therefore biased toward the luminescence intensity (LI) values of the small stones. Generally, the large stones (>#12) showed good luminescence, while the smaller ones were more problematic. Recovery of small sizes would require very sensitive diamond sorting equipment, that is, the x-ray sorting equipment will need to be set at a lower than normal threshold setting, which could have an impact on diamond recovery.

Luminescence data obtained for the gangue material show that high yields can be expected when X-ray recovery technology is used to process DMS concentrate. Yields for the finer size fractions are estimated to be in the order of 0.3%. Excessively high yields can be expected for the coarser size fractions (+8 mm material). The data also showed that a yield in excess of 44% could be expected when processing material from certain areas of the kimberlite pipes. The actual diamond recovery may vary compared to the test work.

Table 13-3: Diamond Recovery Characteristics (Evaluation Process)

Pipe	% Recovery Characteristics of 0.25 Volts
5034	90.8
Hearne	94.3
Tuzo	90.3
Tesla	Not Applicable

Note: The 0.25 V is a threshold setting on an X-ray machine. When a diamond luminesces, the light is converted to an electrical signal, and if the signal is above 0.25 V the machine will eject the diamond and surrounding particles to the concentrate chute.

Source: JDS, 2014

All the diamonds samples have a magnetic susceptibility less than 20 x 10-6 cm^3 and thus could be recovered using high intensity magnetic separation. Magnetic susceptibility results showed that of the diamonds tested, 13% were diamagnetic and would not be recovered in using high intensity magnetic separation; thus, other methods are required to recover those stones. With the use of an NdFeB magnet, gangue mass reductions of up to 81.95% were measured.

13.1.2 2005

Test work, as shown in Table 13-4, was completed from 2002 to 2005.

Table 13-4: Test work Summary

Test work Location	Tests Undertaken / Data Generated
Gahcho Kué LLD (Grande Prairie processing facility) Diamonds sorted at the GEMDL (South Africa)	Particle size distribution DMS concentrate yield Diamond recovery Diamond size distributions Granulometry
DebTech (South Africa)	Diamond and gangue luminescence Diamond and gangue magnetic susceptibility Recovery plant yield Drop weight data Slimes characterization Whole ore desimetric analysis Rock mechanics Preliminary scrubbing tests
Patterson and Cooke Consulting Engineers (South Africa)	Slime slurry rheology and pumping
Krupp Polysius (Germany)	High-pressure rolls crushing
Kawasaki (EarthTechnica, Japan)	Cone crushing

Source: JDS, 2014

Test work findings were as follows:

- Gahcho Kué kimberlites exhibit similar impact breakage to their associated granite rock. The impact breakage characteristic of these samples can be classified as medium to hard; therefore, crushers utilizing higher input energies such as 1 kWh/t or higher may be required.
- Gahcho Kué material is resistant to comminution by abrasion as indicated by ta values of 0.27 to 0.52, where ta is the measure (index) of resistance to abrasion breakage. This indicates that a scrubber or a mill could be utilized as a 'washer' rather than a comminution unit.
- Laboratory scrubbing results indicated that comminution attributed to scrubbing would generate very low fines, less than 10%.
- Polysius testwork generated design data for application of a high pressure rolls crushing (HPRC) unit either in a secondary or tertiary crushing mode. The required product size for treating approximately 350 t/h of a mixture of plant feed (-50+30 mm) and DMS rejects (-30+6 mm) will be achieved by a truncated feed size at higher press force, 3.4 N/mm^2 and with specific energy of 3.0 kWh/t.
- EarthTechnica crusher test work generated design and scale-up data for secondary crushing application using a Kawasaki type crusher. These data were generated for a blend of Hearne and 5034 samples. However, it was established that if these kimberlite bodies are treated separately it would result in similar trends within certain limits. This conclusion was based on the individual drop-weight tests (DWT) and rock mechanics results provided to their technical team by GTS Metallurgy.

- Three Kawasaki crusher options, such as KM3015Z, KM3682Z and KG4015Z, were investigated for scale-up.
- DMS yields should be relatively low, potentially less than 1%, for both 5034 and Hearne kimberlite bodies. The optimum split size based purely on the lowest calculated yield was found to be 8 mm. A split DMS was recommended for the conceptual Gahcho Kué process flowsheet.
- Co-thickening has benefit in terms of reagent consumption, water savings and generation of high-density slurry. A high density thickening unit with picket rakes would be necessary to assist with the compaction of the mud-bed to achieve higher-density slurry.
- The results from the ore dressing study showed that the Gahcho Kué material is similar to other kimberlites processed in Southern Africa with respect to comminution and densimetric profiling.
- Normal wear rates are expected for the processing of the Gahcho Kué material through standard diamond processing comminution devices such as cone and high pressure roll crushers. DMS yields can be classed as “medium to low” with less than 1% yield being obtained for both the 5034 and Hearne kimberlites.
- One problematic area that was identified by the ore dressing study was the large amount of luminescent material that reported to the DMS sinks fraction. This material was subsequently tested on a dual-wavelength X-ray machine to determine the probable yields that could be obtained from a production unit. Initial indications were that up to 90% of the luminescent gangue material could be rejected.
- High flocculant consumption rates were obtained for treatment of slimes where the grit fraction had been removed. Flocculant consumption for co-thickened slurries were approximately half that of the slimes only fraction.

13.1.3 2006

Conceptual use of grease recovery technology was explored during 2006. Grease technology was considered to have advantages over the earlier use of x-ray technology at Gahcho Kué because grease technology typically has:

- high efficiency, typically greater than 95% diamond recovery for -3 +1.5 mm material and 97% recovery for -6 +3 mm material;
- low capital and operating costs;
- low yields of 0.05% for -3 +1.5 mm material and 0.01% for -6+3 mm material;
- high throughputs, typically 500 kg/h for -3 +1.5 mm material and 1,000 kg/h for -6 +3 mm material;
- small footprint; and
- fully enclosed for security of product.

The conceptual recovery plant designed in 2006 was based on grease recovery for -6 mm material and X-ray recovery for +6 mm material. To remove non-diamond material, degreased -6 mm concentrate was proposed to be chemically treated using hot molten caustic, and +6 mm X-ray concentrate to be hand-sorted.

13.1.4 2007

Samples of Gahcho Kué Tuzo gangue were characterized at DebTech for amenability to x-ray sorting and magnetic separation technologies. The samples were composed of material fractions, -8 +3 mm and -3 +1.18 mm. The respective size fractions were separately subjected to x-ray excited luminescence intensity, as well as mass magnetic susceptibility measurements.

Tuzo gangue was found to be amenable to x-ray sorting. Magnetic susceptibility data for the Tuzo drill core samples and diamonds indicate that magnetic sorting to reduce the feed to recovery can be applied.

13.1.5 2011 – 2013

A review of all test work completed was undertaken by De Beers Technical Services to establish the final design criteria for the process plant design.

13.2 Mineral Processing

As a producing mine the Gahcho Kué Diamond Mine operates a full scale and a permanent process facility which treats run-of-mine kimberlite material to produce a rough diamond concentrate. The Gahcho Kué process plant has been operating continuously since commissioning in September 2016. To date the plant has treated a mix of various lobes from the 5034 and Hearne deposits. Section 17 further describes the process plant design methodology.

Two production scale bulk samples known as “revenue samples” were treated independently during 2017 to provide insights into the size, quantity and quality of stones recovered from specific lobes in 5034. The samples are discussed in further detail in Section 14.

14 Mineral Resource Estimates

14.1 Introduction

The baseline estimation and classification of the mineral resources was completed by AMEC and summarized in the “Gahcho Kué Kimberlite Project NI 43-101 Technical Report” (AMEC 2009). Additions and modifications to the AMEC mineral resource for the Tuzo Deep mineral resources deeper than 300 metres below surface (mbs) elevation are summarized in the “Update of the Mineral Resource Estimate for the Tuzo Kimberlite, Gahcho Kué Project, Northwest Territories, Canada NI 43-101 Technical Report” (Mineral Services 2013) as a result of an additional ‘Tuzo deep’ drilling program undertaken in 2012.

JDS reviewed both the (AMEC, 2009) and (Mineral Services, 2013) resource statements and compiled the information into a single resource estimate for the 2014 (NI) 43-101 Technical Study (JDS 2014).

The geological resource block models were updated by Waldegger (2018) and Donovan (2019) using additional diamond drilling and mining information. Modelling was updated in Leapfrog and completed in GEMS. All databases were constructed and maintained in the GEMS modelling system. Geological wireframes were built using GEMS modelling tools with the exceptions of Southwest Corridor, Hearne Corridor and Northeast Extension, which were built in the Leapfrog® modelling System and imported, to GEMS for confirmation and mine project usage. Mineral resource estimates were completed in both GEMS and Isatis. Open-pit shells for use in Resource declaration were developed in Whittle and Deswik.

Large diameter drilling was used to collect samples of kimberlite for grade and diamond value modelling. Macro-diamonds[2] from the LDD were used to estimate local grades on 5034 West and Centre lobes and Hearne Pipe. Grade estimations for these pipes were completed using variography and kriging methods. Diamonds from this drilling were also used to confirm diamond size and value data for all lobes and pipes. Micro-diamonds[3] from drill core were used to create local estimates of grade for the 5034 North-East Lobe and Tuzo Pipe. Micro-diamonds are stones (less than 0.5 mm) recovered from the dissolution of drill core using a caustic fusion process. These results were used for local estimation (kriging) into blocks (25 m x 25 m x 12 m) and then converted to carats per hundred tonnes above a commercial bottom cut-off using a micro−macro model of grade as a function of size. Micro-diamonds were used in these cases primarily due to the difficulty of obtaining adequate macro-diamond samples for the purposes of local resource block estimation. In these cases, the available macro-diamonds were used for valuation purposes and for calibration of micro-diamonds models.

Micro-diamonds from drill core were used to create global estimates of grade for the 5034 North and South pipes. Zonal estimates of grade (grade / rock type) were completed in 2013 for Tuzo Deep.

Density modelling was completed using dry bulk densities. Spatial analyses were completed using dry densities per unit for the combined lobes and bulk densities were block estimated by kriging function.

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[2] Macro-diamonds for the purposes of this report are those stones recovered from LDD samples by a treatment process that involves crushing and screening.

[3] Traditionally, stones retained on a 0.5 mm square-mesh screen after sieving are referred to as macro-diamonds, while stones that pass through the sieve are referred to as micro-diamonds. For the purposes of this report, micro-diamond results refer to stones recovered from diamond drill core subjected to acid digestion or caustic fusion. Strictly speaking, these results may contain both micro- and macro-diamonds. The micro-diamond treatment process involves dissolving the kimberlite in an acidic or caustic solution and recovering any diamonds released above a specified bottom cut-off (usually 75 µm or 106 µm). The micro-diamond results can be used to estimate the grade in carats per tonne (cpt) of a kimberlite above a given cut-off. Estimates of grade using micro-diamonds must be adjusted to reflect a realistic bottom cut-off (e.g., 1.0 mm), and may need adjustment to reflect differences in liberation and recovery in a commercial treatment plant and the micro-diamond treatment process.

Appropriate techniques were used to ensure calculation and reporting of the diamond mineral resource at a +1 mm lower cut-off. The mineral resource was adjusted appropriately for expectation of main treatment plant recoveries.

To establish a reasonable cut-off grade and assess reasonable prospects for economic extraction to support declaration of the mineral resources, average diamond pricing was applied to the resource, and Whittle software was used to establish a series of pit shells.

14.2 Mineral Resource Estimation

Chuchra (2013) and Ellemers (2013) updated the three dimensional geological and block models following the completion of the 2013 Tuzo Deep model. The geological and block models were further updated by Waldegger (2018) and Donovan (2019) using additional diamond drilling and mining information. Modelling was updated in Leapfrog and completed in GEMS and includes all available resource information including the Tuzo Deep kimberlite (from 360-564mbgl), 5034 North and East Lobe indicated (300-400mbgl), 5034 Southwest Corridor, recently classified 5034 Northeast Extension and Hearne Corridor. Rock types in the Gahcho Kué Mine are described in detail in Section 7.1.2.6

14.2.1 Grade Estimation

The Gahcho Kué Mine resource grade has been estimated in 2004, 2008, 2012, 2013, 2018, and 2019 (Mountain Province Diamonds, 2010; Ellemers, 2013; Bush, 2018, Bush, 2019, Ellmers, 2019). Changes in the estimates are largely due to changes in the geological model and estimation methodology as well as additional drilling to extend the resource (Southwest Corridor in 2018 and Northeast Extension and Hearne Corridor in 2019).

A global estimate is one value for the entire kimberlite, a zonal estimate is one value per rock type, and a local estimate is kriged into mining blocks (Table 14-1). For Gahcho Kué, a mining block is defined as 25x25x12m.

Table 14-1: Grade Estimate Types

Deposit	Lobe	Estimation Type
5034	West	Local
	Centre	Local
	North East	Local
	North Pipe	Global
	Southwest Corridor	Local
	NE Extension	Local
Hearne	North	Local
	South	Local
	Corridor	Zonal
Tuzo	0-360 mbgl	Local
	360-564 mbgl	Zonal

Source: De Beers, 2019

Local mining block estimates for grade were completed in the West and Centre Lobes of 5034 and the Hearne kimberlite using macrodiamonds recovered from large diameter drilling. Kriging was completed in two passes. In the first pass the search radii was 75x75x50 m in the X, Y and Z directions. In the second pass, the search radii were increased to inform all blocks within the model (Mountain Province Diamonds, 2010). West lobe grade was updated in 2018 with the new data from the run of mine samples. After re-establishing geological continuity through spinel geochemistry and size frequency distribution continuity was confirmed through sample support analysis, the grade was factored by the reconciled sample grade vs grade model. Original model spatial variability was retained (Ellemers et al., 2017a; and Ellemers et al., 2017b).

A local block estimate was completed for the classification of Southwest Corridor using microdiamonds recovered from diamond drilling as well as macrodiamonds from a focused mining sample. Two-pass ordinary kriging was used with a third pass completed in order to fill remaining blocks. For the HK units a 75x75x24 m (X-Y-Z) search ellipse in the first pass and second pass extended to 100x100x48 m. For VK units a 60x60x24 m search ellipse in the first pass and second pass extended to 120x120x48 m. Search ellipse radii were chosen based on the geostatistical parameters of each unit (Bush, 2018).

A local block estimate was also completed for the Northeast Extension (NEX). Microdiamond data from diamond drilling of NEX as well as microdiamond and macrodiamond data from North Lobe were applied to produce the final estimated values. Two-pass ordinary kriging was used with remaining blocks populated via grid filling. For the HK unit a 71x71x24 m (X-Y-Z) search ellipse on the first pass with a 107x107x36 m ellipse on the second pass, both with 90m ranges. For the HKt unit a 71x71x48 m (X-Y-Z) search ellipse on the first pass with a 107x107x60 m ellipse on the second pass, both with 80 m ranges. For the Tk-TKt unit a 71x71x36 m (X-Y-Z) search ellipse on the first pass with a 107x107x60 m ellipse on the second pass, both with 55m ranges. Search ellipse radii were chosen based on the geostatistical parameters of each unit (Bush, 2019)

Validation of the mineral resource estimates included visual inspection, comparison of statistics and analyses to detect spatial bias and smoothing.

Zonal estimates were completed for Hearne Corridor (Ellmers, 2019). Microdiamond data from the drilling intercepts within the corridor, along with macrodiamond recoveries from LDD and focused mining specifically for TKM, for the basis of estimates.

Local mining block estimates for grade were completed using microdiamonds in the Northeast lobe of 5034 and Tuzo (0-360 mblgl). The estimation was carried out in three steps (Mountain Province Diamonds, 2010).

1. Estimating zonal diamond content per rock type (with microdiamonds and macrodiamonds).
2. Locally estimating the block tonnage using the local block percent and density models.
3. Locally estimating the grade per mining block.

The grade models for 5034 Center and 5034 Northeast were updated in 2017 with the new data from the run of mine samples. After re-establishing geological continuity through spinel geochemistry and SFD continuity was confirmed through sample support analysis, the grade was factored by the reconciled sample grade vs. grade model. Original model spatial variability was retained (Ellemers et al., 2017a; and Ellemers et al., 2017b).

In Tuzo, a dilution model was also constructed on a local block resolution in order to estimate the local block tonnage more accurately. In both Tuzo and 5034, calibration and consistency of the models was achieved using macrodiamonds (Mountain Province Diamonds, 2010).

In 2013, significant changes to the extent of the Tuzo kimberlite was achieved through drilling of 5 holes deep into the kimberlites in order to quantify the resource at depth (Avery R, Ellemers K., 2012). Zonal grade estimates were completed (Ellemers, P., 2013) for the rock types of Tuzo Deep. Block models were created for all rock types between 360-564 mbgl. Furthermore, there were changes in the geological wireframe (Chuchra, 2013), between 300-360 mbgl which resulted in changes in the block models between 300-360 mbgl. This resource statement reflect all updates in the Tuzo resource in 2013.

In 2015, the zonal grade in the HK unit in Tuzo between 0-360 masl was changed to match the zonal grade from 360-564 masl. The two different zonal grades for HK was an artefact of two different estimates completed at two different times. The Tuzo Deep (360-564) estimate, completed in 2013 had more data and utilized all of the HK data in Tuzo. It was considered a better zonal estimate. Therefore, the grade in 0-360 masl was changed from 209.6 cpht to 175 cpht to match the grade in 360-564 masl. This resource statement reflect all updates in the Tuzo resource up to and including the changes in 2015.

All databases were constructed and maintained in the GEMS modelling system. Geological wireframes were built Using GEMS modelling tools with the exceptions of Southwest Corridor, Hearne Corridor and Northeast Extension, which were built in the Leapfrog® modelling System and imported, to GEMS for confirmation and mine project usage. Mineral resource estimates were completed in both GEMS and Isatis. Open-pit shells for use in Resource declaration were developed in Whittle and Deswik.

14.2.1.1 Other Considerations Impacting Grade Determination

A number of other issues were considered prior to the grade estimation of 5034 West and Centre lobes:

- The effect of different sample-support sizes of the two LDD programs. Different sample support sizes (in this case, 311 mm and 610 mm diameter LDD drill holes) tend to result in similar grade means, but different grade variances: the larger support size has a smaller variance. A technique to adjust the sample variance of the smaller diameter holes was considered in 2003, but was not applied due to inconsistent results. In this report, as in 2003, no adjustment was made for different hole diameters.
- The effect of different sample lifts, namely 6 m, 12 m and 18 m. The issue of different sample lifts was resolved by regularization, a process that calculates the grade per mining bench height by combining or sub-dividing samples into common lengths and weight averaging the diamond content over the new interval. For Gacho Kué, a bench height of 12 m was planned, and grade values were drill hole length weighted according to the drill hole intersection per bench to accommodate sample lengths that varied from less than 12 m to greater than 18 m.
- The impact of clustering of the 2002 drill holes. To test the effect of the clustered LDD samples on the mineral resource estimates, a de-clustering method was tested but not applied for two reasons. Only small differences were found between global grades using de-clustered data and clustered data, and the semi-variograms indicated that the correlation between sample points was preferentially orientated in a vertical rather than horizontal direction.

- Assess the diamond recovery differences between campaigns. Results from different campaigns exhibited differences in recovery characteristics, which were related to reasonably well understood drilling conditions.

14.2.1.2 Composite Preparation (CP)

The adjusted sample macro data were imported into GEMS where they were bench composited to 12 m lengths while honouring geology. The cut-off for the minimum length of composites to be used in the estimation was investigated by comparing the average cp/m^3 value of composites at several cut-offs to ensure there was no bias in the selection of composite length. The difference in the average cp/m^3 value between all composites, and those where bottom cut-offs were applied, is negligible. To maximize the use of available grade information, a minimum length of 6 m was imposed.

14.2.2 Bulk Density Estimation

Several programs of density sampling have taken place throughout the development of the Gahcho Kué Mine. Programs prior to 2004 were noted to contain samples with no indication of dry density. These samples have been superseded by additional programs from 2004, 2005, 2006, and 2007 in which industry standard were applied for measuring both wet and dry densities as well as stringent protocol for QA-QC. For 2004 and 2005 programs the method applied was coated immersion followed by drying and reweighing of the samples producing both wet and dry densities (Waldegger, 2005). 2006 and 2007 programs followed De Beers MRM protocol. This consisted of sampling of core, 10 to 15 cm in length, at intervals of 6m in kimberlite and 12 m in country rock, selected to be representative of local geology seen in core. Samples were collected immediately at the drill and plastic wrapped to retain in-situ moisture. Wet and dry bulk densities were determined using coated immersion (Mountain Province diamonds, 2010).

Density modelling for the Gahcho Kué Mine was completed using dry bulk densities calculated from 2004 forward with the exception of areas where no dry density data was available. At these locations wet densities were used to predict dry density. Spatial analyses were completed using dry densities per unit for the combined lobes and bulk densities were block estimated by kriging function (Mountain Province Diamonds, 2010)

14.2.3 Assortment Modelling

The 5034, Hearne and Tuzo kimberlites have been divided into several significant geological units, representing a range of depositional environments. A single assortment model is used at present for Hearne and another single model is used for Tuzo. The 5034 body is modelled with two distinct assortments and five separate Size Frequency Distribution models. The West lobe and Southwest Corridor share one assortment model, moderated by specific SFDs, with the Centre and Northeast lobes and the North pipe having three further individual SFD models with one assortment (Table 14-2)

Table 14-2: Size Frequency Distribution and Assortment Models (1-3)

Sieve	5034 Centre	5034 West	5034 NE	5034 SW Corridor	Hearne	Tuzo
	% Carats	% Carats	% Carats	% Carats	% Carats	% Carats
+23	1.36	0.80	0.67	0.63	0.61	1.09
+21	2.36	1.92	1.08	2.15	1.23	1.59

Sieve	5034 Centre	5034 West	5034 NE	5034 SW Corridor	Hearne	Tuzo
	% Carats	% Carats	% Carats	% Carats	% Carats	% Carats
+19	4.29	3.36	2.52	3.03	2.75	2.66
+17	2.87	2.42	1.84	2.32	2.03	1.83
+15	1.98	1.66	1.37	1.57	1.52	1.29
+13	7.85	6.18	5.51	6.17	5.77	5.10
+12	6.52	4.74	4.70	5.06	4.65	3.77
+11	13.48	9.89	8.07	9.19	10.11	8.14
+9	17.71	14.58	14.07	13.91	15.08	12.35
+7	13.30	12.30	12.69	11.71	12.72	11.46
+6	10.53	12.49	13.37	12.38	12.76	12.20
+5	9.36	13.03	14.57	13.04	13.51	17.45
+3	6.73	13.15	15.17	14.56	13.44	16.35
+2	1.66	3.49	4.37	4.26	3.83	4.73
+1	-	-	-	-	-	-
-1	-	-	-	-	-	-
Total SSV	**100**	**100**	**100**	**100**	**100**	**100**

Source: De Beers, 2019

14.2.4 Resource Classification

The Gahcho Kué Mine mineral resource was classified by the Mineral Resource Classification Committee (MRCC) using the De Beers Mineral Resource Classification Scorecard (MRCS). The scorecard system is based on completion of key questions that define the level of confidence in one of the five elements that comprise a diamond resource estimate: geology, volume, grade, density and revenue. De Beers Canada resources and reserves are classified according to the Canadian Institute of Mining and Metallurgy Resources and Reserves Standards.

In classifying the mineral resource, qualitative levels of confidence in the geological model and the estimates made up of volume, grade, density and average diamond value were assessed. The assessment also considers data integrity, methodology and adherence to procedures. The primary considerations in arriving at a resource classification are the geological model, the quality and density of sampling, and the method of estimation used. Diamond revenue (US$/ct) estimation involves two key parameters, size frequency distribution and assortment. The former defines the size range and proportion of diamonds per size range, while the latter relies on modelling the diamond value $/ct/sieve class for each geological facies based on the actual sample grades. The combination of these considerations and the degree of confidence in each will dictate the resource classification.

The Gahcho Kué Resource was classified between the January 2009 and the March 2013 with Southwest Corridor added on October 2018 and the Northeast Extension added on July 2019 (Table 16). The 5034 NE, 5034 W, 5034 Center, 5034 SWC, 5034 NEX 354 mbgl, Tuzo 354 mbgl, and Hearne 204 mbgl resources were classified as Indicated. The 5034 NEX below 354 mbgl, Hearne North 204-318 mbgl and

Tuzo 354-564 mbgl resources were classified as Inferred. All Resource classifications were ratified and approved by Dr. A. Grills or Mr. K. Gostlin (De Beers Group) as the classification Competent Persons. The reference elevation (lake surface) is 420.9 masl. An amendment to the classification of the 5034 NE from 300-400 was granted in 2014. As of the end of December 2013, 5034 NE below 300 mbgl was documented as not classified and therefore comprised part of the Gahcho Kué deposit statement. However, it was determined that in 2008, this formed part of the original classification of 5034 and the amendment was requested and granted (Ratshitanga, 2014).

The classification risk for 5034 is its small size and the irregular "root zone" nature of the body that may affect volume estimates. The diamond parcel available for revenue estimation from 5034 is well in excess of 3,000 carats that has traditionally been considered adequate for average price calculations. Production results during the first two years has been incorporated into the updated revenue models for both 5034 and Hearne.

The North Pipe of 5034 has been incorporated into the newly classified Northeast Extension. Given the large amount of additional information in the region, remodeling has affected the volume. However, much of the former North Pipe is converted by transfer. Northeast revenue data has been applied to Northeast Extension following significant petrological analysis identifying continuity.

The South Pipe of 5034 has been incorporated into the Southwest Corridor for the classification mentioned above. This volume has been included in transfer by classification.

The classification risk for the Hearne kimberlite is the small size of the pipe. Simulation studies have shown that sample data for grade are sufficient to define an Indicated Mineral Resource above 204 mbgl. The number of samples falls off rapidly with depth. The macro-diamond parcel is well in excess of 2,700 carats and is sufficient for both size frequency distribution and assortment analysis. This has been significantly augmented by continuous mining including four focused mining samples.

The Tuzo body has a geologically complex interior and carries significant amounts of dilution that is irregularly distributed throughout the body. Based on the 2007 core drilling program and the LDD program carried out in 2008, an Indicated classification was applied for all parts of the Mineral Resource above 300 mbgl.

The Tuzo pipe remains open at depth and is modelled to a depth of 564 mbgl; from 300-360 mbgl grades were estimated for mining blocks in this zone in a similar way to the estimation of the Indicated Mineral Resource and this resource has been upgraded to an indicated level of confidence based on the new drill core information. The section of the Tuzo model from 360-564 mbgl was classified as an Inferred Mineral Resource and a zonal grade estimate was completed.

14.3 Model and Estimate Validation

Gahcho Kué Mine has developed Resource and Reserve reporting process flow maps to ensure the accuracy in the generation and reporting of Resource and Reserve related information. The following parties conduct reviews:

1. On-site by the De Beers CPs of Resource and Reserve;
2. Offsite by De Beers Canada Calgary Support Centre; and
3. Offsite by specialists within De Beers Group including the Mineral Resource and Reserve Committee Members.

Data informing the geological and resource models is checked on-site by Production Geologists, validated by the Resource Geologist, and reviewed and signed off by the Technical Services Manager. The geological model was updated in 2019 using additional drilling from the 2018-2019 Northeast Extension classification program as well as the abundance of data from blast holes and face maps collected during regular mining operations.

Existing resource estimates with global values are managed and maintained on-site by the Resource Geologist. New resource estimate updates (Ellemers, 2017a; and 2017b; Bush, 2018; Bush, 2019) were incorporated to the resource model.

As the models are transferred from GEMS into mining software for the purpose of mine planning and scheduling, the GEMS model is compared to the mining model to ensure that the material reported in mining is accurately representing the GEMS model and that any error between the software packages is identified.

The spatial checks were conducted on the exclusive resources using the spatial check template provided by Group MRM to confirm the remaining Mineral Resources after conversion to Ore Reserves. These checks were conducted by the Gahcho Kué Resource Geologist and reviewed by the Resource CP and the Reserve CP.

JDS has also imported the 2019 GEMS resource model and confirmed reserve and resource statements.

14.4 Mineral Resource Summary

The Gahcho Kué Mine resources are summarized in Table 14-3. In order to comply with the Reasonable Prospects of Eventual Economic Extraction (RPEEE), classified resources of an inferred level of confidence or higher were subject to a preliminary evaluation in order to test their potential economic viability in the future. This test assumed a revenue factor of 1.8 x revenue, and mining, treatment and sales cost in 2019 constant dollars, and relied on an independent Whittle run in order to define the potential open pit limit. The revenue to which the factor of 1.8 was applied is the 'RPEEE 2019 4+8' at RV (96% of SSV as per the JV agreement) and a price index of $131.70 at a strict bottom cut-off (Table 14-4). For Tuzo, a material portion of the orebody does not pass the 2019 RPEEE pit limit test. However, using the 2018 Tuzo Optimization Study which included a sub-level cave underground design as the basis, a RPEEE underground test at 1.8 x revenue was performed on Tuzo in 2018. In this underground assessment, all of the Tuzo material passes the RPEEE test.

Those resources that passed the open pit or underground RPEEE test were then considered valid resources, included in the Resource Statement and were available for consideration for Reserve conversion. Those resources that did not pass the RPEEE test were reverted to deposit levels of confidence and reported there. In this case, a portion of the estimate was reverted to deposit. Note that the RPEEE evaluation was undertaken using the same bottom cut-off as stated in the Resource Statement i.e. 1.0 mm.

JDS is of the opinion that the resource estimate presented provide an accurate and complete basis for state of the resource as of December 31, 2019. Resources are exclusive of mineral reserves.

Table 14-3: Mineral Resource Summary (December 31, 2019)

Resource	Classification	Tonnes (Mt)	Carats (Mct)	Grade (cpt)
5034	Indicated	1.3	1.8	1.36
	Inferred	1.3	2.3	1.76

Resource	Classification	Tonnes (Mt)	Carats (Mct)	Grade (cpt)
Hearne	Indicated	0.2	0.4	1.58
	Inferred	1.3	2.2	1.69
Tuzo	Indicated	0.7	0.6	0.93
	Inferred	11.0	14.9	1.36
Summary (In-Situ)	**Indicated**	**2.2**	**2.8**	**1.26**
	Inferred	**13.6**	**19.4**	**1.43**
Stockpiles	Indicated	0.0	0.0	0.00
	Inferred	0.0	0.0	0.00
Grand Total Resource	**Indicated**	**2.2**	**2.8**	**1.26**
	Inferred	**13.6**	**19.4**	**1.43**
	Total	**15.8**	**22.1**	**1.40**

Notes:
(1) Mineral Resources are reported at a bottom cut-off of 1.0 mm. Incidental diamonds are not incorporated in grade calculations.
(2) Mineral Resources are not mineral reserves and do not have demonstrated economic viability.
(3) Tonnage quoted as dry metric tonnes.
(4) Resources are exclusive of Mineral Reserves.
(5) Resources have been depleted of any material that was processed prior to and including Dec 31 2019. Q4 depletion is based on forecasted values and may differ slightly from actual values.
Source: De Beers, 2019

Table 14-4: RPEEE Revenue 2019 4+8 at RV (90% of SSV) $/ct on $131.70 Price Index

AREA	131.70 RV$/ct		EXCH RATE	RPEEE FACTOR	Whittle Revenue	
5034 Centre	USD	$ 113.53	1.25	1.80	CAD	$ 255.44
5034 West	USD	$ 77.88	1.25	1.80	CAD	$ 175.23
5034 North East & NEX	USD	$ 71.80	1.25	1.80	CAD	$ 161.54
5034 South West Corridor	USD	$ 75.89	1.25	1.80	CAD	$ 170.76
Hearne	USD	$ 67.67	1.25	1.80	CAD	$ 152.25
Tuzo	USD	$ 59.76	1.25	1.80	CAD	$ 134.45

Source: De Beers, 2019

JDS has reviewed the resources and compared to those stated in the 2017 (NI) 43-101 Technical Report and 2018 modelling work provided by De Beers. Table 14-5 and

Table 14-6 summarize differences in resource carats and tonnes from 2018 to 2019. During this comparison, JDS confirmed the following changes in resource estimates:

- The opening resource balance at the start of 2019 was 2,543 thousand carats in the indicated category and 16,973 thousand carats of Inferred
    - Conversions – All three open pits were redesigned based on revised geotechnical design parameters and/or additional resource information. The combined effect of changes due to conversion is an increase of 217 thousand carats in the indicated category. These carats include a reduction of 352 thousand in 5034, an increase of 500 thousand carats in Tuzo and an increase of 69 thousand carats in Hearne.
    - Economic Assumptions - An updated RPEEE test was applied. Indices and costs were updated. The approach to RPEEE assessment was consistent to the approach taken in 2018 in which a 1.8 x revenue shell was utilised as per the De Beers standard. The year on year change resulted in a decrease of 559 thousand carats of inferred material in Hearne.
    - New Information –The addition of 5034 Northeast Extension added 1,268 thousand carats while Hearne Corridor added 281 thousand carats (both inferred).
    - Model Refinement - Change in Hearne SFD results in a decrease of 1 thousand carats inferred.
    - Reconciliation adjustment - The total reconciliation adjustment was 309 thousand carats of inferred resulting from a correction to the Tuzo block model, extending the model to cover the bottom of Tuzo Deep.
- The closing balance at year-end December 2019 amounts to 2,761 thousand carats indicated and 19,389 thousand carats inferred.

Table 14-5: Reconciliation of Resource Carats from December 2018 to December 2019

Exclusive Resource Carats (000's)	Classification	Previous Year Resource Estimate	Depletions	Conversions	Economic Assumptions - RPEEE	New Information - Classification	Model Refinement - Contact	Reconciliation Adjustment	Current Year - Exclusive Resource
5034	Indicated	2,125	0	-352	0	0	0	0	1,774
	Inferred	987	0	0	0	1,268	0	0	2,255
Hearne	Indicated	316	0	69	0	0	0	0	385
	Inferred	1,399	0	0	559	281	-1	0	2,238
Tuzo	Indicated	102	0	500	0	0	0	0	602
	Inferred	14,587	0	0	0	0	0	309	14,896
Subtotal Insitu	**Indicated**	**2,543**	**0**	**217**	**0**	**0**	**0**	**0**	**2,761**
	Inferred	**16,973**	**0**	**0**	**559**	**1,549**	**-1**	**309**	**19,389**
	Total	**19,517**	**0**	**217**	**559**	**1,549**	**-1**	**309**	**22,150**
Stockpile	Indicated	0	0	0	0	0	0	0	0
	Inferred	0	0	0	0	0	0	0	0
Grand Total	**Indicated**	**2,543**	**0**	**217**	**0**	**0**	**0**	**0**	**2,761**
	Inferred	**16,973**	**0**	**0**	**559**	**1,549**	**-1**	**309**	**19,389**
	Total	**19,517**	**0**	**217**	**559**	**1,549**	**-1**	**309**	**22,150**

Notes:

(1) The figures quoted in the statement above reflect the total estimates for the Gahcho Kué Mine as at December 31, 2019
(2) Mineral Resources are stated at a strict 1.0mm bottom cut off
(3) Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
Source: De Beers, 2019

Table 14-6: Reconciliation of Resource Tonnes from December 2018 to December 2019

Exclusive Resource Tonnes (000's)	Classification	Previous Year Exclusive Resource Forecast	Depletions	Conversions	Economic Assumptions - RPEEE	New Information - Classification	Model Refinement - Contact	Reconciliation Adjustment	Current Year - Exclusive Resource
5034	Indicated	1,425	0	-126	0	0	0	0	1,299
	Inferred	472	0	0	0	809	0	0	1,281
Hearne	Indicated	206	0	37	0	0	0	0	243
	Inferred	866	0	0	261	196	-3	0	1,321
Tuzo	Indicated	179	0	472	0	0	0	0	650
	Inferred	10,782	0	0	0	0	0	210	10,992
Subtotal Insitu	**Indicated**	**1,810**	**0**	**383**	**0**	**0**	**0**	**0**	**2,193**
	Inferred	**12,121**	**0**	**0**	**261**	**1,004**	**-3**	**210**	**13,594**
	Total	**13,931**	**0**	**383**	**261**	**1,004**	**-3**	**210**	**15,787**
Stockpile	Indicated	0	0	0	0	0	0	0	0
	Inferred	0	0	0	0	0	0	0	0
Grand Total	**Indicated**	**1,810**	**0**	**383**	**0**	**0**	**0**	**0**	**2,193**
	Inferred	**12,121**	**0**	**0**	**261**	**1,004**	**-3**	**210**	**13,594**
	Total	**13,931**	**0**	**383**	**261**	**1,004**	**-3**	**210**	**15,787**

Notes:

(1) The figures quoted in the statement above reflect the total estimates for the Gahcho Kué Mine as at December 31, 2019
(2) Mineral Resources are stated at a strict 1.0mm bottom cut off
(3) Mineral Resources are not Reserves and do not have a demonstrated economic viability.
Source: De Beers, 2019

15 Mineral Reserve Estimates

15.1 Open Pit Geotechnical

Mine geotechnical investigations at Gahcho Kué have been ongoing since 1996 primarily under the supervision of independent consultants SRK and more recently, Piteau Associates. Between 1996 and 2013 a geotechnical model for the Gahcho Kué deposits was created through eight drilling and core logging campaigns, and three field mapping programs. These programs resulted in the development of the mine geotechnical parameters and pit slope design criteria used during the 2014 PFS. The original criteria outlined in a 2004 SRK study identified six distinct structural domains used to develop the pit design sectors for 5034, Hearne and Tuzo. The pit slope design parameters outlined in the 2014 PFS and subsequent pit designs were used as the basis for operational mine planning and reserve reporting during 2014, 2015 and 2016.

During 2015 and 2016, field observations of the performance of the eastern walls in 5034 warranted additional investigation into the geotechnical design criteria. The significance of the J5 joint set, a shallow dipping northeast trending structure was made apparent during the excavations of the first two benches of the 5034 pit. The J5 structure's unfavourable orientation presented the possibility for significant crest loss and compromised ramp widths on the eastern pit walls of 5034.

As a result the GKJV commissioned a new geotechnical study under the supervision of Piteau Associates in 2016 with the following primary objectives:

- Conduct a drilling and logging of twelve bore holes with a primary focus on assessing the geotechnical characteristics of 5034, Hearne and Tuzo, as well as the significance and continuity of the J5 structure.
- Perform updated kinematic analysis using new geotechnical data and re-assess the geotechnical domains for all three pits.
- Provide revised geotechnical design criteria based on updated analysis for the purpose of open pit optimization and detailed pit design to mitigate the potential concerns of J5 in 5034, Hearne and Tuzo.

Results from the Piteau field investigation were used to update rock mass data, and develop recommendations and alternatives on inter-ramp angle, bench face angle and catchment width which were provided to Gahcho Kué in early 2017.

Following the 2017 Piteau Associates work, an additional field investigation commenced from 2017 to 2018 drilling 15 geotechnical drill holes. Photogrammetry mapping data of the temporary and final pits walls, as well as surface mapping data of the outcrops and the upper west, north and east walls of the 5034 pit were collected. The developed surface mapping structural database consisted of 2,755 structural features along with characteristic information (spacing, persistence, toughness, etc.).

The purpose of the investigation was to address data gaps and target potential adverse structural orientations that could not be analyzed in detail from 2017. Following sample testing, kinematic analysis and pore water pressure calculations, geotechnical analysis of the ultimate pit shapes was conducted by Piteau, and used to assess the potential for inter-ramp and overall slope stability. As a result of in-lab rock strength testing, the universal compressive strength (USC) ranges from 237 MPa to 245 MPa between the Tuzo, 5024, and Hearne pits.

The GK rock mass was previously subdivided into eight structural domains. Certain structural domains that have a significant amount of new structural data available were subsequently divided and domain boundaries updated. The rock mass was divided into 15 structural domains between the Tuzo, 5034 and Hearne pits following the 2017 update.

In 2018 and early 2019, the drilling program targeted the saddle portion between the existing 5034 open pit and the proposed Tuzo open pit. This result developed the new geology model for the Northeast Extension. The configuration of the Hearne pit was also updated to incorporate the slope design recommendations from Piteau Associates 2018 geotechnical investigation report.

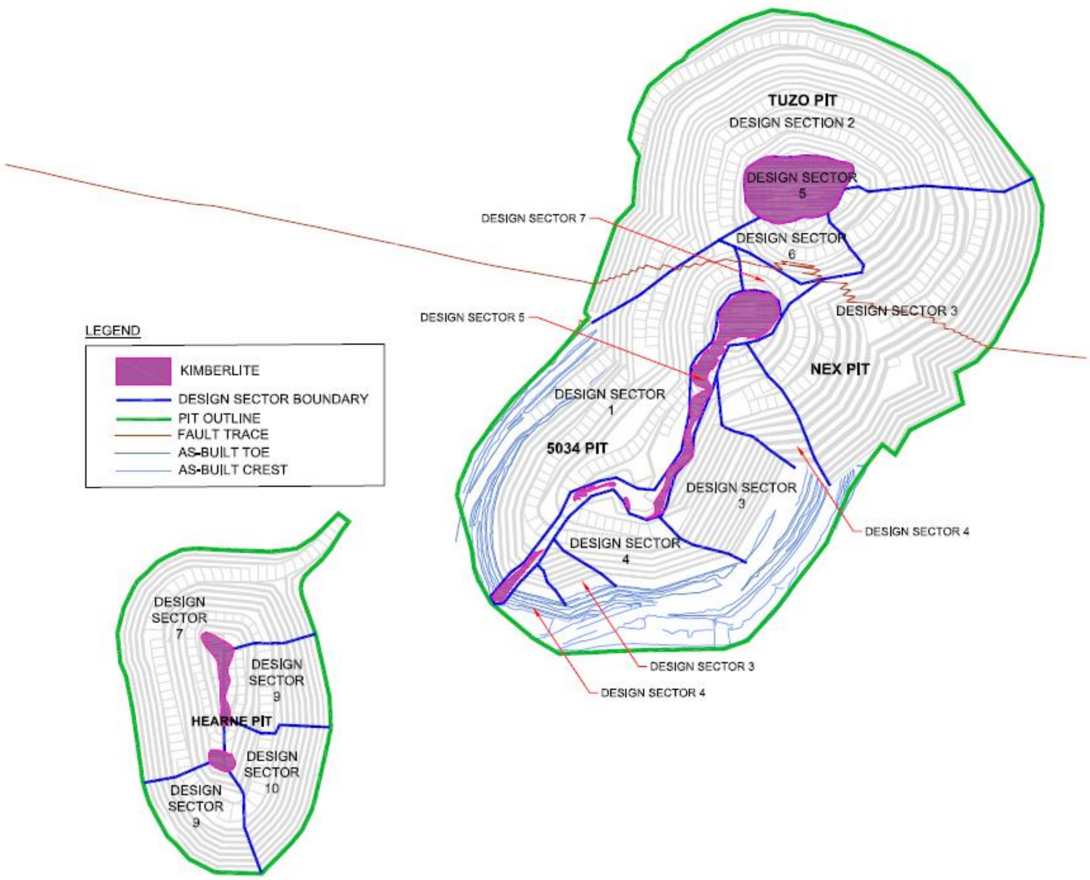
Based on the updated structural information, some structural domains were amalgamated due to the review of structural data. The current and planned pits (5034/NEX/Tuzo and Hearne) are divided by 13 structural domains which are bound by several steeply dipping faults. In general, these faults are characterized by zones of more intense jointing. No significant deformation of the rock mass near the faults (i.e., drag folds, recumbent folds, etc.) is indicated by the model. From these 13 structural domains, 11 design sectors have been created (Figure 15-1) based on the dominant joint sets in each given pit wall.

Economic and risk analysis were conducted on the impact of each alternative presented in the various design sectors. **Error! Reference source not found.** outlines the pit slope criteria selected by Gahcho Kué as the basis for the updated pit optimizations, detailed designs and reserves as of December 31, 2019.

Double benches are recommended for all areas of the pits where rock mass conditions are good and structural conditions are favourable. However, where rock mass conditions are fair and structural conditions are unfavourable, single benches are recommended. This includes areas where kimberlite is exposed to the pit wall, and where planar instability has the potential to develop along moderately or deeply developed joints sets with moderate dip and high continuity.

Initial benches in all pits should be developed using single benches until wall performance suggests that double benches can be applied in the target design sector using parameters in the table below. Allowance for single benching at surface has been incorporated into detailed pit designs.

Figure 15-1: Piteau Pit Slope Design Sectors



Source: De Beers, 2019

Table 15-1: Pit Slope Design Criteria

Design Sector	Pit Area	Lithology	Bench Type	Slope Dip Direction °	Bench Height (m)	Effective Bench Face Angle °	Effective Catchment Berm (m)	Inter-Ramp Angle °
1	5034 / NEX / Tuzo	Granite	Single	060 to 180	14	74.5	9	47
			Double		28	78.0	12	57
2			Single	100 to 260	14	74.5	9	47
			Double		28	83.0	11	63
3			Single	260 to 340	14	72.5	9	46
			Double		28	74.1	14	52
4			Single	340 to 060	14	74.5	9	47
			Double		28	83.5	11	63
5		Kimberlite	Single	All	14	69.3	14	44
6	5034 / NEX / Tuzo (Saddle)	Granite	Single	340 to 060	14	74.5	9	47
			Double		28	83.0	11	63
7			Single	180 to 260	14	74.5	9	47
			Double		28	83.5	11	63
8	Hearne	Granite	Single	060 to 240	14	74.5	9	47
			Double		28	81.4	12	60
9			Single	240 to 260 340 to 060	14	74.5	9	47
			Double		28	81.4	12	61
10			Single	260 to 340	14	72.5	9	46
11	All	Overburden	Single	000 to 360	14	33.7	7	27

Source: Piteau Associates, 2019

15.2 Open Pit Optimization

De Beers used Whittle software to conduct pit optimizations on the three deposits at Gahcho Kué and select ultimate pit shells. The Whittle optimization process uses a set of input parameters to develop open pit shapes by varying the price (revenue factor) and generating a 'breakeven' pit shell for each revenue factor.

The objective of the pit optimizations was to maximize the extraction of the mineral resources outlined in the 3D resource block model. These pit shapes were then used as the basis to create detailed pit designs from which Mineral Reserves could be calculated.

Joint venture approved diamond prices, an average of the De Beers Group Sight Holder Sales (DBGSS) 1.0 mm cut-off prices (2019 4+8 DBGSS index 122.70) and Mountain Province's 2019 prices were used to determine the diamond pricing for the basis of the optimization. A summary of the revenues and other inputs are provided in Table 15-2.

Table 15-2: Open Pit Optimization Parameters

Parameter	Unit	Value
Mining OPEX Variable	CAD / t mined	3.17
Mining OPEX Fixed	CAD/ t processed	12.18
Mining Sus. CAPEX	CAD / t processed	1.73
Processing OPEX	CAD / t processed	12.64
Processing Sus. CAPEX	CAD / t processed	0.86
G&A OPEX	CAD / t processed	41.13
G&A Sus. CAPEX	CAD / t processed	1.91
Total ‘Process’ Cost Input	**CAD / t processed**	**70.45**
Exchange Rate	CAD : USD	1.25
Dilution	Refer to section 15.4	
Mining Recovery	%	100
Prices		
5034 Southwest Corridor	US$/ct	72.19
5034 West	US$/ct	73.46
5034 Centre	US$/ct	104.05
5034 North East	US$/ct	65.92
Hearne	US$/ct	65.89
Tuzo	US$/ct	70.68
Discount Rate	%	8.0
Selling Cost	%	4.0
Price Escalation		
5034		1.17
Hearne		1.11
Tuzo		1.32
Pit Slope Parameters	Refer to Section 15.1.1	

Note: Mine design parameters in this table differ slightly from final cost estimates but the QP does not consider the differences to be material to the Mineral Reserve estimate.

Source: De Beers, 2019

The cut-off ore selection method with an in-situ cut-off grade of 25 cpht (exclusive of external dilution) was used for the optimization. This allows all kimberlite, with the exception of low-grade kimberlite below 25 cpht in Tuzo, to be treated as ore and reflects practices at Gahcho Kué, and correctly accounts for processing cost in the optimization. This was achieved by removing blocks below an in-situ grade of 25 cpht from the block model and setting the cut-off value to near zero (inclusive of external dilution) to ensure diluted blocks along the kimberlite and waste rock contact are included as ore.

Mining cost adjustment factors (MCAF) were not used to adjust the mining cost with depth. The impact of mining depth on cost at Gahcho Kué is not distinctly correlated. The mine rock storage sequencing is optimized to smooth out the haul truck requirements by long hauling during the earlier years of the plan, and short hauling to the external mine rock storage facilities as well as backfilling in-pit during the mining of the lower-most benches.

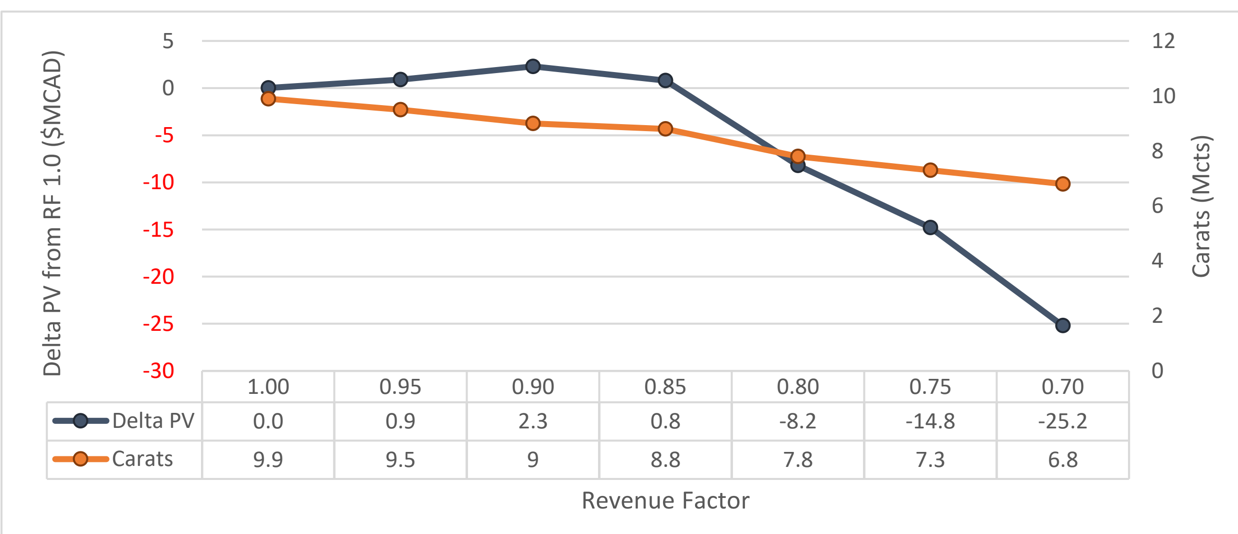
After an integrated Whittle shell optimization was completed on the 5034, Hearne and Tuzo kimberlite pipes, a skin analysis (incremental shell review) was performed to identify the optimal net present value (NPV) final pit shell. The discounted revenue at both JV and De Beers' prices were evaluated. The skin analysis was completed for 5034 pit. However, as the pit is over one third mined down to the final depth, geotechnical and operational factors were the main drivers of determining the optimal pit design. For Hearne, the 5034 NEX Pushback and Tuzo, the revenue factor shells with the highest discounted cash flow at JV prices were selected to guide the detailed 2019 pit design updates. The Whittle outputs and shell selection are shown in Table 15-3 to Table 15-8.

Table 15-3: Hearne Whittle Outputs

Revenue Factor of Final Shell	Total Pit Size (Mt)	Waste (Mt)	Ore (Mt)	Total Carats (Mcts)	Discounted Cashflow ($M CAD)	Delta PV from RF 1.0 ($M CAD)
1.00	46	41	4.8	9.9	335	0.0
0.95	40	35	4.6	9.5	336	0.9
0.90	**34**	**29**	**4.3**	**9**	**337**	**2.3**
0.85	31	26	4.1	8.8	336	0.8
0.80	22	19	3.5	7.8	327	-8.2
0.75	20	16	3.2	7.3	320	-14.8
0.70	15	12	2.9	6.8	310	-25.2

Source: De Beers, 2019

Table 15-4: Hearne Graph of Outputs



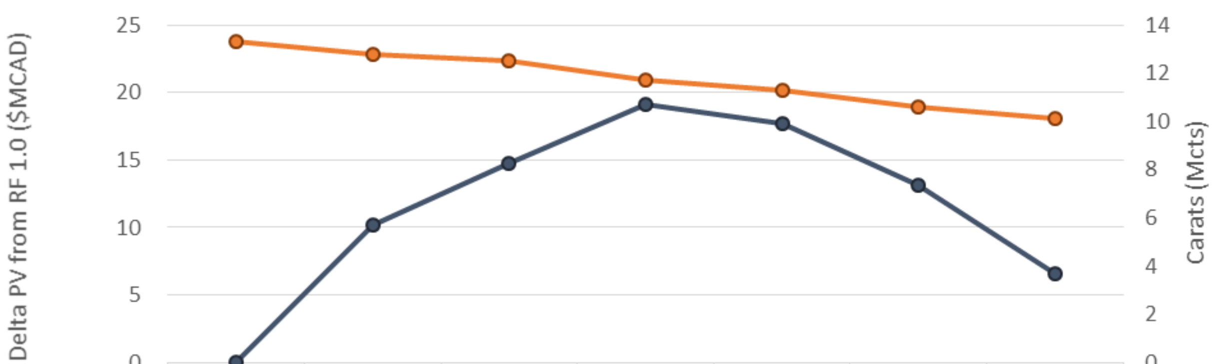
Source: De Beers, 2019

Table 15-5: 5034 NEX Whittle Outputs

Revenue Factor of Final Shell	Total Pit Size (Mt)	Waste (Mt)	Ore (Mt)	Total Carats (Mcts)	Discounted Cashflow ($M CAD)	Delta PV from RF 1.0 ($M CAD)
1.00	126	120	6.3	13.3	190	0.0
0.95	119	113	6	12.8	200	10.2
0.90	114	109	5.8	12.5	205	14.7
0.85	**105**	**99**	**5.4**	**11.7**	**209**	**19.1**
0.80	101	96	5.1	11.3	208	17.7
0.75	93	88	4.8	10.6	203	13.1
0.70	89	84	4.5	10.1	197	6.6

Source: De Beers, 2019

Table 15-6: 5034 NEX Graph of Outputs



	1.00	0.95	0.90	0.85	0.80	0.75	0.70
Delta PV	0.0	10.2	14.7	19.1	17.7	13.1	6.6
Carats	13.3	12.8	12.5	11.7	11.3	10.6	10.1

Source: De Beers, 2019

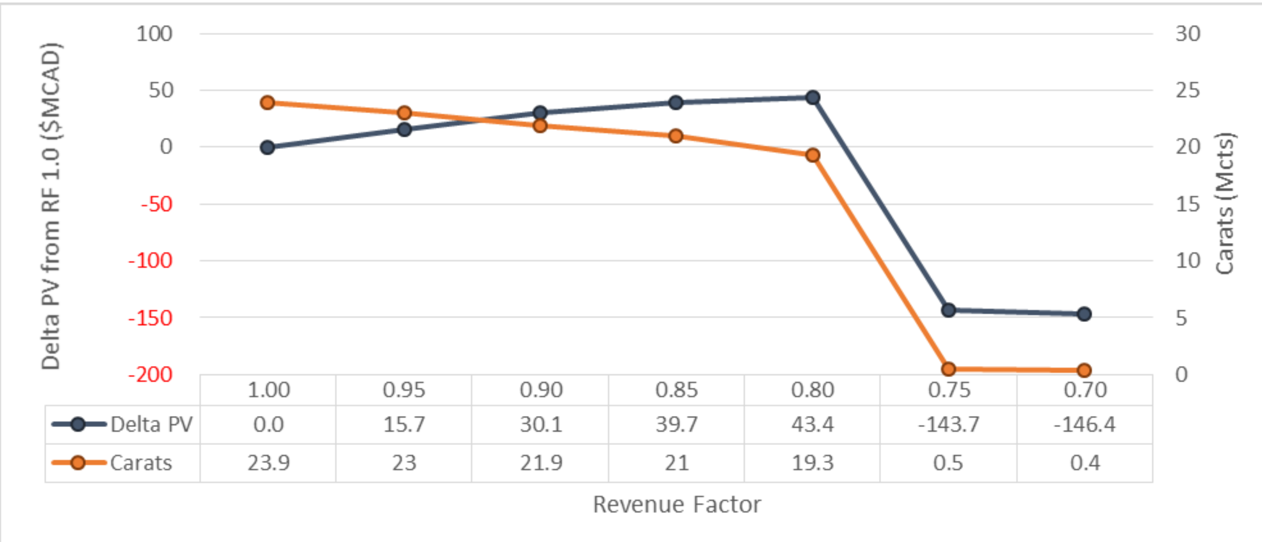
Table 15-7: Tuzo Whittle Outputs

Revenue Factor of Final Shell	Total Pit Size (Mt)	Waste (Mt)	Ore (Mt)	Total Carats (Mcts)	Discounted Cashflow ($M CAD)	Delta PV from RF 1.0 ($M CAD)
1.00	230	211	18.8	23.9	164	0.0
0.95	213	195	18.3	23	179	15.7
0.90	194	176	17.5	21.9	194	30.1
0.85	181	164	17	21	203	39.7
0.80	**157**	**141**	**15.8**	**19.3**	**207**	**43.4**
0.75	3	3	0.2	0.5	20	-143.7

Revenue Factor of Final Shell	Total Pit Size (Mt)	Waste (Mt)	Ore (Mt)	Total Carats (Mcts)	Discounted Cashflow ($M CAD)	Delta PV from RF 1.0 ($M CAD)
0.70	2	2	0.2	0.4	17	-146.4

Source: De Beers, 2019

Table 15-8: Tuzo Graph of Outputs

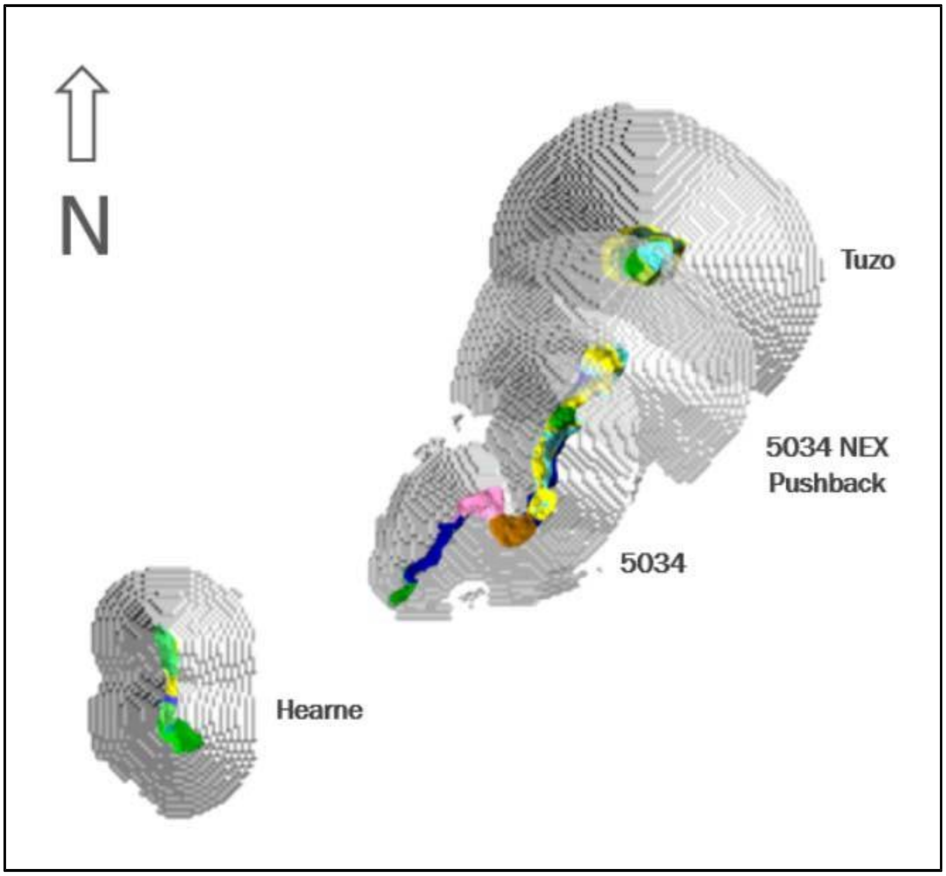


Source: De Beers, 2019

These selected shells were 0.90, 0.85 and 0.80 for Hearne, the 5034 NEX Pushback and Tuzo respectively. The selected Whittle shells are presented in Figure 15-2 through Figure 15-4

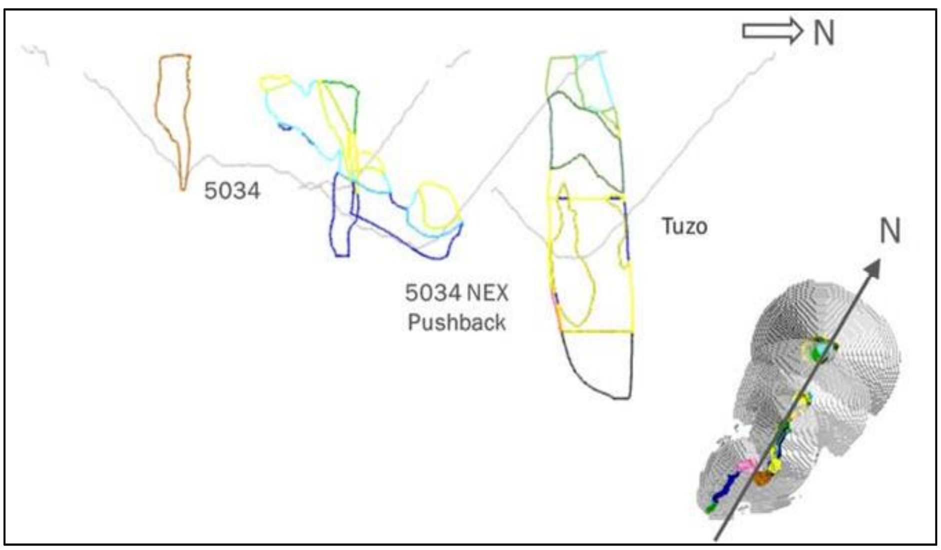
Due to the large zone of high internal dilution in the Tuzo pipe, the revenue factor 0.8 selected shell shows marginal economics. Further study is planned to try and improve the economic viability of this phase.

Figure 15-2: Plan View Selected Shells



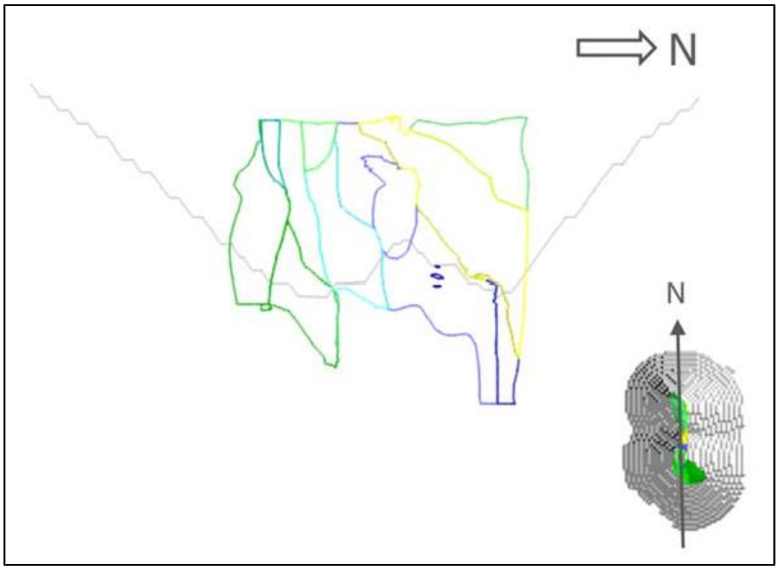
Source: De Beers, 2019

Figure 15-3: Cross-Section through 5034, 5034 NEX, and Tuzo Selected Shells



Source: De Beers, 2019

Figure 15-4: Cross-Section through Hearne Selected Shell



Source: De Beers, 2019

15.3 Open Pit Design

All stated reserves for the Gahcho Kué Mine exist within detailed pit designs. These detailed designs are based on the recommended geotechnical parameters for each geotechnical zone, as well as the selected optimal Whittle shell. Detailed pit designs for each of the three deposits were generated with the following considerations:

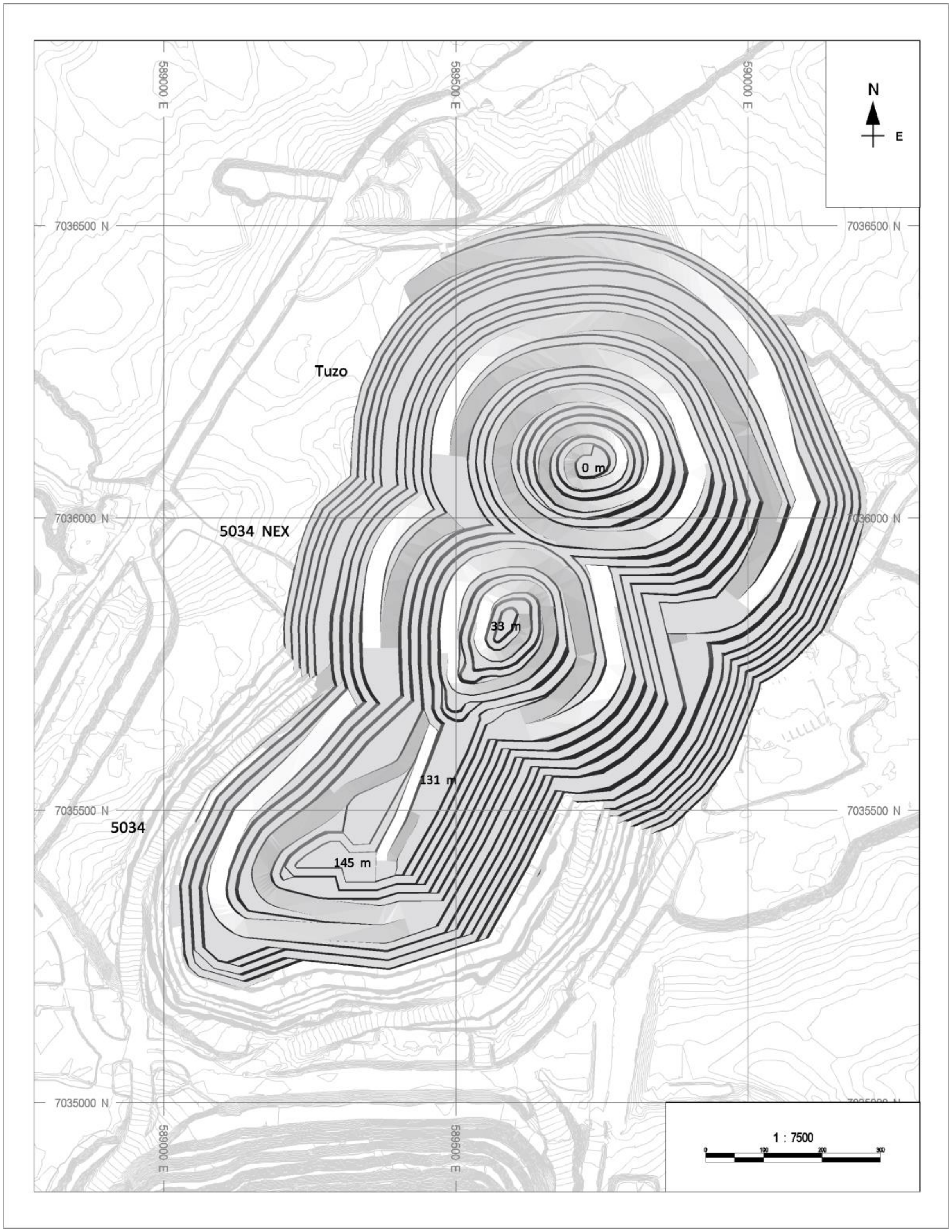
- Double and single lane haul ramps designed to meet the regulations outlined in the NWT Mines Health and Safety Regulations. (3x and 2x the width of the largest haul truck + berm);
- Catchment benches;
- Minimum mining widths;
- 14.0 m benches; and
- Double benching were applicable

Due to the close proximity of the Tuzo and 5034 pipes as well as the addition of 5034 NEX, the two pits connect. The Hearne pit is a stand-alone design with no interaction to 5034 at this time.

Ramp orientations have been established to optimize exit distances relative to waste rock piles and critical infrastructure. Ramps are a mixture of concentric and switchback designs based on geotechnical criteria. Tuzo and Hearne maintain a concentric ramp while 5034 includes a switchback on the West wall due to geotechnical constraints outlined in Section 15.1. The 5034 NEX area is accessed by an internal phase ramp which is removed as Tuzo progresses. It is not necessary to maintain access to 5034 NEX as it is eventually backfilled.

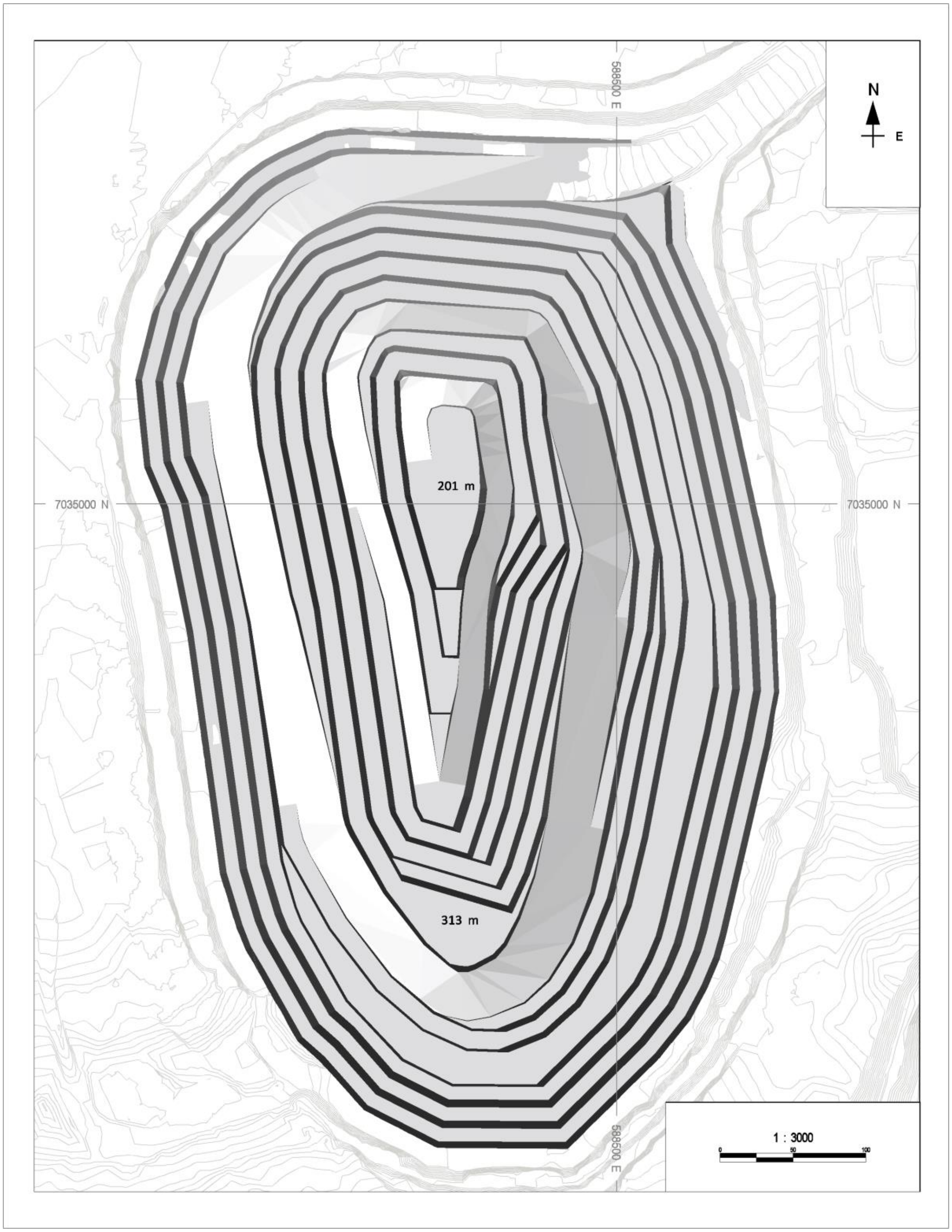
Pit designs for 5034, Hearne and Tuzo are presented in Figure 15-5 and Figure 15-6.

Figure 15-5: 5034 / Tuzo Ultimate Pit Design



Source: De Beers 2019

Figure 15-6: Hearne Ultimate Pit Design



Source: De Beers, 2019

15.4 Mining Dilution and Losses

Mining dilution and losses have been incorporated in the conversion of Mineral Resources to Mineral Reserves.

A global factor of 1% has been applied to all reserves to account for mining losses due to stockpile manipulation and fleet destination errors.

Internal and external dilution has been considered and addressed separately for each pit. Internal dilution is incorporated into the mineral resource with the exception of a large raft of waste (1.4Mt) in the Tuzo body which is excluded from the mineral resources and reserves. External mining dilution is estimated by spatially modeling a 1.35 m thick 'skin' of dilution at all waste and kimberlite contact areas. This assumes that all material from mixed ore/waste contact areas will be sent to the treatment plant rather than low grade stockpiles. The dilution thickness was chosen by evaluating a series of dilution skins with of incremental thickness and comparing results to actual data. The application of the 1.35m external dilution skin results in the following average mining dilution by deposit:

5034: 10.9% (exclusive of 5034 NEX Pushback);

5034 NEX Pushback: 7.1%;

Hearne: 8.1%; and

Tuzo: 4.7%.

15.5 Open Pit Mineral Reserves

The optimization results and subsequent pit designs have determined the economic mineral reserve estimate for each deposit as summarized in Table 15-9.

Table 15-9: Mineral Reserve Estimate

Area	Classification	Tonnes (M t)	Carats (M ct)	Grade (cpt)
5034	Probable	13.0	26.3	2.02
Hearne	Probable	3.4	6.4	1.91
Tuzo	Probable	16.1	19.4	1.20
In-Situ Total	**Probable**	**32.6**	**52.1**	**1.60**
Stockpile	Probable	0.5	0.9	1.74
Total	**Probable**	**33.0**	**53.0**	**1.60**

Notes:
(1) Mineral Reserves are reported at a bottom cut-off of 1.0 mm
(2) Mineral Reserves have been depleted to account for mining and processing activity prior to Dec 31 2019.
(3) Q4 2019 depletion is based on forecasted values and may differ slightly from actual depletion.
(4) Mineral Reserves are based upon the updated resource model (2019) and therefore reflect any changes to the estimation of tonnes, grade and contained carats within that resource. Details on resource changes are summarized in Section 14.
(5) Prices used to determine optimal pit shells have been escalated by factors varying by pit, which are indicative of the respective pit's timing and duration.

Source: De Beers, 2019

Table 15-9 was reviewed by JDS and complies with CIM definitions and standards for a National Instrument (NI) 43-101 for an operating mine.

The economic analysis presented in Section 22 confirms that the probable reserve estimates meet and comply with CIM definitions and (NI) 43-101 standards. At the time of this report, the mine is economically viable using current diamond prices and prevailing long-term price estimates.

15.5.1 Stockpiles

The Gahcho Kué Mine stockpiles run of mine (ROM) ore on a pad adjacent to the primary crusher. Ore is loaded into the hopper of the primary crusher using front end loaders at a rate of approximately 400 tph. The run of mine (RoM) stockpile at the primary crusher has a year-end inventory of approximately 490k tonnes and 850k carats inclusive of dilution and mining losses. This material is from 5034 North East, 5034 Centre, 5034 Southwest Corridor and Hearne.

Stockpile strategy is defined by the building and maintenance of stockpiles by lobe that provide the appropriate grade and tonnage in accordance with the life-of-mine plan and based on mining availability. Grade and density accounting follows a ‘first-in-average-out’ strategy where depletions are calculated month-on-month using the previous month end averages. Weighted values with material from the current month are applied only when depletions exceed previous month totals.

16 Mining Methods

16.1 Mining Methods

The Gahcho Kué Mine employs conventional open pit truck/shovel mining methods. Waste and ore are blasted and loaded using a fleet of diesel powered trucks, shovels, drills and ancillary equipment. Waste rock will be stored in two surface mine rock piles as well as in two of the excavated pits at later stages of the mine life. Kimberlite ore is hauled to a run-of-mine storage pad where the ore is stockpiled and loaded into the primary crusher via a front end loader. Kimberlite processing creates two additional waste streams of coarse and fine processed kimberlite. Coarse processed kimberlite (CPK) is loaded into haul trucks and stacked in a pile north of the plant, while the fine processed kimberlite (FPK) is deposited via slurry into a settlement pond known as Area 2. Non-acid generating (NAG) and potentially-acid generating (PAG) waste rock is differentiated using an on-site sampling system of blast hole cuttings. PAG rock is encapsulated within the surface mine rock piles and eventually below the restored final lake elevation of Kennady Lake during period of pit backfill.

The mine design and consequent mine plan considers conventional truck / shovel mining utilizing 29 m^3 bucket diesel hydraulic front shovels, a 17 m^3 front-end loader and 218 t class haul trucks to mine kimberlite and waste. This large fleet is augmented by 12 m^3 bucket front-end loaders, scaling excavators and five 90 t haul trucks. Production drill and blast activities are supported by a fleet of rotary blast hole drills drilling 251 mm diameter holes. Pre-shear and auxiliary drilling is conducted by down the hole percussion drills drilling 171mm diameter holes.

Pit designs were developed using optimized Whittle shells as a basis, and these were used to develop the mine production plan and schedule. The mining sequence is optimized to smooth waste stripping requirements, while ensuring adequate kimberlite exposure to meet kimberlite feed requirements, as well as mine rock storage considerations within the Hearne and 5034 pits throughout the mine life.

Pre-stripping began on land in the northern half of the 5034 pit in 2014, with the majority of the granite waste used for road, dyke and infrastructure pad construction. Unsuitable overburden material was placed in the South mine rock pile. Mining continued in the north side of 5034 until Q1 2016, when mining in the south half of the ultimate 5034 pit began. Mining in the 5034 pit will be completed in Q2 2024. From this point, mine rock from the adjacent 5034 NEX Pushback will be placed in the mined-out 5034 pit.

Mining of Hearne pit started in December 2017 and will be completed in mid-2022. Priority has been placed on mining Hearne in these years to open up in-pit waste storage capacity. Once Hearne is complete, fine processed kimberlite will be diverted from the FPK storage facility to the empty pit.

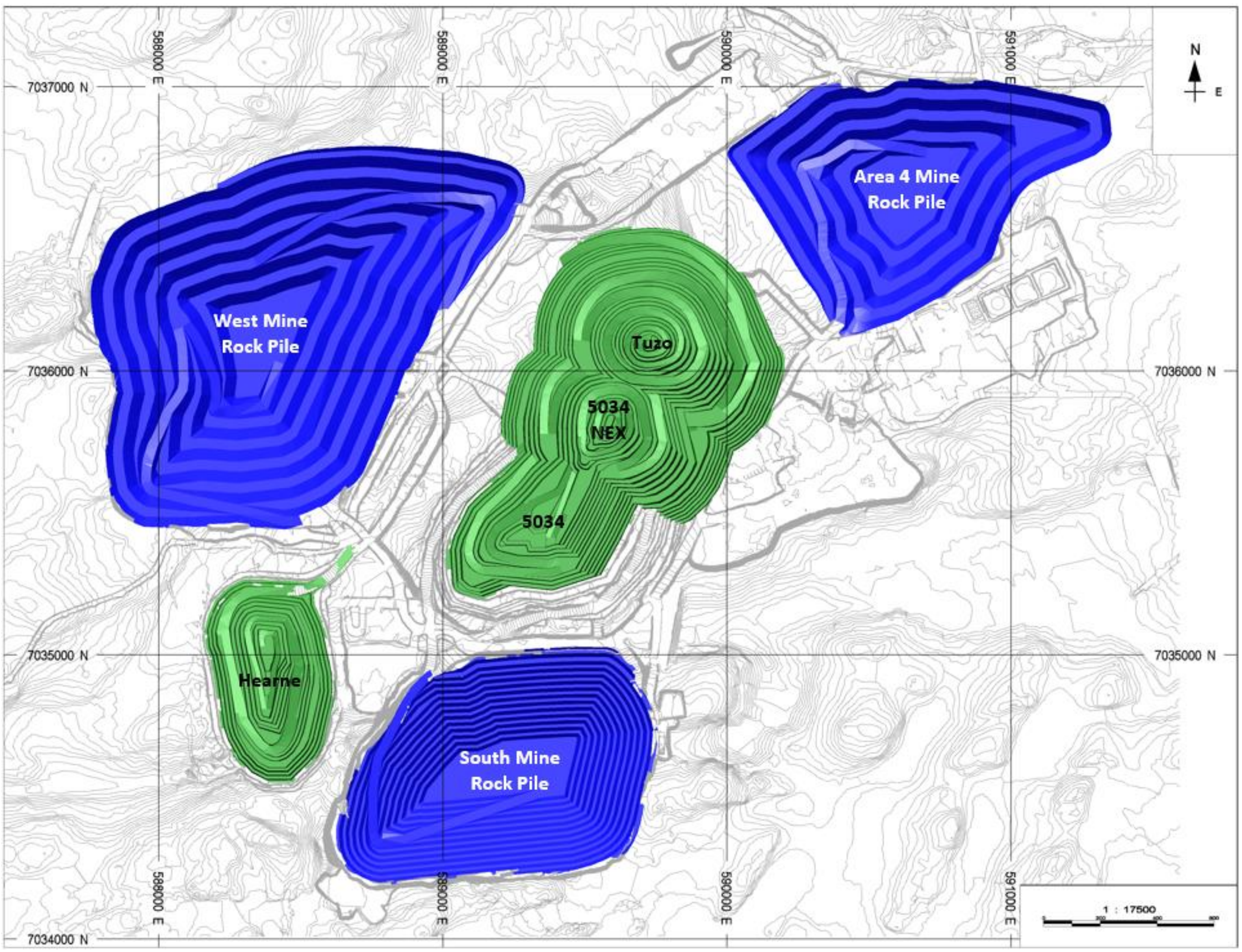
In Q2 2020, equipment will begin stripping the 5034 NEX Pushback which also incorporates the first phase of Tuzo. Tuzo ore from this first phase that will be mined with the NEX Pushback will be released starting in 2021 and will continue through to mid-2023. In mid-2024, NEX ore will be released and it will be the primary kimberlite production source until mining in the NEX Pushback is complete in Q1 2026. At this stage in the mine life, the combined mined-out area of the NEX Pushback and the 5034 pit will be used for Tuzo mine rock storage. Waste stripping in the third and final phase of Tuzo pit will begin in Q3 2023 and ore release will start at the end of 2025. Kimberlite production in Tuzo will be sustained until mid-2030.

Commissioning of the treatment plant was completed in March 2017 with steady-state production expected through to mid-2030. The annual production is a planned 3.35 million tonnes in 2020, and approximately 3.23 million tonnes from 2021 to the end of the mine life.

All three kimberlite deposits exist under Kennady Lake, and required substantial dewatering efforts prior to mining. Dewatering of the Southern portion of Kennady Lake (Area 8, 7 and 6) was completed in 2015 along with construction of the primary dewatering infrastructure exposing the 5034 and Hearne deposits. Completion of the remaining dewatering dike network and substantial dewatering of Area 4 was conducted in 2018 and 2019, which exposed the Tuzo mining area.

A general layout of the mining area is shown in Figure 16-1.

Figure 16-1: General Mine Arrangement, Gahcho Kué Mine



Source: De Beers 2019

16.1.1 Operations

The Gahcho Kué Mine operates 365 days per year, 24 hours per day. The mine operation is run using two-12 hours shifts, with the majority of operations and operational support personnel working a 14 day on / 14 day off rotation. A portion of Yellowknife based mine management and mine administrative staff work a four day on / three day off schedule working 12 hour shifts and provide a consistent management presence at the mine site.

16.2 Mine Production Plan

The current mine production plan for Gahcho Kué has been developed to maximize the value of the 5034, Hearne and Tuzo reserves through a strategic mining sequence. This sequence considers internal phasing to balance strip ratios during pre-strip activities, concurrent mining of all three pits, ore stockpiling and blending as well as in-pit backfill of the Hearne and 5034 pits during the later years of the mine life. The three pits are mined in the following order and for the following durations:

- 5034 – commenced in 2014 and extends to 2026;
- Hearne – commenced in 2017 and extends to 2022; and
- Tuzo – 2020 to 2030.

The annual life-of-mine schedule is summarized below in Table 16-1.

Table 16-1: Mine Production Summary

Mine Reserve Production	Units	Total	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Waste mined Total	**Mt**	**321.8**	**39.3**	**39.2**	**39.7**	**43.3**	**44.0**	**41.7**	**42.4**	**17.1**	**10.0**	**3.8**	**1.1**
Waste mined 5034	Mt	**155.9**	24.3	20.4	31.6	39.8	32.4	7.1	0.3	0.0	0.0	0.0	0.0
Waste mined Hearne	Mt	**25.2**	13.6	10.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waste mined Tuzo	Mt	**140.6**	1.4	8.6	6.7	3.5	11.6	34.6	42.1	17.1	10.0	3.8	1.1
Ore mined Total	**Mt**	**32.7**	**3.3**	**4.4**	**3.7**	**2.5**	**1.7**	**3.5**	**3.1**	**3.4**	**3.2**	**3.1**	**0.9**
Ore mined 5034	Mt	**13.2**	2.8	1.8	1.7	1.5	1.7	3.5	0.3	0.0	0.0	0.0	0.0
Ore mined Hearne	Mt	**3.3**	0.6	2.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ore mined Tuzo	Mt	**16.2**	0.0	0.6	1.2	1.0	0.0	0.0	2.8	3.4	3.2	3.1	0.9
Strip Ratio	**W:O**	**9.8**	**11.8**	**9.0**	**10.7**	**17.4**	**26.3**	**12.0**	**13.6**	**5.1**	**3.1**	**1.2**	**1.3**
Ore treated Total	**Mt**	**33.2**	**3.3**	**3.2**	**3.1**	**3.2**	**3.2**	**3.2**	**2.9**	**3.2**	**3.2**	**3.2**	**1.3**
Ore treated 5034	Mt	**13.5**	2.7	1.7	1.8	1.9	1.7	3.2	0.5	0.0	0.0	0.0	0.0
Ore treated Hearne	Mt	**3.6**	0.6	1.5	0.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ore treated Tuzo	Mt	**16.2**	0.0	0.1	0.5	0.7	1.5	0.0	2.3	3.2	3.2	3.2	1.3
Average grade Total	**cpt**	**1.59**	**1.99**	**2.15**	**1.91**	**1.54**	**1.47**	**2.22**	**0.97**	**1.10**	**1.29**	**1.37**	**1.26**
Average grade 5034	cpt	**1.99**	1.99	2.20	1.91	1.60	1.93	2.22	1.83	0.00	0.00	0.00	0.00
Average grade Hearne	cpt	**1.88**	2.01	2.09	1.78	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average grade Tuzo	cpt	**1.20**	0.00	2.18	2.09	1.49	0.97	0.00	0.77	1.10	1.29	1.37	1.26
Recovered carats Total	**m carats**	**52.9**	**6.7**	**6.9**	**5.9**	**5.0**	**4.7**	**7.2**	**2.8**	**3.5**	**4.2**	**4.4**	**1.7**

Mine Reserve Production	Units	Total	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Recovered carats 5034	m carats	**26.8**	5.4	3.7	3.4	3.0	3.2	7.2	1.0	0.0	0.0	0.0	0.0
Recovered carats Hearne	m carats	**6.7**	1.3	3.1	1.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recovered carats Tuzo	m carats	**19.4**	0.0	0.2	1.1	1.0	1.5	0.0	1.8	3.5	4.2	4.4	1.7

Notes:
(1) Minor variation in scheduled reserves as compared to Table 15-9 can be attributed to:
  a. Schedule was prepared using July 2019 starting surface and forecasted depletion to December 31, 2019
  b. Schedule was prepared using 5 x 5 x 14 m re-blocked model versus the 25 x 25 x 12 m model used to prepare reserve statement
(2) Any inferred material carried in schedule has been included in waste totals.
(3) Mineral Reserves are reported at a bottom cut-off of 1.0 mm

Source: De Beers, 2019

16.3 Mine Equipment

Mine equipment at the Gahcho Kué mine has been subdivided into three categories:

- Load and Haul – Primary Production Fleet (Shovels, large excavators, haul trucks loaders and large dozers);
- Drill and Blast – Drills and explosives trucks; and
- Support or Ancillary – small dozers and excavators, fuel / service trucks, tool carriers, pick-ups, buses, cranes and all other mobile equipment.

Equipment requirements, costing, maintenance and scheduling is based on Service Meter Unit (SMU) hours correlated directly to the mine plan as per the Anglo Time Model. Equipment requirements are calculated by comparing modelled productivities and SMU hour requirements for each type of equipment to the maximum effective working hours for a single unit (P200). These effective working hours account for equipment availability and all controllable and non-controllable production delays.

16.3.1 Equipment Selection

Major mining equipment size and type has been selected based on the following criteria:

- Annual mine production schedule and waste stripping requirements;
- Pit design parameters and working bench height;
- Productivity and operating costs;
- Proven original equipment manufacturers (OEM) with Canadian Arctic diamond experience;
- Established supplier maintenance, repair and supply chain systems capable of supporting the owner's team; and
- Compliance with all safety and environmental standards.

The mining fleet must deliver 3.2 Mt of kimberlite annually to the process plant during production and strip an average of 32 Mt of waste per year during the same period. Peak waste stripping is approximately 44 Mt per year in 2024 when stripping is conducted at both 5034 and Tuzo.

During 2017, Gahcho Kué implemented a GPS-based collision avoidance program through a partnership with Hexagon Mining. The system has been outfitted to all mobile equipment in both the production and ancillary fleets. Additionally, the mine has implemented a GPS-based high precision drill management system.

SMS-Komatsu is currently the primary equipment supplier and maintenance contractor for shovels, excavators, haul trucks, dozers and the majority of support equipment. Atlas Copco is the primary drill supplier and drill maintenance contractor, providing maintenance expertise under the direction of the Gahcho Kué maintenance program.

Life of mine equipment requirements for the Gahcho Kué mine are presented in Table 16-2.

Table 16-2: Life of Mine Equipment Requirements

Equipment Type	Model	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
29 m^3 Shovel	PC5500	3	3	3	3	3	3	3	2	1	1	1
17 m^3 FEL	WA1200	1	1	1	1	1	1	1	1	1	1	1
218 t Haul Truck	830E	16	17	17	17	17	17	13	8	6	4	4
Rotary Drill 251mm	PV271	4	4	4	4	4	4	4	2	1	1	1
Percussion Drill 171mm	ACD65	3	3	3	2	2	2	2	2	2	1	1

Source: De Beers, 2019

16.3.2 Equipment Availability

Equipment availability has been modelled for each piece of equipment. Models have been constructed to account for the following operational factors:

- Equipment age and cumulative hours;
- Major capital overhauls; and
- Seasonal effects of extreme cold weather.

Target availabilities vary over the life of mine. Average availabilities for the primary production fleet are summarized in Table 16-3 below:

Table 16-3: Equipment Availability Assumptions

Equipment Type	Model	Target Annual Availability (LOM Average)	Target Operating Utilization (LOM Average)
29 m^3 Shovel	PC5500	81.1%	85.3%
17 m^3 FEL	WA1200	82.0%	25.5%
218 t Haul Truck	830E	87.9%	85.0%
Rotary Drill 251mm	PV271	85.7%	76.0%
Percussion Drill 171mm	ACD65	81.0%	76.0%

Source: De Beers, 2019

16.3.3 Mine Equipment Maintenance

Mobile equipment maintenance at Gahcho Kué is managed and executed by a combination of De Beers and contractor personnel. Primary production equipment maintenance is managed through a reliability, availability and maintenance service agreement with SMS and Atlas Copco. Additional contracts are in place for specialty services such as welding, light vehicles and tire management.

Maintenance activities are conducted in several facilities at the mine as well as in the field. The primary maintenance facilities at Gahcho Kué include:

- Primary 5 bay truck shop with wash bay (built to accommodate the 218 t haul trucks and front end loader);
- Welding shop;

- Tire shop; and
- Light vehicle shop.

16.4 Explosives

Blasting at the Gahcho Kué Mine consists of production, wall control and pre-shear blasting. Each activity requires specific patterns and explosive products to achieve optimal results depending on rock type and drill-hole diameter.

Explosive supply, transportation, inventory and manufacturing at the Gahcho Kué Mine is managed by a single service contractor responsible for all explosives related activities up to, and including pumping down the hole. The Gahcho Kué mine typically uses a 70/30 bulk emulsion explosive product for production blasting which is manufactured on-site at a contractor managed facility. Bulk ammonium nitrate is stored on site in quantities sufficient for one full year of production, and transported to the manufacturing facility from the storage facility on a daily basis. Pre-packaged explosive products and explosives accessories are also stored on-site in four magazines. Packaged explosive products and accessories are shipped to site periodically by air throughout the year as supply dictates.

Once manufactured, bulk explosive product is transported from the on-site emulsion facility to the blast pattern using two “triple threat” emulsion trucks. Bulk explosives are then pumped down-hole, primed and tied in by the mine’s blasting personnel.

16.5 Personnel

Being a remote operation, the mine utilizes a combination of two types of rotations to generate the on-site manpower roster. These rotations include two-week-on / two-week-off rosters for the majority of operations personnel, as well as four day on / three day off rosters for management and some technical services positions. For the purposes of this report, the organizational structure of the Gahcho Kué mine site has been broken down into the following categories:

- Mine Operations and Mobile Maintenance;
- Processing, Engineering and Fixed Plant Maintenance;
- Site Services and Camp Operations;
- Technical Services; and
- General and Administrative.

16.5.1 Mine Operations and Mobile Maintenance

Mine operations manpower refers to all personnel directly and indirectly related to the management and execution of mining activities such as:

- Heavy equipment operators;
- Drill and blast;
- Mobile equipment maintenance;
- Earthworks construction;

- Pit dewatering;
- Mine engineering; and
- Mine management.

16.5.2 Processing Operations, Engineering and Fixed Plant Maintenance

Process operations, engineering and fixed plant maintenance manpower refers to all personnel directly and indirectly related to the operation and maintenance of the process plant and major fixed site infrastructure including:

- Process plant operations;
- Metallurgy and sorting;
- Process and engineering management; and
- Process and fixed plant maintenance.

16.5.3 Site Services and Camp Operations

Site services and camp operations manpower refers to all personnel directly related to the operation of the mine's ancillary equipment and accommodation facilities including:

- Catering;
- Cleaning;
- Site services personnel; and
- Site services management and supervision.

Site services personnel may perform tasks such as crane operation, carpentry and facility maintenance, operation and maintenance of the water and sewage treatment systems, waste management, and boiler house maintenance and operations.

16.5.4 Technical Services

Technical Services manpower refers to all personnel directly related to the technical support and reporting functions of the mine operation, these include:

- Geology;
- Survey;
- Strategic and long-range planning; and
- Technical services management.

16.5.5 General and Administrative

General and Administrative manpower refers to all personnel directly and indirectly related to the management, safety, environment, logistics and overhead functions which support the operation of the mine. These roles include:

- General management;
- Health, safety and environment;
- Logistics, materials management and procurement;
- Aboriginal affairs;
- Protective services; and
- Human resources and training.

16.5.6 On-Site Manpower

The organizational philosophy of the Gahcho Kué operation has been structured to minimize the number of on-site personnel. De Beers has supported this initiative through the development of an off-site support center based in Calgary, Alberta, where many supplementary administrative roles are based.

A summary of total on-site manpower is presented in Table 16-4 below. This table represents total personnel and as such, positions rostered by a 2x2 rotation will require half the stated requirement.

Table 16-4: On-Site Manpower

Areas	Category	Average Manpower LOM	Max Manpower LOM
Mine Operations Total		**177**	**224**
Drill & Blast	Employee	29	38
Drill & Blast	Contractor	11	12
Load & Haul	Employee	124	160
Mine Engineering	Employee	8	9
Mine Management	Employee	4	5
Mine Maintenance Total		**119**	**137**
Mobile Maintenance	Employee	59	67
Mobile Maintenance	Contractor	60	80
Plant Operations Total		**55**	**60**
Plant Management	Employee	2	3
Plant Metallurgy	Employee	8	9
Plant Operations	Employee	45	48
Engineering & Maintenance Total		**66**	**70**
Engineering Management	Employee	4	4

Areas	Category	Average Manpower LOM	Max Manpower LOM
Plant Maintenance	Employee	58	62
Plant Maintenance	Contractor	4	4
Site Services and Camp Operations Total		**101**	**105**
Camp Catering & Cleaning Contractor	Contractor	57	61
Management & Supervision	Employee	10	10
Site Services Personnel	Employee	34	34
Technical Services Total		**14**	**17**
Geology	Employee	7	9
Management & Supervision	Employee	2	2
Planning	Employee	2	2
Survey	Employee	3	4
General & Adminstrative Total		**87**	**88**
Aboriginal Affairs	Employee	3	3
Human Resources & Training	Employee	2	2
Human Resources & Training	Contractor	8	8
Management	Employee	1	1
Management & Business Improvement	Employee	2	3
Materials Management & Logistics	Employee	28	28
Protective Services	Employee	17	17
Safety, Health, & Environment	Employee	22	23
Human Resources & Training	Contractor	3	3
Grand Total Site Manpower		**619**	**701**

Source: De Beers, 2019

17 Recovery Methods

17.1 Kimberlite Processing

17.1.1 Process Summary

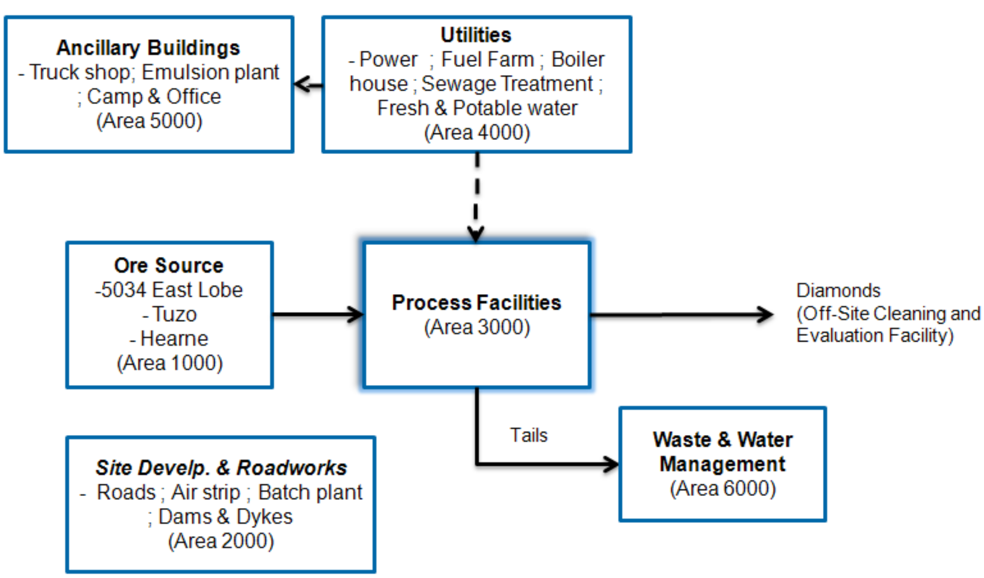
The mine extracts kimberlite ore from three different kimberlite pipes: 5034, Hearne, and Tuzo. The process plant was designed to treat 3.0 million tonnes per annum of ore, however several throughput improvements have been implemented since commercial production was achieved in Q1 2017.

The 2019 Strategic Business Plan includes an increase to the process plant throughput to 3.35 million tonnes in year 2020. From 2021 onwards, the plant rate is scheduled at 3.23 million tonnes per annum to align with the ore release rate that the mine plan is able to maintain based on the required strip ratios. In years 2024 and 2026 however, the annual plant throughput will be reduced to 3.18 and 3.13 million tonnes per annum respectively when waste stripping requirements are higher and the stockpile is depleted. The planned throughput is in line with demonstrated plant operation performance, as in 2019, the year-to-date plant throughput performance to the end of October averaged 3.53 million tonnes per annum.

In the process plant, the ore is treated via crushing, screening, dense media separation and x-ray sorting, to produce a diamond rich concentrate that is sent to Yellowknife for final cleaning and Northwest Territories Government valuation. The processing plant targets the recovery of liberated diamonds in the 1 to 28 mm size range.

The following block flow diagram (Figure 17-1) shows the Process Facilities (Area 3000) compared to the other key areas of the Gahcho Kué site.

Figure 17-1: High Level BFD of the Overall Process / Site



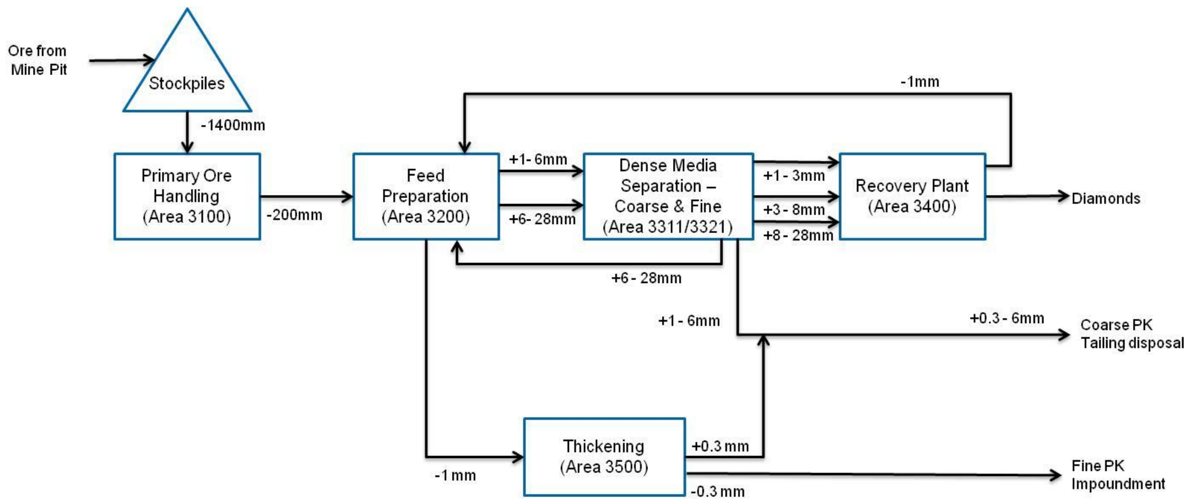
Source: Hatch, 2013

17.1.2 Process Plant Description – General Overview

The Process Facilities (Area 3000) are divided into the following areas and sub-areas:

- Primary Ore Handling (Area 3100):
- Feed Preparation (Area 3200):
- Dense Medium Separation (DMS):
- Recovery Plant (Area 3400):
- Thickening (Area 3500):
- Plant Water and Air Systems (Area 3600):

Figure 17-2: Block Flow Diagram of the Process Plant



Source: Process Plant BFD (Hatch, 2013)

17.1.3 Process Design Criteria & Quality

This section presents a summary of the main criteria used for the plant design for various areas of the plant. Values in the Table 17-1 will vary, or may have been adjusted depending of equipment selection during construction or changes during operations. They are presented as guidelines only.

Table 17-1: Process Design Criteria

Description	Min	Ave	Max	Units
Primary Ore Crushing – Area 3100				
Top size from mine			1400	mm
Top size to primary crushing – (grizzly cut size)			900	mm
Top size to secondary crushing – (target)		250		mm
Feed Preparation - Area 3200				
HPGR crusher feed size - target	1		75	mm
Degrit cut size - target		1		mm
Size fraction to DMS – Fine DMS	1		6	mm
Size fraction to DMS – Coarse DMS	6		28	mm
DMS area – Area 3300				
DMS modules	1 Coarse & 1 Fine			text
Medium Type	FeSi – 150D – 270 D			text
Coarse DMS – FeSi Medium to ore ratio	5:1			vol/vol
Fine DMS – FeSi Medium to ore ratio	7:1			vol/vol
Fine Process Kimberlite (PK) impoundment			0.3	mm
Coarse Process Kimberlite (PK) cut size (float screen)	1		6	mm
Coarse Process Kimberlite (PK) cut size (de-watering screen)	0.3		1	mm

Source: JDS, 2014

17.2 Recoverability and Reconciliation

Reconciliation refers to the comparison of actual production to the current estimates of production, most commonly to mine plans, or resource and reserve models. Reconciliation is carried out both monthly and annually. This comparison is used to measure the performance of the original resource and reserve estimates, mine plans and process plant.

Tonnage reconciliation at Gahcho Kué is completed monthly and compares:

- Measured tonnes treated from a weightometer on the front end of the plant to;
- Surveyed tonnages incorporating mined volumes and stockpile depletion / additions.

Grade reconciliations compares the predicted grade in the resource model for the associated depleted volumes to the real calculated grade (recovered carats / weightometer tonnage).

17.3 Processed Kimberlite Containment

Processed kimberlite from the Gahcho Kué Plant is produced in two streams:

- Coarse Processed Kimberlite (CPK); and
- Fine Processed Kimberlite (FPK).

Coarse processed kimberlite consists of the reject fraction of materials from the coarse and fine DMS. The material is a +0.3 - 6.0 mm fraction which is discharged on a conveyor belt from the north side of the plant. The material is piled under the tail end of the conveyor where the material is loaded into 100 t haul trucks by a front end loader. Storage capacity of the plant discharge is currently such that this loading process occurs on a continuous basis during plant operations. Once loaded, CPK material is transported directly north of the plant and truck shop where the CPK is stacked in lifts on the coarse processed kimberlite pile. The CPK pile is designed to provide capacity until 2023. Once full, CPK will then be co-deposited in Hearne with FPK materials, once again using 100 t haul trucks to transport.

Figure 17-3: Coarse Processed Kimberlite Pile Q3 2017

Source: CPK Facility (De Beers, 2018)

Fine processed kimberlite consists of the final reject fraction from the thickening fraction. This would include all remaining kimberlite content less than 0.3 mm in size. The material is pumped as a slurry and deposited in one of two final locations:

1) Sub-aqueously in the Area 2 FPK storage facility (Years 2017 to 2022); and
2) Hearne pit (Years 2022 to 2027).

The Area 2 FPK facility consists of both impermeable retention walls to contain the FPK and associated discharge water from entering the receiving environment, as well as a large filtration dike on the South perimeter to allow water to permeate and filter back into the Area 3 water management pond for process plant recirculation or potential discharge. Once this facility is full, FPK discharge infrastructure will be re-oriented to co-deposit FPK materials into the Hearne pit along with CPK and potentially waste rock.

Figure 17-4: Area 2 Fine Processed Kimberlite Facility Q3 2017

Source: Area 2 FPK Facility (De Beers, 2018)

17.4 Plant Control Philosophy

The Gahcho Kué Plant processes are automated to allow high-quality production with minimal human intervention.

The instrumentation and control systems are capable of providing the information and control necessary to operate the plant safely, efficiently, and economically.

The design of the instrumentation and control system allow for the control and monitoring of all field instrumentation, motors and actuators from a central control room using a basic process control system (BPCS). The BPCS is based on Programmable Logical Controllers (PLCs) and Human Machine Interfaces (HMIs).

The instrumentation and control system is designed for fail-safe operation and allow for fault diagnosis and reporting.

Control valves are pneumatically operated. Mechanical equipment complies with standard Z432 – Safeguarding of Machinery and include all necessary safety devices (E-Stop, Pull cords, etc.).

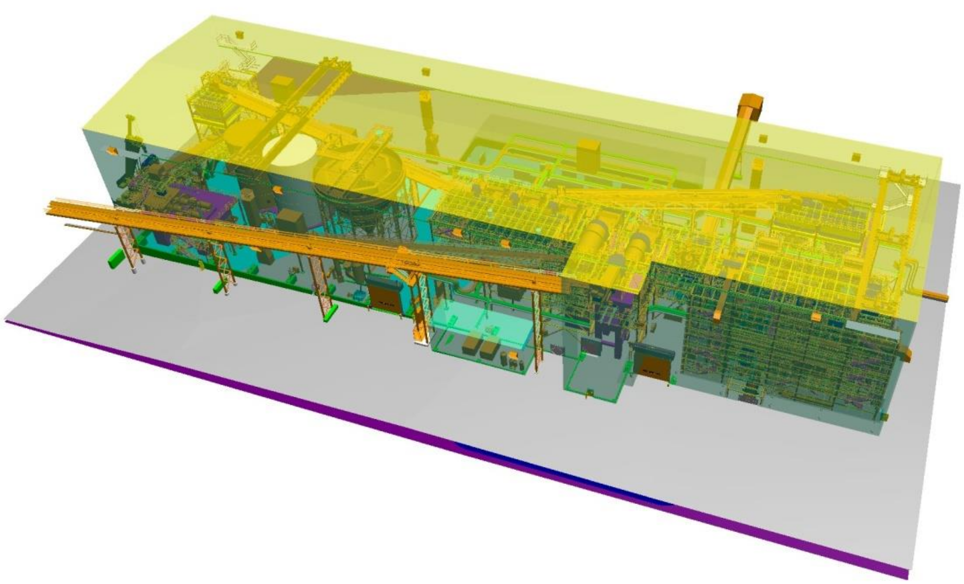
The plant is controlled from a central control room. This Control room shall be located in a strategic location to provide a clean, safe and air conditioned operating environment and will be manned 24/7.

The PLCs and control system servers and communication devices are installed in an air-conditioned server room adjacent to the control room. Access to the server room is restricted.

17.5 Process Plant Facilities Description

The process plant is oriented along an east-west axis. Plant feed is introduced near the middle of the plant length. In the middle of the plant is the secondary cone crusher, the scrubbers and primary screening. On the west side of the plant the high pressure grinding roll crusher (HPGR) is positioned, along with the water tanks and the thickener. On the east side of the plant the dense media separation modules are positioned and, in a separate building within the plant, the recovery. Coarse PK tails leave by conveyor from the north side of the plant.

Figure 17-5: Process Plant Oblique Isometric



Source: Process Plant Isometric (Hatch, 2013)

Two 30 t overhead cranes, with a 5 tonne auxiliary hoist, service the building. Fire water pumps are located in a modular building on the north side of the process plant. Compressors are located in a modular building on the south side of the process plant.

The security system divides the plant into “Red” (recovery plant / sort house; high-security) and “Blue” (remaining plant; lower-security) areas. The Red area is physically separated by steel cladding walls from the rest of the plant. All wall penetrations are sealed. Authorized entry and exit is controlled by fingerprint identification and a system of inter-locking doors. In addition, facilities are in place for the random selection of personnel exiting the Blue area for additional search. Mandatory search will be in effect for exit from the red area. Normal access to the plant (Red and Blue zone) is done through the PCC building located at the east side of the process plant.

18 Project Infrastructure

18.1 Re-Supply Logistics and Personnel Transport

18.1.1 Winter Road

The primary means of material supply for the Gahcho Kué mine is via the winter road. The winter road is typically open for a 60 day period from February 1 to March 30. The winter road consists of a 120 km spur road to Gahcho Kué which is connected to the Tibbitt-to-Contwoyto GKJV road shared between several other operating mines in the region. The winter road is used as the primary route for re-supply of bulk and heavy loads including:

- Fuel;
- Ammonium nitrate;
- Lubricants, emulsifiers and other bulk consumable liquids;
- Mining equipment (Haul trucks, shovels, drills, etc); and
- Bulk materials for infrastructure and plant upgrade projects.

These items, due to their size or required quantities would be considered un-economic or not feasible to be transported by air.

18.1.2 Air Freight

All freight transported to Gahcho Kué outside of the winter road season must be done via air. Routine air freight consists of high volume site consumables with limited storage capacity such as:

- Food;
- Non-critical maintenance parts for mobile equipment; and
- Explosive accessories.

The majority of heavy freight transport into Gahcho Kué is planned for the winter roads to minimize cost, however the airstrip is designed to accommodate Boeing-737 and L-382 Hercules aircraft capable of transporting up to 13,600kg and 21,800kg respectively for unplanned re-supplies of certain critical spares.

18.1.3 Personnel Transport

Personnel working at the Gahcho Kué mine site arrive by air transport during all seasons. Routine personnel charter flights are organized out of two primary locations directly to the GK Aerodrome:

- Calgary International Airport (YYC) – twice weekly; and
- Yellowknife Regional Airport (YZF) – minimum 3x weekly.

18.2 On-Site Operations Support

On-site operational support is limited to those services which are deemed necessary to ensure the continuity of the 24/7 operation. These overhead services include:

- Full time medic;
- Full time IT personnel for troubleshooting and maintenance of site communications;
- Full time trainers to administer training on site procedures, policies, equipment operation and orientations; and
- Full time safety and environmental department.

Department heads typically work a four days on / three days off schedule and are on-site with general management weekly.

18.3 Corporate and Administrative

De Beers corporate and administrative support for the Gahcho Kué mine site is located off-site at the Calgary Operational Support Center. The facility is located at the Calgary International Airport which when required, promotes ease of travel to and from the mine site on planned weekly charters.

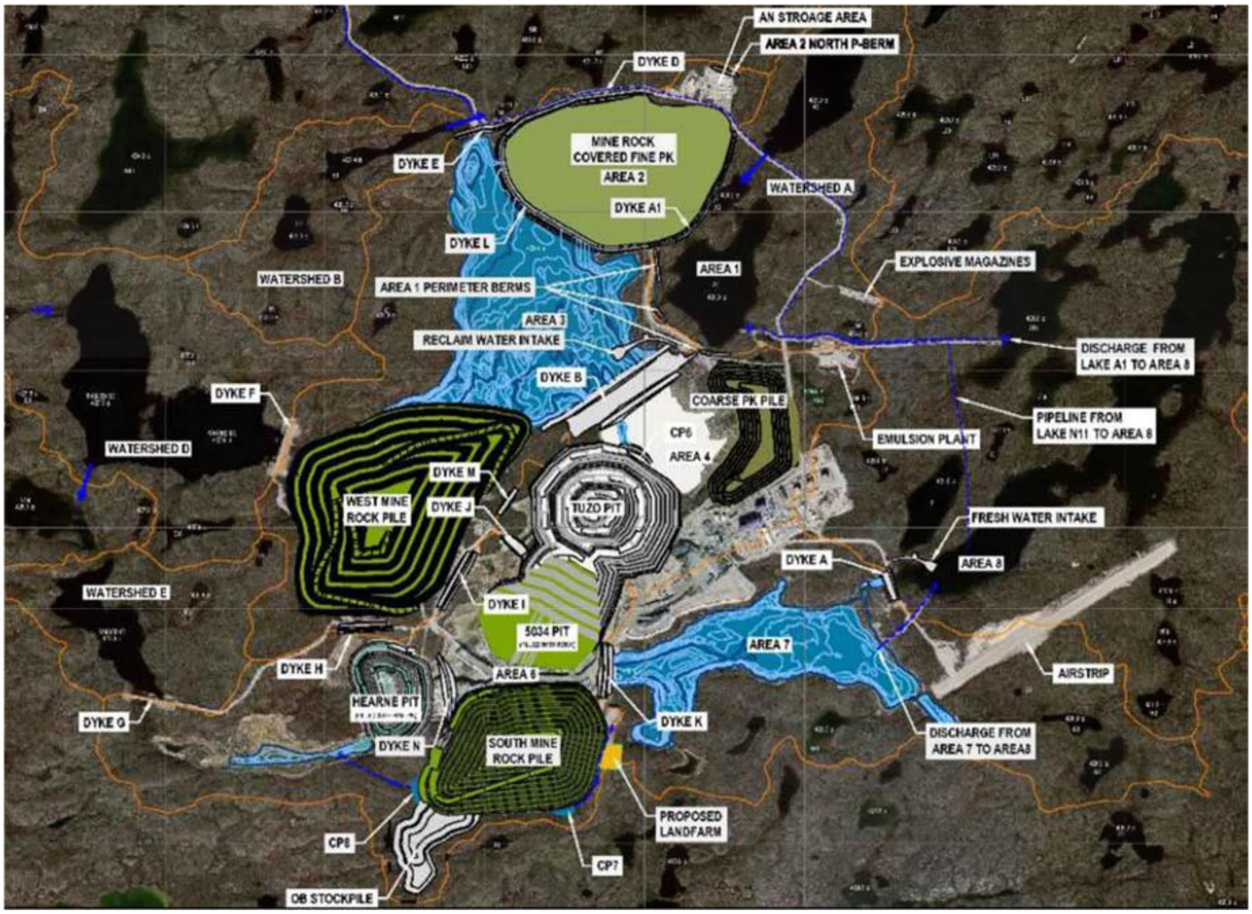
Corporate and administrative manpower based at the Calgary Support Center include:

- Corporate leadership team;
- Strategic business planning and long range mine planning;
- Mine accounting;
- Resource management and exploration;
- Permitting;
- Public relations;
- Technical support and IT.; and
- Human Resources Management.

18.4 Site Layout

Figure 18-1 represents the current overall site layout for the GK site.

Figure 18-1: General Site Layout Drawing



Source: De Beers, 2019

18.5 Power Generation and Distribution

Power is generated by modular on-site diesel driven power plants. Five generators have been installed rated for 2,825 kWe output at 4,160 V/3Phase each. Each generator is provided in a modular enclosure with independent cooling and an 8-hour fuel tank. The generators are connected electrically using 5 kV switchgear.

The generators have been installed in an N+1+1 arrangement using three generators to meet average demands, one generator on stand-by and one available for routine maintenance. Total design operating load for the power station is 8.05 mW.

Power distribution is generally at 4.16 kV, with lesser loads supplied at 600 V. All plant site distribution is cable run within the utilidors as much as possible. Cable required for the outlying areas is run along the ground. The cables are suitably marked for safety purposes and to prevent damage.

The 4.16 kV feeders originating at the power plant are distributed to area substations throughout the site using overland cables adjacent to service roadways. These area substations step voltage down to 600 V for distribution to MCCs and power panels as required.

18.6 Fuel Supply, Storage and Distribution

The Gahcho Kué tank farm was designed for the storage and dispensing of diesel and oils, such as:

- Diesel fuel to feed all mobile equipment and powerhouse;
- Fresh and used lube-oil, fluids and greases for the mobile maintenance group; and
- Glycol for waste heat recovery.

These liquids are stored in:

- Three 18,000 m^3 main storage fuel tanks;
- Eight 500 m^3 fuel tanks; and
- Ten 60 m^3 multi-usage tanks.

All fuel storage facilities have been constructed with lined containment designed for 110% of the stored liquid capacity.

Diesel fuel and lubricants supplied to fixed infrastructure such as the powerhouse and truck shop are delivered via a permanent piping network. Fuel and lube supply to mobile equipment and remote infrastructure is done using a series of tandem axle fuel and fuel / lube distribution trucks.

18.7 Camp & Administration Office Complex

The Gahcho Kué camp and administrative complex was constructed as a pre-fabricated modular-type construction designed for arctic weather conditions. The facility rests on-top of temporary cribbing supports and does not include any concrete foundations. The facility is connected to the process plant, truck shop and other ancillary infrastructure via a series of arctic corridors.

The facility consists of the following components:

- Dormitory wings;
- Kitchen and food storage facilities;
- Dining hall;
- Arrivals / Departure area;
- Medical center;
- Heated three bay fire hall;
- Gymnasium and recreational facilities;
- Training and cultural center;
- Personnel control center (PCC) building, including the process plant change rooms (blue area);
- Dry;
- Laundry facilities;
- Water treatment plant;

- Sewage treatment plant; and
- Server Rooms.

18.8 Truck Shop & Warehouse Facilities

The remote location of Gahcho Kué requires that all routine maintenance of the mobile production and service equipment be carried out on-site. To effectively accomplish the task, a fully equipped workshop, warehouse and offices were constructed. A summary of maintenance and warehouse related facilities is listed below:

- Main five bay truck shop – All primary maintenance activities and warehousing for mobile production and support equipment.
- Megadome structure – Primary heated indoor warehouse facility.
- Welding shop – Re-purposed construction facility for welding and G.E.T repairs.
- Light vehicle shop – Temporary construction maintenance shop, re-purposed specifically for light vehicle maintenance.
- Tire Shop – Dedicated structure for all tire repairs and replacements.
- East laydown – Primary winter road freight offload point for large freight complete with scales.
- West Laydown – Adjacent to the megadome and process plant this is the primary outdoor warehouse location for critical process spares.

18.9 Ancillary Facilities

Ancillary facilities constructed for the operation of Gahcho Kué are as follows:

- Mobile aggregate crushing plant;
- Fresh water treatment module;
- Sewage treatment module;
- Microwave communications antenna;
- Incinerator;
- Mine operations muster;
- Ammonium nitrate storage facility;
- Bulk emulsion plant;
- Explosives storage magazines; and
- Environmental laboratory, geo-sampling facility and dust monitoring facility.

18.10 Aerodrome

The gravel strip aerodrome has been designed to Transport Canada specifications for landing approach angle, runway lighting, lighted windsocks, standard and RNav GPS approach, non-directional beacon, AWOS and VHF radio facilities. The aerodrome has also been outfitted with an aircraft radio control of aerodrome lighting unit (ARCAL). Additionally, the strip has been equipped with basic de-icing, refueling and airport firefighting capabilities. The overall length of the strip is 1,676m and overall width, excluding run-off or graded areas, is 46m.

The airstrip has been constructed and certified to accommodate 737-type jet aircraft and is regularly serviced by RJ85 and Boeing-737 jets for passengers and cargo respectively.

18.11 Roads

18.11.1 Winter Access Road

The winter access road links the project site with the existing Tibbitt-to-Contwoyto to winter road at MacKay Lake. A 120 km winter access road spur off the north end of MacKay Lake will be constructed each year to connect the Project site to the Tibbitt-to-Contwoyto winter road at km 271, just north of Lake of the Enemy. The winter access road will be constructed and operated in accordance with license and regulatory conditions and with appropriate updates and improvements as required.

18.11.2 Site Roads

Site haul, access and service roads are constructed using crushed and screened mine rock, as well as suitable overburden material and run of mine rock. Site roads have been classified into three types, each with specific design requirements. The three types of roads are as follows:

- Mine Haul Road: Primary haulage routes on site, excluding in-pit and waste dump roads designed to 3x the width of the 218 t haul fleet.
- Main Access Road: Access to mine site facilities from winter road and the N11 discharge (11 m minimum width).
- Service Road: Used to access site infrastructure off primary haul routes (10 m minimum width).

Road materials are a mix of till and run-of-mine blast rock for fill. Sized crush rock (40 mm minus) is used for surfacing.

It is expected that regular grading and levelling using crushed gravel will be required to keep the roads in an acceptable condition to reduce wear and tear on the trucks and tires.

18.12 Fire Protection and Emergency Response

18.12.1 Fire Protection

Fire protection for each facility in the plant site area consists of a combination of hydrant / hose stations, sprinkler systems, heat and smoke detection and portable chemical fire extinguishers. Fire-fighting water is provided from dedicated storage tanks and fire pumps.

The fire water reserve and pumping system for the plant site is located inside the process plant. Here, the lower 500 m^3 of the reclaim water tank is dedicated fire water storage. This capacity will allow for two hours of fire-fighting. If an extended fire-fighting time is required, the remaining capacity of the raw water tank and the capacity of the process water tank can be used.

Two 250 m^3/h pumps—one electric and one diesel (back-up)—along with a pressure maintaining jockey pump provide the line pressure and volume to sustain fire-fighting water requirements to any one of the main areas within the plant site.

18.12.2 Emergency Response

The Gahcho Kué mine site is equipped with a volunteer emergency response team. Emergency response activities are based out of a heated three bay fire hall attached directly to the medical center. The emergency response group is equipped with a conventional pumper fire truck, modern four-wheel drive ambulance and Panther 6x6 ARFF fire truck for aircraft fire and rescue. The team consists entirely of volunteers who attend mandatory practices and meet or exceed the minimum hour requirements outlined by the NWT Mines Health and Safety Act.

19 Diamond Market and Sales Process

19.1 Diamond Market Outlook

JDS has relied on MPD marketing group to provide a current overall description of the diamond market outlook.

The fourth quarter of each calendar year is the defining period for consumer diamond jewellery demand, with the major gifting occasions of Thanksgiving and Christmas in western markets, and Diwali and wedding seasons in India. Overall, and against a backdrop of macroeconomic and geopolitical uncertainty, retail demand in the final quarter of 2019 was healthy, adding a welcome boost to an otherwise challenging year.

Major US jewellery retailers Signet and Tiffany & Co. reported moderate sales growth over the holiday period, with online sales continuing to increase in market share. Chinese growth rates have slowed, due to US-China trade tensions, depreciation of the yuan against the US dollar and the continuing political unrest in Hong Kong. The emerging threat of the new coronavirus in China is expected to further impact consumer and industry confidence. Despite these headwinds, China's largest diamond jewellery retailer, Chow Tai Fook, reported strong sales growth in its Mainland China stores, although it has announced plans to close 15% of its stores in Hong Kong.

In India, sales through the festive Diwali period and end of year wedding season witnessed reasonable growth, as reported by market leader Titan Company. This is despite sales and consumer sentiment being negatively impacted by a broader economic slowdown, currency devaluation and emerging social unrest in some parts of the country.

Global high-end brands continue to outperform the rest of the diamond jewellery market. Tiffany, Richemont, Kering and LVMH all posted strong sales growth across their jewellery business units in 2019. LVMH's purchase of Tiffany and Co. in November 2019 demonstrates the luxury group's confidence in natural diamond jewellery.

Evolution in consumer purchasing behaviour is impacting inventory management across the value chain. Multi-channel jewellery shopping and online diamond trading are providing consumers with greater access to pricing and product information. The market share of online sales of diamond jewellery is increasing in all major markets, although still at a lower level than other luxury consumer goods. Retailers are adjusting their buying and distribution strategies accordingly.

Profitability in the polished diamond manufacturing sector remains problematic as margins continue to shrink. Manufacturers are seeking longer-term financing options as consignment practices increase and inventory turnover days lengthen in many product segments. Access to financing remains difficult as banks continue to tighten finance and credit requirements. The Global Diamond Industry Report 2019 published by Bain & Company Inc. (the Bain Report), estimates that since 2013, available financing for midstream players has decreased by 30%, or USD 5 billion.

Growth in the lab-grown diamond segment is expected to continue, as industrial capacity increases and production costs decline. Retail prices for lab-grown product continue to fall against natural diamonds. The Bain Report estimates that at the end of 2019, an LGD product is retailing at a 50-55% price discount to an equivalent natural stone, compared to a 20% discount three years ago. Though awareness of LGDs is growing at the retail level, particularly in North American markets, the level of acceptance by consumers is yet to be established. The natural diamond industry is keen to safeguard clear demarcation between the two product segments, by boosting generic and branded natural diamond marketing campaigns and continuing to invest in and promote LGD detection technologies.

The diamond industry experienced difficult conditions through 2019 for both rough and polished goods as the market struggled to balance demand and supply. Rough diamond sales were reportedly down over 25%, or USD 2.5 billion, from the previous year as major producers delivered lower volumes to polished manufacturers in an attempt to balance sales with demand. Prices across all rough diamond categories remained under pressure through 2019. In the second half of 2019, both majors offered their customers increased purchasing flexibility, and in Q4 De Beers announced a significant price decrease which was widely reported to have better aligned De Beers' pricing with the market. It is anticipated that 2019's reduction in global rough diamond sales will positively impact the diamond pipeline in 2020. The mid-term supply fundamentals, particularly for cheaper rough diamond categories, are more positive with the pending closure of older mines.

Despite the current challenges, the Bain Report remains optimistic about the long-term outlook for the diamond market. Bain's updated 2030 supply-demand forecast projects rough diamond supply growth in volume terms to be negative 2% or 0% annually. Bain expects demand for mined rough diamonds to recover, either remaining at current levels or increasing at 3% annually through 2030. The Bain Report clearly states that recovery requires continued growth of GDP, the middle class and purchasing power, particularly in China and India. The report also states that to maintain or expand its share of this increasing wealth, the natural diamond industry must provide structured marketing support or risk losing ground to the Electronics and Experiences categories, and lab-grown stones, as consumer preferences shift and cultural norms change.

19.2 MPD Marketing and Sales Process Overview

Mountain Province Diamonds sells its share of the GK mine production through its own unique distribution model. MPD's marketing team are involved at all steps of the sales process ensuring revenue is optimized by offering customers accurate and consistent diamond parcels through its competitive, on-line sales platform.

Production split and royalty valuation

MPD's 49% share of the Gahcho Kué production is confirmed after the JV royalty valuation/ production split is agreed between the Government of the Northwest Territories, MPD and De Beers Canada. These 49:51 production splits occur approximately every 5 weeks in Yellowknife, with a prearranged annual schedule agreed to by all parties. MPD's sale dates to customers are also set annually with individual sale dates aligned to industry buying cycles. MPD's 49% share of production is exported to India for sorting and valuation in accordance with this sales schedule.

Fancies and Specials (Fancies are coloured diamonds, Specials are diamonds larger than 10.8 carats) are settled through an internal tender process with De Beers. Highest bidder pays the opposing JV partner their respective share of the bid price.

MPD's average time from production split in Yellowknife to closure of sale in Antwerp is 55 days and among the fastest in the industry.

MPD sorting, valuation and sale

Diamond sorting and valuation is completed in Visakhapatnam, India by the Constell Group, a highly respected diamond services contractor whose clients include other major diamond producers and jewelers.

The Gahcho Kué orebody and product profile are complex, producing a broad range of white commercial goods together with large, high value Special stones and higher than expected volumes of small, brown diamonds. The Gahcho Kué product also exhibits varying degrees of fluorescence.

Each of these product types has a market and an established customer base. All Gahcho Kué goods, with the natural exception of some industrials, are sold into market segments that cut and polish the rough, with resultant polished destined for the major diamond jewelry markets of the US, India and China. MPD's diamonds are sold independently on the open market as a discrete production and to date a 100% sell-through rate has been achieved.

Competitive tender sales are conducted in Antwerp and operated by Bonas Group ('Bonas'), the world's oldest diamond brokering and consultancy firm. A fixed number of sales are scheduled per year in-line with industry buying cycles with lot viewings and tender logistics managed by Bonas. Bids are submitted through an online bidding system, offering a simple, secure and convenient process for buyers. Lots are sold to the highest bidder and Bonas facilitates the collection of payment and delivery to winning bidder. Payment terms are five working days.

Market interest in the MPD tender sales has been strong from the outset with customer participation rates strengthening through to 2020. There is a high level of customer competition for Gahcho Kué diamonds with more than 120 of industry's leading companies bidding and over fifty individual companies winning goods each sale. These high levels of competition, combined within the open and transparent sales platform, deliver the highest, current market price and enable the company to maximize revenue.

MPD customers include leading polished and jewelry manufacturers, rough traders and financiers, with operations in the major diamond markets of Belgium, India, Israel, UAE and China. This high caliber of participating companies indicates that industry leaders are investing in the product for the long term. MPD's direct and independent control over its sales provides a highly visible chain of custody.

19.3 Diamond Pricing

MPD provided updated diamond price baseline data. Modeled diamond prices for of the three Gahcho Kué mine pits are updated based on actual sales information for 5034 and Hearne and revaluation of the Tuzo bulk sample parcels. JDS relied upon and reviewed the underlying data and pricing valuation methodologies and is of the opinion that the modelled diamond prices used reflect reasonable prices to use for baseline 2018 diamond prices for the GK current and planned production.

Based on their outlook for the market, MPD has also provided a baseline 2.5% real growth factor in diamonds prices, year to year, to be applied to future production. JDS compared the MPD price growth factor to those price factors projected in the Bain Report and utilized by other diamond producers and is of the opinion that the MPD factor is reasonable.

19.3.1 Diamond prices by pipe

The following section outlines the diamond price assumptions by pipes for the Gahcho Kué Mine. The price schedule is based on latest actual sales figures in 2019, and reflects current market conditions where applicable, with the exception of the Tuzo pipe for which no commercial sales have taken place to date.

Table 19-1: 2019 Diamond Pricing

Area	2019 Prices ($ USD)
5034-CP	$66
5034-WP	$66
5034-NE	$66
5034-SWC	$66
Hearne	$60
Tuzo	$62

Source: Mountain Province Diamonds, 2019

Table 19-2 summarizes the diamond price by area. Blended annual prices have been calculated based on the current life of mine plan. Prices include 2.5% real growth factor and are reported in CAD. Exchange rates assumed for conversion of USD:CAD are listed in Table 19-3.

Table 19-2: Annual Price ($ CAD) Schedule by Area

Area	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
5034-CP	$87.34	$89.69	$92.15	$94.69	$97.25	$99.94	$102.56	$105.39	$108.16	$111.04	$114.14	$117.35
5034-WP	$87.34	$89.69	$92.15	$94.69	$97.25	$99.94	$102.56	$105.39	$108.16	$111.04	$114.14	$117.35
5034-NE	$87.34	$89.69	$92.15	$94.69	$97.25	$99.94	$102.56	$105.39	$108.16	$111.04	$114.14	$117.35
5034-SWC	$87.34	$89.69	$92.15	$94.69	$97.25	$99.94	$102.56	$105.39	$108.16	$111.04	$114.14	$117.35
Hearne	$79.40	$81.54	$83.77	$86.08	$88.41	$90.86	$93.24	$95.81	$98.33	$100.95	$103.76	$106.68
Tuzo	$82.05	$84.25	$86.56	$88.95	$91.36	$93.89	$96.35	$99.01	$101.60	$104.31	$107.22	$110.24
Blended Price		***$88.11***	***$88.27***	***$91.40***	***$94.37***	***$98.08***	***$102.56***	***$101.90***	***$101.60***	***$104.31***	***$107.22***	***$110.24***

Source: Mountain Province Diamonds, 2019

Table 19-3: Annual Exchange Rate Assumptions

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Rate	1.326	1.329	1.332	1.335	1.338	1.340	1.343	1.345	1.347	1.351	1.355

Source: Mountain Province Diamonds, 2019

20 Environmental Studies, Permitting, & Social / Community Impact

20.1 Permits

The Gahcho Kué Diamond Mine is in full compliance with all existing permits, authorizations and licences. Table 20-1 provides a summary of the regulatory permits, licences and authorizations applicable to the Gahcho Kué Mine. The mine is currently in compliances with all legal requirements.

Table 20-1: Existing Permits, Licenses and Authorizations

Permits, Authorizations and Agreements	Legislation	Agency	Expiry and Tenure
Archaeological Research Permit 2020-002	*NWT Archaeological Research Act*	Prince of Wales Northern Heritage Centre, Department of Education, Culture and Employment, GNWT	• Issued annually as needed for archaeological monitoring of the identified archaeological sites near the winter road and the mine site.
Wildlife Research Permit WL500669	*NWT Wildlife Act*	Department of Environment and Natural Resources, GNWT	• Expiry December 31, 2021 • Permit will be needed for each phase of mine life for a wildlife monitoring plan. • Permits are issued every three years.
Scientific Research Licence 16682	*NWT Research Act*	Aurora Research Institute	• Expiry December 31, 2020 • As needed for Socio-economic and Traditional Knowledge field work and investigations, and aquatic and wildlife effects monitoring plans. • Licences are issued annually.
Surface Leases: 75N/6-2- 2, 75N/6-3-2, 75N/6-5-2, 75N/6-7-2, 75N/6-8-2	*Territorial Lands Act* and Regulations	GNWT, Lands Department	• Expiry August 31, 2035 (in approval process). • Maximum 21 year lease for winter access road then renewal to cover final years.
Mineral Leases: 1. NT-4199, NT-4200, NT-4201 2. NT-4341	*Territorial Lands Act Northwest Territories and Nunavut Mining Regulations*	Mineral and Petroleum Resources Directorate, Aboriginal Affairs and Northern Development Canada	• Expiry: 1. July 15, 2023 2. July 17, 2023 • Initially issued from AANDC for 21 years; renewable for a further 21 years.

Permits, Authorizations and Agreements	Legislation	Agency	Expiry and Tenure
Type A Water Licence MV2005L2-0015	*Mackenzie Valley Resource Management Act* *Northwest Territories Waters Act* *Northwest Territories Waters Regulations*	Mackenzie Valley Land and Water Board	• Expiry September 30, 2028. • Renewable for additional years to cover remaining phases of mine life (Licence tenure in renewals may be variable as dictated by the MVLWB).
Class A Land Use Permit MV2005C0032 (Mining and Milling Activities)	*Mackenzie Valley Resource Management Act* *Mackenzie Valley Land Use Regulations*	Mackenzie Valley Land and Water Board	• Expiry August 10, 2021. • Permits generally issued for five years, with a 2-year extension.
Class A Land Use Permit MV2018C001 (Exploration Activities)	*Mackenzie Valley Resource Management Act* *Mackenzie Valley Land Use Regulations*	*Mackenzie Valley Resource Management Act* *Mackenzie Valley Land Use Regulations*	• Expiry August 10, 2023. • Permits generally issued for five years, possibility for a 2-year extension.
Fisheries Authorization no. 03-HCAA-CA6- 00057.1 for the destruction of habitat associated with the following activities: 3. Dewatering of Kennady Lake and Lake D1 4. Construction of dykes	*Fisheries Act*	Fisheries and Oceans Canada, Fish Habitat Management	• Completion of habitat destruction and compensation by December 31, 2020. • Further authorization needed at each stage of renewal of Water Licence or Land Use Permit, if fish habitat is harmfully altered, disrupted, destroyed.
Licence to Fish for Scientific Purposes S-19-20-3012-YK	*Fisheries Act* *NWT Fisheries Regulations*	Fisheries and Oceans Canada, Fish Habitat Management	• Renewed annually. • Granted for annual fish monitoring programs.
Approval for Constructing Works in Navigable Water 14-1087	*Navigable Waters Protection Act*	Transport Canada, Canadian Coast Guard	• Project completed through dyke construction in 2015.
Approval of Waste Dump, Dam, or Impoundment Plan	*Mine Health and Safety Act (Territorial)*	GNWT, Chief Inspector, Workers Compensation Board.	• Granted, no expiry indicated.
Hazardous Waste Generation, Transport and Storage Permit NTG537	*Canadian Environmental Protection Act*	Department of Environment and Natural Resources Canada	• Granted, no expiry indicated.

Permits, Authorizations and Agreements	Legislation	Agency	Expiry and Tenure
Hazardous Waste Storage Permit NTR138	*Canadian Environmental Protection Act*	Department of Environment and Natural Resources Canada	• Granted, no expiry indicated.
Explosive Storage, Explosives Handling, Magazine Permits 2015-0105-0106-0107 Permit to Store Detonators 2015-0104	*Mine Health and Safety Regulations (Territorial)*	GNWT, Chief Inspector, Workers Compensation Board.	• Expiry December 31, 2020. • Long-term authorization needed for all phases of mine until closure is complete.
Registration of Fuel Storage Tanks	*Canadian Environmental Protection Act*	Environment Canada with cooperation from Aboriginal Affairs and Northern Development Canada	• Granted, no expiry indicated.
Ni Hadi Xa Agreement		Tlicho government, North Slave Métis Alliance, NWT Métis Nation, Lutsel K'e Dene First Nation, Deninu Kué First Nation, and Yellowknives Dene First Nation.	• Expire after two year after the end of active closure.

Source: De Beers, 2019

The water licence for the Gahcho Kué Diamond Mine (Type "A" Water Licence (MV2005L2-0015) sets out several conditions with respect to alteration, diversion or otherwise use water for the purpose of mining. The water licence was initially issued in 2014 has a term of 16 years and will require a renewal on or before September 2028.

The Gahcho Kué Diamond Mine is subject to the Authorization for Works or Undertakings Affecting Fish ("Fisheries Authorization") issued by Fisheries and Oceans Canada (DFO 2014). The Fisheries Authorization outlines reporting requirements and approvals, and compensation requirements for the "serious harm" to fish. The finalization of options for fish habitat compensation to account for serious harm to fish associated with the Project has been developed in consultation with regulatory agencies. The current draft Offsetting Plan (formerly "No Net Loss Plan") (Golder Associates Ltd., 2012) for Gahcho Kué involves the Redknife Bridge Culvert rehabilitation to allow for the passage of fish to the upstream reaches of the Redknife River. The rehabilitation of the culvert has the ability to provide more fish habitat than is being lost by the Mine.

The federal explosives permit approves and regulates the operation of the bulk explosives manufacturing facility and ensures the safety of personnel and property within specified radii surrounding the plant. This permit is issued to and holds responsible the explosives supplier as the owner and operator of the manufacturing plant on-site. Nothing in this permit precludes the requirements of the territorial mines act and regulations governing the storage, handling and use of the explosives in the mine.

The Gahcho Kué Diamond Mine's closure and reclamation liabilities are covered by financial security provisions required under the water licence and land use permit.

20.2 Communities

The area around Gahcho Kué is sparsely populated. The closest community to the mine is Lutsel K'e, located 140 km southeast.

Historically, two broadly-defined groups of indigenous peoples have used the region surrounding Kennady Lake: the Dene and the Métis. A cultural heritage assessment and archaeological surveys were completed and approved as part of the original mine development planning.

During the mine's approval process, De Beers committed to the priority hiring of northern residents and indigenous people born in the Northwest Territories and their descendants. The company's recruitment policies are such that recruitment is carried out internally first, nationally and only then are external candidates sought. Candidates living in the North are given preference and in practice, the company gives preference to applicants from the surrounding villages. The company has committed to transporting employees who reside in the villages and to provide transport to and from the site. A Human Resources Strategy has been developed and made available to the public. In addition, a Socio-Economic agreement with the Government of the Northwest Territories has been signed. Impact Benefit Agreements (IBAs) are in place with the local aboriginal communities and De Beers has an effective communities program that has been in place for several years and will continue through post-closure.

De Beers entered into six impact benefit agreements as part of the mine development:

- Socio-Economic Monitoring Agreement with the Government of the Northwest Territories. The Agreement outlines De Beers' commitments to local employment, economic benefits, cultural and community well-being and the monitoring of these requirements by a Board of community, government and De Beers' representatives.
- Environmental Agreement with five indigenous groups. Ni Hadi Xa. The agreement provides funding for independent environmental monitoring and engagement.
- Impact Benefit Agreements (IBAs) have been developed between De Beers and six indigenous groups that assert ties to the Gahcho Kué region include the following:
    - Tłıchǫ̀ Government;
    - Yellowknives Dene First Nation;
    - Łutsel K'e Dene First Nation;
    - Deninu Kué First Nation;
    - North Slave Métis Alliance; and
    - Northwest Territory Métis Nation.

20.2.1 Tlicho Communities

Behchokǫ̀ – The largest Tlicho community, formerly known as Rae-Edzo, is located on the northwest tip of Great Slave Lake, approximately 110 km (68 mi) northwest of Yellowknife. It has population of 1,874, based on the 2016 sensus.

Whati — The second-largest Tli Cho community had a 2019 population of 502, the majority of whom are aboriginal. A traditional lifestyle and economy are maintained in Whati is based almost solely on trapping, fishing and hunting. Employment is primarily with the governments of the First Nation, the territory, and the hamlet. There is little in the way of private business besides a bed-and-breakfast and convenience store. There is some employment by the three diamond mines, with employees working on rotation.

Gamèti — Gamèti had a 2019 population of 313 people. Approximately 7% of the population is non-aboriginal. Gamèti was a seasonal hunting camp used by Tli Cho people for many years and became a more permanent settlement in the 1970s. Fishing, hunting and trapping remain a large part of the local economy and way of life. Some residents work at the diamond mining operations. A local business development corporation offers business services to Gamèti residents and operates a motel, gas station, and a fishing camp.

Wekweèti — According to 2019 statistics, Wekweèti had a population of 140 people. Wekweèti's location on the Snare River was originally for fishing and travel. Today, the river is the location of a series of dams and powerhouses that provide hydroelectricity to Yellowknife and Behchoko. Tourism is strong with fishing and hiking outfitting services offered in the area.

20.2.2 The Yellowknife's Dene First Nation (YKDFN):

Detah — Detah is a small aboriginal community of 234 people (NWT Bureau of Statistics, 2019). Economic activities include government, private enterprise and mining-related work. Many residents of Detah are employed in nearby Yellowknife. The YKDFN also has a business arm called the Det'on Cho Corporation whose mandate is to create training and job opportunities for Yellowknife's Dene and bring in revenue through profitable business ventures. The corporation includes over 20 companies in the construction transportation, logistics, and training and management sectors.

N'dilo — N'dilo is an aboriginal community of 257 people (NWT Bureau of Statistics, 2019) located at the outskirts of Yellowknife, a short walk from Yellowknife's "Old Town". Some residents retain a traditional Dene lifestyle, fishing and hunting nearby, while others work in Yellowknife and at the diamond mines. The main occupations are related to government, private enterprise and mining-related work. There is a business arm, the Det'on Cho Corporation, as noted above for Detah.

20.2.3 Łutsel K'e First Nations (LKDFN):

Łutsel K'e — This Dene community has approximately 314 residents. Languages spoken are Chipewyan and English. The local economy is largely traditionally based with hunting and trapping remaining key occupations for most residents. Arts and crafts are important as well. In recent years, efforts have been made to develop the tourism potential of the area. A fishing lodge is located near the community and accommodation is available there. There is also some employment with the mines. The Denesoline Development Corporation, based in Lutsel K'e, manages the for-profit businesses owned by the Lutsel K'e membership and provides management services to the Limited Partnerships in which Denesoline Corporation has an interest.

20.2.4 North Slave Métis Alliance (NSMA):

Métis are a culturally distinct group of indigenous people that emerged from the relations of aboriginal women and European men. Based in Yellowknife, the North Slave Métis Alliance (NSMA) is a non- profit organization whose core mandate is to represent the interests of the direct descendants of the Métis of the

North Slave region of the Northwest Territories. Its objectives include negotiation and implementation of a land and resources agreement, founded on the principles of self-government and to promote the educational, economic, social and cultural development of the Métis of the region. The economic development arm of the NSMA is MÉTCOR Inc., formed to create business and employment opportunities for Métis in the North Slave region of the Northwest Territories. MÉTCOR's joint ventures and subsidiary companies provide a range of services to the territory's mining industry, creating direct and indirect employment and contracting opportunities for members of the NSMA.

20.2.5 Deninu Kué First Nations (DKFN):

Deninu Kué means "moose island" and is a settlement corporation at Fort Resolution, southwest of the Slave River Delta on the south shore of Great Slave Lake. According to Aboriginal Affairs and Northern Development Canada, as of December 2012, the Deninu Kué First Nation (DKFN) has a total registered population of 878 people. DKFN have asserted that their traditional territory extends into the region. The DKFN own, operates and are participants in joint venture agreements in the region.

20.2.6 The Northwest Territory Métis Nation (NWTMN):

The Northwest Territory Métis Nation (NWTMN) represents the indigenous Métis of the South Slave region. They are the Aboriginal descendants of the Cree, Slavey and/or Chipewyan people of the South Slave region. The home communities of the NWTMN are Hay River, Fort Resolution and Fort Smith. The Metis currently and historically undertake hunting and trapping in the region. The NWTMN owns, operates or are in joint venture in the region.

20.3 Land Use and Mineral Tenure

The Gahcho Kué Mine operates within five adjoining Land Lease parcels administered by the GNWT. The Land Lease requirements overlap with those outlined in the Water Licence (MV2005L2-0015), with an additional requirement that addresses the "deposit and maintenance of financial security deposit". Financial security estimations are summarized in Section 10 of this document. The Land Use Permit (MV2005C0032) also includes conditions specific to the development of an ICRP, and execution of the approved reclamation activities within a specified timeline. These requirements are satisfied through conformance with conditions detailed in the Water Licence (MV2005L2-0015).

20.4 Environmental Management

The mine's environmental management system is ISO 14001 certified. A full-time environmental staff is responsible for monitoring, directing, reporting and communicating on environmental matters.

Key areas of environmental management and monitoring include:

- Ecological monitoring and sampling;
- Wildlife monitoring and management;
- Water flow management in open pit;
- Acid generation potential of waste rock;
- Sewage water;

- Treatment of effluent water and removal suspended solids;
- Ammonia, phosphorus and suspended solids in effluent water discharged to downstream;
- Effluent water monitoring to determine potential toxicity to fish; and
- Mine closure planning, reclamation research and site rehabilitation activities.

Water quality monitoring activity includes surveillance of water in and around the mine site, and an aquatic effects monitoring program that measures changes in the downstream aquatic environment. Results from water quality monitoring programs are reviewed to identify the need for any follow-up action.

De Beers monitoring programs are focused on assessing the potential effects of the mine on wildlife and wildlife habitat. This helps to determine if predictions made in the environmental assessment are accurate and help assess the effectiveness of mitigation strategies. The mine staff conducts caribou, raptor, wolverine, grizzly bear, and other wildlife monitoring programs. Caribou are a key indicator species because of their cultural and economic value to northern residents as well as being of ecological importance. Low-impact behavioral surveys of caribou are undertaken at varying distances from the mine. Ni Hadi Xa also undertakes independent monitoring and review of data collection and reporting.

Every three years, mine environment staff undertake studies to measure dust deposition on lichen, both on- and off-site. Lichen is very important as a food source for caribou throughout the year. De Beers conducts engagement sessions and workshops to incorporate both scientific methods and traditional knowledge into the work.

The complete range of environmental monitoring and study programs includes:

- Dust monitoring:
  - suppression of dust generated by the mine operation dust sampling and dispersion behavior by season use of suppressants air quality monitoring;
  - meteorology; and
  - measurement of wind speed and direction, temperature, humidity, precipitation, evaporation, solar radiation.
- Water quality:
  - sample collection and analysis;
  - water levels in ponds and dams;
  - makeup water usage; and
  - site water balance.
- Aquatic effects:
  - sampling and analysis for water quality, phytoplankton, zooplankton, benthic invertebrates, sediment chemistry, fish health; and
  - short- and long-term effects.
- Wildlife:
  - caribou, raptor and waterfowl, wolverine, grizzly bear, other wildlife; and

    - accuracy of predictions, effectiveness of mitigation strategies.
- Fisheries:
    - licence requirements; and
    - studies to determine metal concentrations in fish tissue.
- Reclamation research:
    - re-vegetation test plots; and
    - country rock test piles.

Government inspections provide assurances that Gahcho Kué remains in compliance with the legal provisions of permits and licences related to land and water use and waste management.

20.5 Mine Closure Planning

The Gahcho Kué Diamond Mine has a mine closure plan and cost estimate in place for closing the mining areas, dismantling buildings, capping / sealing the processed kimberlite containment, restoring the land, breaching the dikes and returning the lake water to original shoreline.

Financial security to cover the closure liability is in place and held by the Government of the Northwest Territories. In assessing the adequacy of the coverage, the territorial government obtained an independent review of the mine closure concept and cost estimate for the Gahcho Kué Diamond Mine from a recognized independent industry expert in 2014 and 2017.

The government's independent estimate of total mine closure cost for Gahcho Kué and the financial security amount levied on the mine for the liability provides substantially for the actual mine closure plans in place.

De Beers has had a mine closure plan for Gahcho Kué since project inception. The latest update to the plan was approved in August 2019. The overall approach to reclamation and closure planning for Gahcho Kué conforms to both corporate and established international guidelines for mine closure. The closure plan is an ongoing work-in-progress with periodic updates based on long-term research underway in the field and a growing base of traditional knowledge gained from engagement with community members. As a requirement of the Type A water licence and land leases, a report is prepared annually to report to stakeholders on progress, research results, and ongoing changes to the interim closure plan.

The mine closure cost, being driven by the mine closure plan, which is updated periodically, is likewise updated periodically and dialogues with the government are held regularly to ensure that the liability coverage remains appropriate.

The latest closure and reclamation security estimate for the Gahcho Kué Mine was included in the updated water licence (MV2005L2-0015) and land use permit (MV2005C0032) in December 2018 by the MVLWB. The MVLWB is authorized to set the security deposit amount by subsection 35 (1) of the Waters Act and the regulations promulgated under the act. The purpose of the security deposit is to ensure funds are available to complete reclamation of the site, inclusive of the closure and post-closure phases.

The financial security estimate is divided into land and water, where the land securities are held under the land use permit (MV2005C0032) and the water securities are held under the water licence (MV2005L2-0015). The payments are further divided into milestones, being:

- Prior to initiating construction activities;

- One year following the initiation of construction activities (2015);
- Prior to Year 1 of operations;
- Prior to Year 5 of operations;
- Prior to Year 7 of operations; and,
- Prior to Year 12 of operations.

These milestones were selected as they represent time periods where key operational changes occur that affect reclamation. These operational changes are the beginning of mining and milling (Year 1), the end of mining Hearne Pit (Year 5), the end of mining 5034 Pit (Year 7) and the end of operations (Year 12). There is a clear spike in financial security in Year 5 as it marks the end of Hearne pit, as well as the beginning of pre-stripping and mining Tuzo Pit.

Table 20-2: Summary of construction and operations phase security (total, million) at project milestones (MVLWB, 2018)

Phased Payment Schedule	Cumulative Total	Land	Water
Construction Phase			
Prior to Initiating Construction Activities	$15.4	$11.8	$3.6
One Year following the Initiation of Construction Activities	$3.6	-	$3.6
Operation Phase			
Prior to Year 1 of Operations	$18.6	$2.0	$16.6
Prior to Year 5 of Operations	$42.4	$17.7	$24.7
Prior to Year 7 of Operations	$9.1	$3.7	$5.4
Prior to Year 12 of Operations	$8.2	$1.2	$7.0
Total	**$97.3**	**$43.4**	**$53.9**

Source: De Beers, 2019

20.6 Socioeconomic Agreement with GNWT

Early in the mine development, De Beers committed to northern training, employment, and business opportunities in addition to the environmental stewardship associated with sustainable development. To provide a formal mechanism for ensuring that environmental mitigation measures as well as social commitments were appropriately implemented and monitored, the environmental assessment of the Gahcho Kué Diamond Mine included a requirement for the aforementioned Socio-Economic Monitoring Agreement (SEMA).

20.7 Comment

The QPs are satisfied that the status of permitting, quality of environmental management, monitoring performance, positive community impacts and social acceptance support the economic viability of the estimated mineral reserves.

21 Capital and Operating Costs

21.1 Sustaining Capital Costs

Sustaining capital costs for the Gahcho Kué Mine are comprised of expansion capital, stay in business capital, capitalized waste and closure financial securities.

Life of mine capital projects at the Gahcho Kué Mine are referred to as Stay in Business (SIB) Capital, and are forecasted on an annual basis with an emphasis placed on the upcoming budgeting year. Due to the seasonal nature of the ice road and optimum construction season, it is critical that these projects are scoped and budgeted in time to allow for procurement and mobilization to incorporate the winter road when required. Sustaining capital expenditures include:

- Purchase of additional or replacement surface mining equipment;
- Replacement of light vehicles;
- Process Plant equipment and pump rebuilds/replacement;
- Implementation of new technology for improved safety and operational performance;
- Value added infrastructure development projects identified to improve the operation as a whole; and
- Purchase of critical spares.

Capital cost assumptions in this report reflect the current life of mine SIB model for the mine as a whole.

Table 21-1: Sustaining Capital Expenditures Gahcho Kué Diamond Mine

Year	Unit	Closure Finance Cost	Expansion Capital	Stay In Business Capital - Cash Basis	Capitalized Waste	Total Capital Expenditure
2020	**C$M**	14.1	0.4	26.4	61.6	**102.5**
2021	**C$M**	14.1	7.7	18.7	52.1	**92.6**
2022	**C$M**	14.1	0.0	11.5	95.2	**120.9**
2023	**C$M**	0.0	1.4	17.4	158.2	**177.0**
2024	**C$M**	0.0	0.0	14.8	141.7	**156.5**
2025	**C$M**	9.1	0.0	14.2	143.4	**166.7**
2026	**C$M**	0.0	0.0	10.4	63.8	**74.2**
2027	**C$M**	0.0	0.0	10.1	0.0	**10.1**
2028	**C$M**	0.0	0.0	10.0	0.0	**10.0**
2029	**C$M**	8.2	0.0	2.8	0.0	**11.0**
2030	**C$M**	0.0	0.0	1.2	0.0	**1.2**

Source: De Beers, 2019

21.2 Operating Costs

Operating costs include all normal, recurring costs of production including:

- Open pit mining (labour, maintenance, fuel, explosives);
- Processing (process consumables, maintenance, engineering);
- Site & Corporate;
    - Power generation;
    - Site services, support and logistics;
    - Site labor;
    - Technical services; and
    - Corporate and administrative functions.

Operating budgets are based on first principal calculations and historical performance provided by each respective department. Budgets are updated in detail annually to reflect changes in markets, consumable prices and site specific operating parameters. Annual budgets are scrutinized internally by department heads, senior management and strategic business planners to ensure costs align with business objectives and sufficient detail is present. Operating budgets are finalized to ensure adequate time for the procurement process to take place prior to the winter road season.

The Gahcho Kué Mine operating costs consist of both variable and fixed cost items. Variable costs have a linear correlation to cost drivers such as open pit production, equipment hours or process throughput, while fixed costs do not.

For the mineral reserves in this report and the schedule of mining and processing envisioned for them, Table 21-2 depicts modeled estimates of the associated operating costs by year in Canadian dollars and in real terms.

Table 21-2: Modeled Operating Costs

Year	Unit	Open Pit Mining	Processing	Support Services	G&A	Total Operating Expense
2020	C$M	115.1	37.6	123.9	20.5	**297.1**
2021	C$M	132.1	37.8	123.5	20.2	**313.6**
2022	C$M	86.5	38.1	123.0	19.2	**266.8**
2023	C$M	23.1	39.1	122.1	15.9	**200.2**
2024	C$M	28.2	38.6	122.3	15.8	**204.9**
2025	C$M	16.5	38.6	122.4	21.8	**199.4**
2026	C$M	81.7	37.2	118.5	15.2	**252.6**
2027	C$M	91.6	37.2	107.0	15.0	**250.8**
2028	C$M	70.5	36.7	101.4	16.2	**224.7**
2029	C$M	43.1	36.6	97.9	27.8	**205.4**

Year	Unit	Open Pit Mining	Processing	Support Services	G&A	Total Operating Expense
2030	C$M	16.8	29.3	76.2	21.2	**143.5**

Source: De Beers, 2019

21.3 Continuous Business Planning

While strategic business plan updates happen annually, continuous business planning activities including quarterly and monthly reforecasting are practiced at Gahcho Kué. Historically production deficits are re-distributed throughout the year at the end of each production month in an attempt to keep production targets in line with the strategic business plan (SBP). Additionally, weekly, monthly and quarterly plans are generated within each business unit to identify and track against key production metrics relative to that unit. Departmental forecasting and planning is conducted at these intervals to capture and mitigate operational challenges such as equipment outages, weather delays and other potential production delays. When re-forecasting within business units, if targets or goals become unreasonable given the operations various constraints, planning challenges are elevated to upper management and the strategic planning team where decisions can be made on changes to the SBP.

22 Economic Analysis

22.1 Introduction

This economic analysis represents the cash flows of MPD and their respective ownership of the Gahcho Kué Mine. The economic analysis in this report represents a forward-looking view that is subject to known and unknown risks as well as other factors which may cause actual results to differ from those portrayed here.

Forward looking views in this report include but are not limited to:

- Future diamond values;
- Resource and reserve estimates;
- Mineability and recovery of the mineral reserve;
- Geotechnical assumptions;
- Production sequence, schedule and volumes;
- Processing rates and recoveries;
- Operating costs;
- Capital costs;
- Product sales;
- Exchange rates;
- Assumption that zero catastrophic events will occur;
- Assumption the mine will continue to maintain a social license to operate and all necessary permits;
- Assumption that the mine will continue to manage environmental risks in a way that does not negatively impact operations; and
- Assumption of retention of property title with no disputes.

Diamonds prices and markets have changed since the 2018 Reserve Update. This resulted in lower unit carat sales price for the 5034 production and lower projected sales prices assumptions for the Hearne and Tuzo future production. This Technical Report sets new baseline diamond prices for 2020 based on actual sales and updated valuations of diamond bulk sample parcels.

22.2 Reserve Determination

Due to the nature of mining kimberlite deposits at the Gahcho Kué Mine, cut-off grade economics are not used to convert ore into waste, or waste into ore. Kimberlite forms a discrete contact with the host granite rock clearly separating, in most cases visually, ore from waste. While the kimberlite itself may contain varying levels of granitic dilution, and varying levels of diamond grade and quality, diamonds are not found beyond the contact. Therefore, all Gahcho Kué kimberlites qualifying as reserves are mined with no selectivity, including zones of unexplained lower diamond content.

22.3 Discounted Cash Flow Analysis

An annual discounted cash flow analysis is presented in this report to demonstrate the economic viability of the entire mine operation to depletion of the current mineral reserves and validate the entire reserve determination stated in Section 15. The cash flow in this report is presented only as that portion owned by Mountain Province Diamonds (49%). Overall economic reserve viability is considered to be demonstrated by the resulting overall positive cash flows.

The mine output and process throughput assumptions used for this cash flow analysis are considered to be within the capabilities of the Gahcho Kué Mine. These rates are based on known operating performance from 20199 and reflect the intentions of the mine production plan outlined in Section 16. Diamond recoveries are assumed to be 100% over a 1.00 mm screen slot size.

Figure 22-1: Ore Processing Profile

Source: Ore Processed (JDS, 2020)

Operating costs are explained in detail in Section 21.3 and are inclusive of all fixed and variable costs directly associated with the mine operation including closure. Costs summarized in Section 21.3 do not include any government royalties however they have been accounted for in the cash flow analysis. No third-party royalties have been included in this cash flow analysis. Taxation and government royalty estimates were provided by Mountain Province Diamonds for their portion of the project.

Prices used for this analysis have been updated based on a combination of recent sales information from 5034 and a re-valuation of the samples from Hearne and Tuzo. Average prices are summarized below:

- 5034 US$66/carat – average sales price and parcel distribution 20199.
- Hearne US$60/carat – updated pricing for original bulk sample distributions.

- Tuzo US$62/carat – updated pricing for original bulk sample distributions.

The prices used in this economics assessment are different than what was used to initially design the pits to quantify the reserves. The potential economic difference is presented in the sensitivity section below.

Future price escalation was estimated by Bain. A price escalator of 2.5% has been applied equally to all 3 pipes, and assumes year by year escalation starting in calendar year 2019.

An exchange rate between Canadian and U.S. currencies was provided by MPD. Rates vary on an annual basis and range from 1.32-1.35 $C/$US.

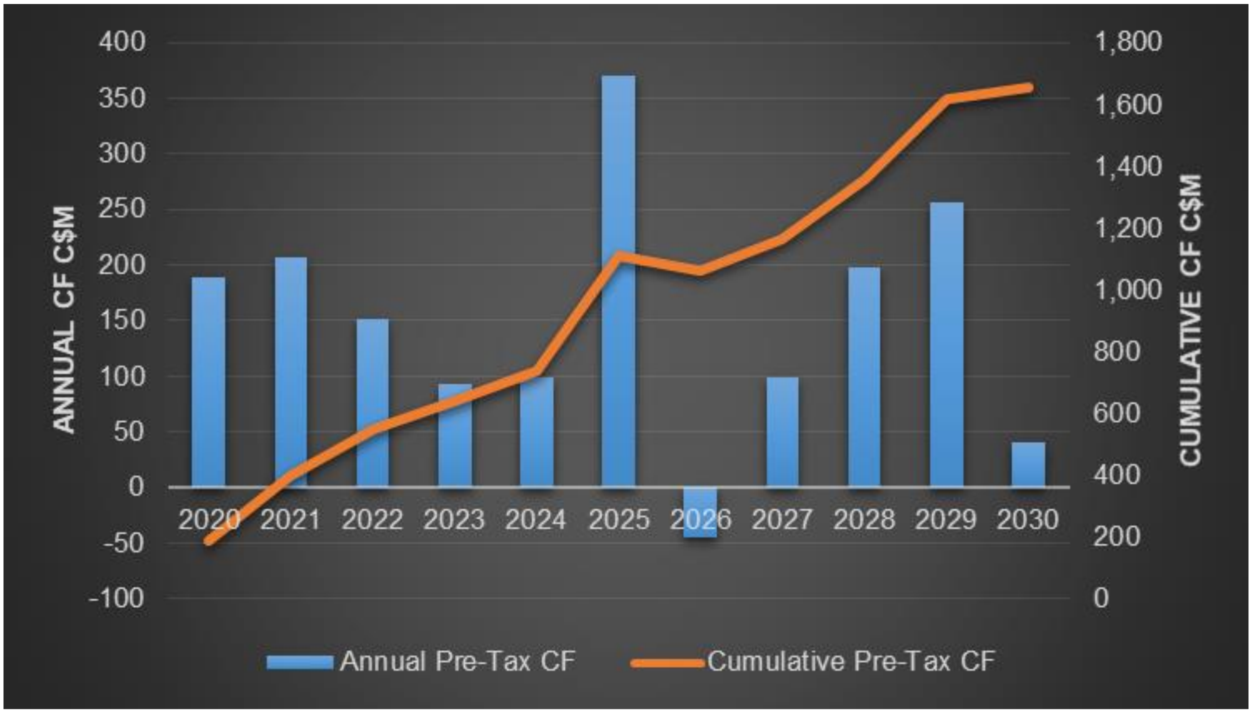
Inflation has not been considered in this analysis as the analysis is discounted and all amounts are in present dollars.

The discounted cash flow analysis indicates positive economics for the entire mineral reserves over the remaining ten-year mine life. Assuming a 7.5% discount rate, the MPD portion of the project presents an after-tax net present value (NPV) of C$569 Million / US$426M.

Figure 22-2: Gahcho Kué Discounted Cash Flow Analysis

	Unit	Total	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PRICE													
Average Carat Price	**US$/Carat**	**72.56**	**66.46**	**66.43**	**68.72**	**70.69**	**73.26**	**76.54**	**75.37**	**75.54**	**77.43**	**79.37**	**81.35**
5034	US$/Carat	**66.00**	67.7	69.3	71.1	72.9	74.7	76.5	78.5	80.4	82.4	84.5	86.6
Hearne	US$/Carat	**60.00**	61.5	63.0	64.6	66.2	67.9	69.6	71.3	73.1	74.9	76.8	78.7
Tuzo	US$/Carat	**62.00**	63.6	65.1	66.8	68.4	70.1	71.9	73.7	75.5	77.4	79.4	81.3
Price Escalation	Annual %	**2.5%**	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
F/X Rate	USD:CAD		0.75	0.75	0.75	0.75	0.75	0.75	0.74	0.74	0.74	0.74	0.74
MINE PRODUCTION													
Waste Mined													
5034	k tonnes	**155,919**	24,315	20,422	31,570	39,785	32,384	7,107	336	0	0	0	0
Hearne	k tonnes	**25,234**	13,608	10,180	1,446	0	0	0	0	0	0	0	0
Tuzo	k tonnes	**140,625**	1,388	8,595	6,723	3,495	11,582	34,638	42,098	17,146	9,997	3,840	1,122
Total	**k tonnes**	**321,777**	**39,311**	**39,197**	**39,739**	**43,280**	**43,966**	**41,746**	**42,434**	**17,146**	**9,997**	**3,840**	**1,122**
Ore Mined													
5034	k tonnes	**13,197**	2,772	1,794	1,713	1,479	1,672	3,475	292	0	0	0	0
Hearne	k tonnes	**3,330**	571	1,965	793	0	0	0	0	0	0	0	0
Tuzo	k tonnes	**16,174**	0	593	1,208	1,011	0	5	2,825	3,366	3,184	3,115	867
Total	**k tonnes**	**32,700**	**3,343**	**4,352**	**3,714**	**2,490**	**1,672**	**3,479**	**3,117**	**3,366**	**3,184**	**3,115**	**867**
Total Material Mined													
5034	k tonnes	**169,116**	27,087	22,216	33,283	41,264	34,056	10,582	628	0	0	0	0
Hearne	k tonnes	**28,563**	14,179	12,145	2,239	0	0	0	0	0	0	0	0
Tuzo	k tonnes	**156,799**	1,388	9,188	7,931	4,507	11,582	34,643	44,924	20,512	13,181	6,955	1,989
Total	**k tonnes**	**354,478**	**42,654**	**43,548**	**43,453**	**45,770**	**45,638**	**45,225**	**45,551**	**20,512**	**13,181**	**6,955**	**1,989**
Strip Ratio	w:o	**9.8**	11.8	9.0	10.7	17.4	26.3	12.0	13.6	5.1	3.1	1.2	1.3
MILL FEED													
Material Treated													
5034	k tonnes	**13,459**	2,709	1,662	1,765	1,883	1,673	3,230	536	0	0	0	0
Hearne	k tonnes	**3,573**	641	1,467	799	666	0	0	0	0	0	0	0
Tuzo	k tonnes	**16,174**	0	101	519	681	1,510	0	2,336	3,230	3,230	3,230	1,336
Total	**k tonnes**	**33,205**	**3,350**	**3,230**	**3,084**	**3,230**	**3,183**	**3,230**	**2,873**	**3,230**	**3,230**	**3,230**	**1,336**
	k tpd	**8.3**	**9.2**	**8.8**	**8.4**	**8.8**	**8.7**	**8.8**	**7.9**	**8.8**	**8.8**	**8.8**	**3.7**
Treated Material Grade													
5034	cpt	**1.99**	1.99	2.20	1.91	1.60	1.93	2.22	1.83	0.00	0.00	0.00	0.00
Hearne	cpt	**1.88**	2.01	2.09	1.78	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuzo	cpt	**1.20**	0.00	2.18	2.09	1.49	0.97	0.00	0.77	1.10	1.29	1.37	1.26
Total	**cpt**	**1.59**	**1.99**	**2.15**	**1.91**	**1.54**	**1.47**	**2.22**	**0.97**	**1.10**	**1.29**	**1.37**	**1.26**
Contained Carats													
5034	k carats	**26,837**	5,392	3,660	3,377	3,020	3,232	7,176	980	0	0	0	0
Hearne	k carats	**6,731**	1,289	3,064	1,421	957	0	0	0	0	0	0	0
Tuzo	k carats	**19,355**	0	220	1,084	1,012	1,460	0	1,801	3,539	4,151	4,410	1,678
Total	**k carats**	**52,923**	**6,681**	**6,944**	**5,882**	**4,989**	**4,692**	**7,176**	**2,781**	**3,539**	**4,151**	**4,410**	**1,678**
	US$M	**3,840**	**444**	**461**	**404**	**353**	**344**	**549**	**210**	**267**	**321**	**350**	**137**
Recovery	**%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
	k carats	**52,923**	**6,681**	**6,944**	**5,882**	**4,989**	**4,692**	**7,176**	**2,781**	**3,539**	**4,151**	**4,410**	**1,678**
REVENUE													
Payable	%	**100%**	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	k carats	**52,923**	6,681	6,944	5,882	4,989	4,692	7,176	2,781	3,539	4,151	4,410	1,678
Gross Revenue	US$M	**3,840**	444	461	404	353	344	549	210	267	321	350	137
	C$M	**5,139**	589	613	539	471	460	736	282	360	433	473	185
Selling Costs	US$M	**0**	0	0	0	0	0	0	0	0	0	0	0
	C$M	**0**	0	0	0	0	0	0	0	0	0	0	0
Net Revenue	**US$M**	**3,840**	**444**	**461**	**404**	**353**	**344**	**549**	**210**	**267**	**321**	**350**	**137**
	C$M	**5,139**	**589**	**613**	**539**	**471**	**460**	**736**	**282**	**360**	**433**	**473**	**185**
NON-GOVERNMENT ROYALTIES													
	% of Value	**0%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Non-Governement Royalties	US$M	**0**	0	0	0	0	0	0	0	0	0	0	0
	C$M	**0**	0	0	0	0	0	0	0	0	0	0	0
OPERATING COSTS													
Mining	C$/tonne	**21.24**	34.35	40.91	28.06	7.16	8.87	5.10	28.44	28.36	21.81	13.35	12.61
	C$M	**705**	115.1	132.1	86.5	23.1	28.2	16.5	81.7	91.6	70.5	43.1	16.8
Processing	C$/tonne	**12.25**	11.22	11.70	12.35	12.10	12.14	11.96	12.96	11.52	11.36	11.33	21.94
	C$M	**407**	37.6	37.8	38.1	39.1	38.6	38.6	37.2	37.2	36.7	36.6	29.3
Support Services	C$/tonne	**37.29**	37.00	38.22	39.90	37.79	38.41	37.90	41.24	33.13	31.38	30.31	57.03
	C$M	**1,238**	123.9	123.5	123.0	122.1	122.3	122.4	118.5	107.0	101.4	97.9	76.2
G&A	C$/tonne	**6.28**	6.12	6.25	6.22	4.94	4.95	6.76	5.28	4.64	5.01	8.60	15.85
	C$M	**209**	20.5	20.2	19.2	15.9	15.8	21.8	15.2	15.0	16.2	27.8	21.2
Subtotal - OPEX	**C$/tonne**	**77.07**	**88.68**	**97.09**	**86.54**	**61.99**	**64.36**	**61.72**	**87.92**	**77.65**	**69.57**	**63.59**	**107.43**
	US$M	**1,911**	**224**	**236**	**200**	**150**	**153**	**149**	**188**	**186**	**167**	**152**	**106**
	C$M	**2,559**	**297**	**314**	**267**	**200**	**205**	**199**	**253**	**251**	**225**	**205**	**144**
WORKING CAPITAL													
Working Capital	**US$M**	**0**											
	C$M	**0**											
OPERATING CASH FLOW	**US$M**	**1,929**	**220**	**225**	**204**	**203**	**191**	**400**	**22**	**81**	**155**	**198**	**31**
	C$M	**2,580**	**292**	**299**	**272**	**271**	**255**	**537**	**29**	**109**	**208**	**267**	**42**
CAPEX													
Development	C$M	**10**	0	8	0	1	0	0	0	0	0	0	0
Sustaining	C$M	**137**	26	19	12	17	15	14	10	10	10	3	1
Capitalized Waste	C$M	**716**	62	52	95	158	142	143	64	0	0	0	0
Closure	C$M	**60**	14	14	14	0	0	9	0	0	0	8	0
Subtotal - CAPEX	**C$M**	**923**	**102**	**93**	**121**	**177**	**156**	**167**	**74**	**10**	**10**	**11**	**1**
Contingency	C$M	**0**											
Total CAPEX	**US$M**	**691**	**77**	**70**	**91**	**133**	**117**	**124**	**55**	**7**	**7**	**8**	**1**
	C$M	**923**	**102**	**93**	**121**	**177**	**156**	**167**	**74**	**10**	**10**	**11**	**1**
PROJECT PRE-TAX CASH FLOW	**US$M**	**1,238**	**143**	**156**	**113**	**70**	**74**	**276**	**-34**	**73**	**147**	**190**	**30**
	C$M	**1,658**	**189**	**207**	**151**	**94**	**99**	**370**	**-45**	**99**	**198**	**257**	**40**
Cumulative Cash Flow	**US$M**	**1,238**	**143**	**298**	**411**	**482**	**555**	**831**	**798**	**871**	**1,018**	**1,208**	**1,238**
	C$M	**1,658**	**189**	**396**	**547**	**640**	**739**	**1,109**	**1,064**	**1,162**	**1,361**	**1,617**	**1,658**
MPVD Portion													
MPVD Project Ownership	%	**49%**	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%
MPVD PRE-TAX CASH FLOW	**US$M**	**607**	**70**	**76**	**55**	**34**	**36**	**135**	**-16**	**36**	**72**	**93**	**15**
	C$M	**812**	**93**	**101**	**74**	**46**	**48**	**181**	**-22**	**48**	**97**	**126**	**20**
Cumulative Cash Flow	**US$M**	**607**	**70**	**146**	**202**	**236**	**272**	**407**	**391**	**427**	**499**	**592**	**607**
	C$M	**812**	**93**	**194**	**268**	**314**	**362**	**543**	**521**	**570**	**667**	**792**	**812**
MPVD Pre-Tax NPV @ 7.5%	**US$M**	**445**											
	C$M	**595**											
MPVD TAXES													
NWT Royalty	US$M	**22**	0	0	0	0	0	0	0	0	3	19	0
	C$M	**30**	0	0	0	0	0	0	0	0	3	26	0
NWT and Federal Taxes	US$M	**13**	0	0	0	0	0	0	0	0	1	10	0
	C$M	**18**	1	1	1	1	0	0	0	0	2	14	0
MPVD AFTER-TAX CASH FLOW	**US$M**	**572**	**69**	**76**	**55**	**34**	**36**	**135**	**-16**	**36**	**68**	**64**	**14**
	C$M	**765**	**92**	**101**	**73**	**45**	**48**	**181**	**-22**	**48**	**92**	**86**	**19**
MPVD After-Tax NPV @ 7.5%	**US$M**	**426**											
	C$M	**569**											

Figure 22-3: MPD LOM Pre-Tax Cash Flow

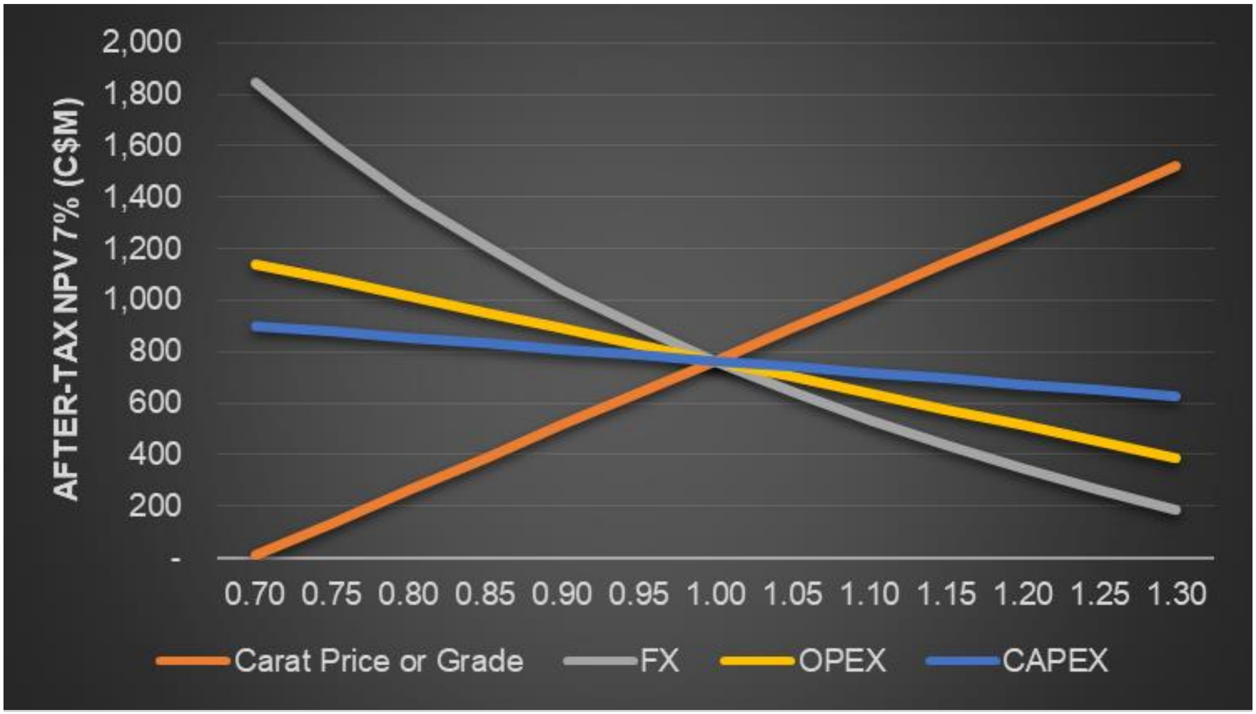


Source: Pre-Tax Cash Flow (JDS, 2020)

22.4 Sensitivities

The economics of the Gahcho Kué Mine are sensitive to changes in various parameters. Using the $NPV_{7.5\%}$ as the basis of comparison, the impact to changes in key parameters were evaluated. Sensitivity to five key variables was assessed to +/- 30%, sensitivity to these variables is presented below in Figure 22-4.

Figure 22-4: MPD NPV Sensitivity Analysis



Source: NPV Sensitivity (Note grade and Ct price overlap) (JDS, 2020)

The majority of factors for which the Gahcho Kué Mine are most sensitive are considered to be external. Externally, the mine is most vulnerable to the foreign exchange rate, as products are sold in US$ and costs are incurred in C$. Additionally, the carat price, which is largely a product of external market influences, as well as the in-situ resource has a notable effect on project economics.

Internally the mine is sensitive primarily to operating costs. Given the remote location, and challenging climate, swings in costs for materials, fuel and labor have a substantial effect on project economics. Diligent control over operating efficiency is required to cushion against uncontrollable fluctuations in external sensitivities.

A 30% decrease in diamond price results in a break-even NPV.

23 Adjacent Properties

In addition to their 49% share of the GKJV, Mountain Province Diamonds has 100% ownership of the neighbouring Kennady North Property. The most recent resource statement was completed in 2019 by Aurora Geosciences Ltd. Table 23-1 summarizes the publicly disclosed resources (http://mountainprovince.com/sedar) mentioned above based on a 1 mm bottom cut-off.

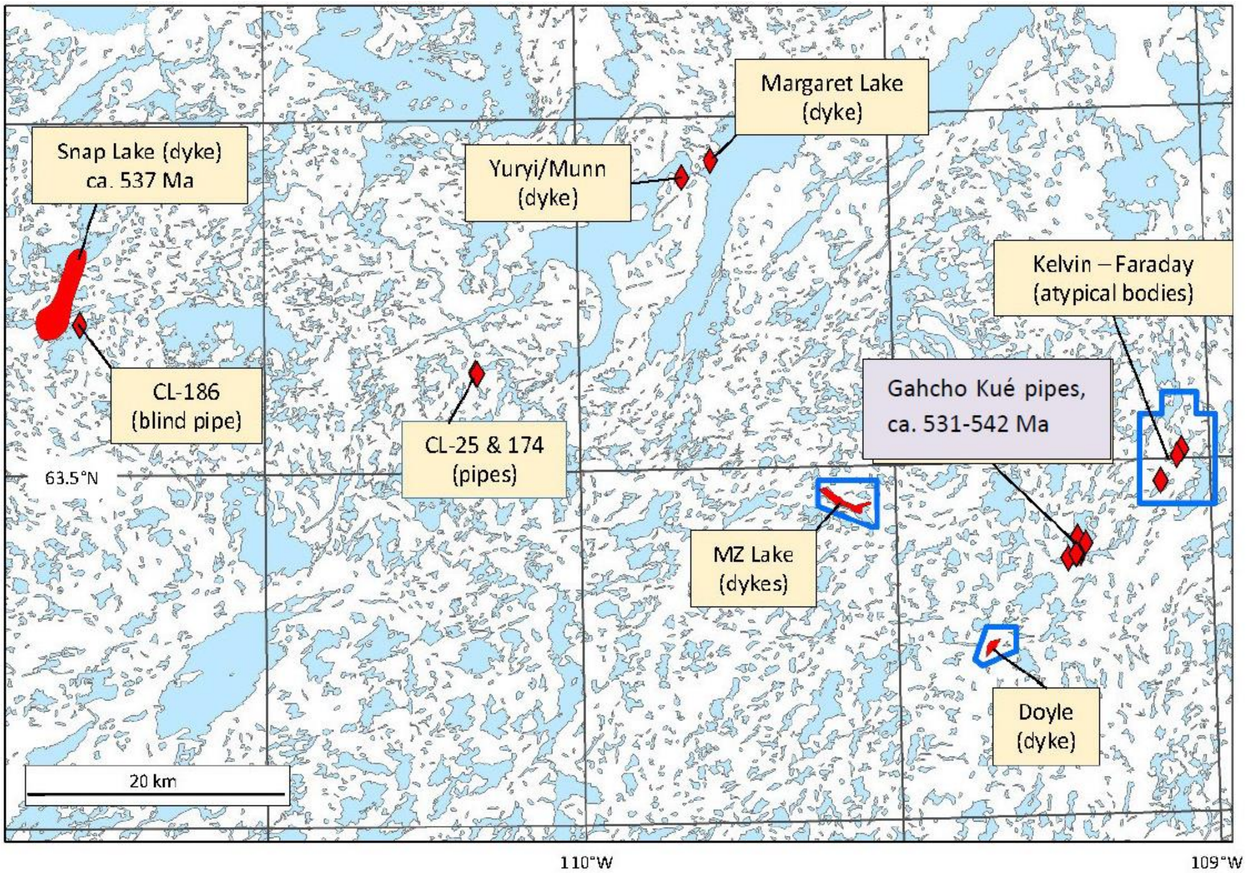
Table 23-1: Kennady North Mineral Resources

Deposit	Classification	Tonnes (Mt)	Grade (cpht)	Carats (Mcts)
Kelvin	Indicated	8.5	1.60	13.6
Faraday 2	Inferred	2.1	2.63	5.5
Faraday 3	Inferred	1.9	1.04	1.9

Note:
(1) Mineral resources are not mineral reserves and do not have demonstrated economic viability.
(2) Mineral resources are quoted above a +1.0 mm bottom cut-off and have been factored to account for diamond losses within the smaller sieve classes expected within a commercial process plant.
(3) Indicated mineral resources are estimated, based upon quantity, grade or quality, densities, shape and physical characteristics, with sufficient confidence and detail to support mine planning and evaluation of the economic viability of the deposit. Indicated resource classification was provided November 17, 2017 (Vivian and Nowicki).
(4) Average diamond value estimates for Kelvin and Faraday 3 are based upon a valuation model provided by WWW International Diamond Consultants Ltd in July 2017.
(5) Inferred mineral resources are estimated on the basis of limited geological evidence and sampling, sufficient to imply but not verify geological grade and continuity. They have a lower level of confidence than that applied to an Indicated mineral resource and cannot be directly converted into a mineral reserve. The Faraday 2 resource classification is of February 28, 2019.
(6) Reasonable prospects for economic extraction have been assessed for both open pit and underground mining at a conceptual level and form the basis for mineral resource estimation. A combination of open pit and underground mining methods has been assumed for Faraday 2. Open pit and underground mining operating costs of CDN$84 and CDN$152 per tonne of ore feed, respectively, have been assumed in the analysis. A foreign exchange rate of 1.30 CDN$:US$ was used for this conceptual mining analysis.
(7) Average diamond value estimates for the Faraday 2 update are based on an updated valuation model provided by WWW International Diamond Consultants Ltd in February 2019.
(8) Mineral resources have been estimated with no allowance for mining dilution and mining recovery.

Source: Mountain Province Diamonds Inc., 2019

Figure 23-1: Kennady Diamonds Kimberlite Prospects and Claim Boundaries



Source: Mountain Province Diamonds Inc., 2019

24 Other Relevant Data & Information

24.1 Reserve Exploitation to Date

Open pit mining and subsequent processing of kimberlite reserves has been continuously ongoing since September 2016. Total reserve exploitation as of December 31, 2019 has been reported as:

Table 24-1: Total Reserve Exploitation as of December 31, 2019

Deposit	Mined Tonnage (Mt)	Mined Grade (cpt)	Mined Carats (Mcts)
5034	8.06	1.68	13.50
Hearne	2.23	2.18	4.85
Total	**10.29**	**1.78**	**18.35**

Source: De Beers, 2019

Actual reconciled recovered carats as of December 31, 2019 are reported as:

		2016	2017	2018	2019
Reconciled carats recovered	Mcts	0.85	5.93	6.94	6.82

Source: De Beers, 2019

25 Interpretations & Conclusions

25.1 Interpretations & Conclusions

The QPs are satisfied with the status of the mineral tenure, regulatory permits, environmental and social stewardship and workplace quality. A strong record, both during development and operations presents a positive outlook in these areas moving forward.

The geological setting, mineralization, structures and the kimberlite bodies themselves are well understood. A high level of diligence from the mine's technical team continues to refine this knowledge as the mine evolves.

Qualified technical staff are employed at the Gahcho Kué Mine and additional diamond and mining industry experts are available from outside the mine. The geological database is conscientiously managed in-house. All modelling is performed within a framework of both peer and expert review. Audits have been performed by third parties to provide assurance of the reliability and completeness of the data for resource estimation.

Classification of mineral resources into indicated and inferred categories is consistent with CIM Definition and Standards on Mineral Resources and Mineral Reserves as of the November 2019 update publication.

The Gahcho Kué Processing plant has operated continuously since commissioning in September 2016 and has since exceeded 'nameplate' capacity. Nevertheless the operation remains focused on improving the efficiency of the process to reduce costs and increase productivity.

The mine engineering design, operating parameters and economic assumptions provide a credible basis for the conversion of mineral resources into mineral reserves. A number of years of operating history is now available. Forward looking views of pricing and exchange rates are established and approved at the corporate level and considered reasonable by the QPs.

Notwithstanding the impossibility of assaying for diamonds and the difficulty of closing reconciliation loops, efforts to reconcile the models to actual production have been diligent and rigorous. Learnings are providing valuable feedback for keeping the resource and reserve models updated and relevant as prediction tools for the mine.

The Gahcho Kué Mine is a fully functioning mine with the majority of infrastructure in place for LOM operations. There is a well-defined sustaining capital plan for remaining infrastructure developments required to maintain continuous production. Projected operating and capital costs appear realistic and the proposed schedules appear reasonable for the methods employed and planned resources.

The global market for diamonds is considered to have sound fundamentals and a favorable outlook based on projected demands outpacing the availability and rate of new mining developments. The price forecasts are based on MPDs sales experience and are a best estimate to provide external long-term pricing trends. The forecasts are a reasonable assumption on which to base the estimated mineral reserves in this report.

With the exception of 2026, cash flows for the Gahcho Kué Mine are projected to be positive in every year of the mine life. The LOM cash flow position supports the definition of mineral reserves for all three deposits.

25.2 Risks

As with most mining Projects, there are many risks that could affect the economic viability of the Project. Many of these risks are based on lack of detailed knowledge, and given that the Gahcho Kué Mine is in operation, these risks can be managed as more sampling, testing, design, and detailed engineering are conducted.

The most significant potential risks associated with the Project are operating and capital cost escalation, unforeseen schedule delays, and changes in regulatory requirements. These risks are common to most mining Projects, many of which can be mitigated with adequate engineering, planning, and pro-active management.

External risks are, to a certain extent, beyond the control of the Project proponents and are much more difficult to anticipate and mitigate, although, in many instances, some risk reduction can be achieved. External risks are things such as the political situation in the Project region, diamond prices, exchange rates, and government legislation. These external risks are generally applicable to all mining Projects. Negative variance to these items from the assumptions made in the economic model would reduce the profitability of the mine and the mineral resource and reserve estimates.

25.3 Opportunities

Opportunities include:

- Developing and incorporating the Kennady Diamonds kimberlites to extend the current mine life. The Kennady Diamonds kimberlites have both inferred and indicated resources located approximately 10km northeast of Gahcho Kué, with information found in section 23.
- Developing and mining the Tuzo Deep resource using a bulk underground mining method similar to the neighboring Ekati and Diavik mines. These resources are inferred at this time and additional resource drilling would be required to upgrade the resource to an indicated level.
- As mining progresses in 5034, monitor and review the revised eastern pit slope and look for opportunities to increase slope angles at depth if geotechnical conditions warrant.

At the time of this report, no permitting, detailed engineering, or detailed economic analysis has been published to conclude the economic feasibility of these opportunities.

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27 Units of Measure and Abbreviations

Table 27-1: Units of Measure and Abbreviation

Abbreviation	Units of Measure	Abbreviation	Units of Measure
'	Foot	Ha	Hectare
"	Inch	hp	Horsepower
µm	Micron (micrometre)	in	Inch
A	annum	kg	Kilogram
A	Ampere	km	Kilometre
Ac	Acre	km^2	Square kilometre
Ag	Silver	kPa	Kilopascal
Au	Gold	kt	Kiloton
cfm	Cubic feet per minute	kW	Kilowatt
cm	Centimetre	kWh	Kilowatt hour
Cu	Copper	L	Liter
d/a	Days per annum	lb	Pound
Dmt	Dry metric tonne	m	Metre
ft	Foot	M	Million
ft^3	Cubic foot	m^2	Square metre
g	Gram	m^3	Cubic metre
h	Hour	min	minute
mm	Millimetre	ppm	Parts per million
MPa	Mega Pascal	psi	Pounds per square inch
mph	Miles per hour	S	Second
Mt/a	Million tonnes per annum	T	Metric tonne
Mt	Million tonnes	t/d	Tonnes per day
°C	Degree Celsius	t/h	Tonnes per hour
°F	Degree Fahrenheit	V	Volt
oz	Troy ounce	W	Watt
Pa	Pascal	wmt	Wet metric tonne
ppb	Parts per billion	Zn	Zinc

Source: JDS, 2019