

Lucara Diamond Corp.

**Non-technical Environmental and  
Social Summary and Update of  
the Underground Mining  
Expansion Project at the Karowe  
Diamond Mine, Botswana**

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Prepared by Prizma LLC

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## Abbreviations

|                    |   |
|--------------------|---|
| BPC                | Botswana Power Corporation                              |
| BNMM               | Botswana National Museum and Monuments                  |
| CITES              | Convention on International Trade of Endangered Species |
| COVID-19           | Coronavirus disease 2019                                |
| CR                 | Community Relations                                     |
| DEA                | Botswana Department of Environmental Affairs            |
| EBRD               | European Bank for Reconstruction and Development        |
| EHS                | Environment, Health & Safety                            |
| EIA                | Environmental Impact Assessment                         |
| EMP                | Environmental Management Plan                           |
| EP                 | Equator Principles                                      |
| ESG                | Environment, Social and Governance                      |
| ESIA               | Environmental and Social Impact Assessment              |
| ESMS               | Environmental and Social Management System              |
| GHG                | Greenhouse Gas  |
| GIIP               | Good International Industry Practice                    |
| GISTM              | Global Industry Standard on Tailings Management         |
| GBV                | Gender based violence                                   |
| Ha                 | Hectares  |
| IESC               | Independent Environmental and Social Consultant         |
| IFC                | International Finance Corporation                       |
| ISO                | International Organization for Standardization          |
| IUCN               | International Union for the Conservation of Nature      |
| KDM                | Karowe Diamond Mine                                     |
| Km                 | kilometer   |
| LLC                | Limited Liability Company                               |
| LOM                | Life of Mine  |
| MAC                | Mining Association of Canada-                           |
| Mg/l               | milligram per liter                                     |
| MP                 | Management Plan   |
| NTS                | Non-Technical Environmental and Social Summary & Update |
| PS                 | IFC Performance Standards                               |
| Prizma             | Prizma LLC  |
| SDG                | Sustainable Development Goals                           |
| SHECR              | Safety, Health, Environmental and Community Relations   |
| SMP                | Social Management Plan                                  |
| tCO <sub>2</sub> e | Tonnes of carbon dioxide equivalent                     |
| TDS                | Total Dissolved Solids                                  |
| T-line             | Transmission line                                       |
| UN                 | United Nations  |
| UNFCCC             | UN Framework Convention on Climate Change               |
| UNDP               | United Nations Development Program                      |
| WBG                | World Bank Group  |

## 1.0 Background

### 1.1 Purpose

Lucara Diamond Corp. (Lucara or the Company) engaged Prizma LLC (Prizma) to generate a Non-Technical Environmental and Social Summary & Update (NTS) for the Underground Mining Expansion (the Project) of the Karowe Diamond Mine (KDM).

### 1.2 Report Structure

Section 2 describes the Project and an associated new 132 kV Transmission line required for the bulk power supply. Key applicable standards and categorization according to the International Finance Corporation (IFC) Performance Standards (PS)/Equator Principles (EP) are presented in Section 3. The environmental and social baseline conditions are summarized in Section 4. The key environmental and social impacts identified, the mitigation measures already adopted or proposed, and the Environmental and Social Management System (ESMS) are summarized in Section 5. A bibliography of key references used for preparation of NTS is also provided.

### 1.3 Authors

The authors of this NTS are Dr. Don Proebstel and Mr. Mehrdad Nazari of Prizma, a niche Environmental and Social Impact Assessment (ESIA), Independent Environmental and Social Consultant (IESC) and Environment, Social and Governance (ESG) advisory practice (<https://prizmasolutions.com>). The authors' biographies are presented below.

**Dr. Don Proebstel** is a Senior Associate of Prizma with over 25 years of professional experience, including Senior Environmental & Social Analyst with the US Overseas Private Investment Corporation (OPIC); Vice President Environmental and Sustainability at Gold Reserve Inc.; and Senior Analyst Pike Research (now Navigant Research). Dr. Proebstel has contributed to numerous Prizma engagements in the mining and renewable energy sectors, including IFC Performance Standards gap reviews of numerous mining projects, developed biodiversity management strategy and action plans, bankable ESIA's, and contributed also to international arbitration. His academic training is in conservation biology. Dr. Proebstel visited KDM and its new transmission line in April 2021.

**Mr. Mehrdad Nazari's** career spans over 25 years, including 10 as Principal Environmental Specialist at the European Bank (EBRD). Mr. Nazari has served as also contributed to bankable ESIA's, developed ESMS, served as expert panelist on independent accountability mechanisms and international arbitration. Previously, Mr. Nazari headed Corporate Responsibility/ESG Research at Fitch's CoreRatings, London (now part of DNV), advising responsible asset managers; served as Principal Environmental Specialist at the EBRD; and was Project Manager and EHS Auditor with Dames & Moore Frankfurt (now AECOM). Mehrdad studied in Germany, USA and the UK, holds degrees in Mineralogy, Hydrogeology and an MBA. Mr Nazari has made several site visits to Karowe from 2012, including April 2021.

### 1.4 Contact

For any comments or questions about the Project or this NTS, please contact Lucara via [esg@Lucaradiamond.com](mailto:esg@Lucaradiamond.com) or Prizma via [mehrdad@prizmasolutions.com](mailto:mehrdad@prizmasolutions.com).

## 2.0 Sponsor, KDM & the Project

### 2.1 About Lucara (Sponsor)

Lucara Diamond Corp., the Project Sponsor, is a Canadian diamond mining company with a producing mine and exploration licenses in Botswana. Its 100% owned Karowe Diamond Mine (KDM), see further below) is one of the world's foremost producers of large, high quality, Type IIA diamonds in excess of 10.8 carats. Lucara also owns Clara Diamond Solutions, a secure, digital sales platform. Lucara is listed on the Toronto Stock Exchange, Nasdaq Stockholm and the Botswana Stock Exchange under the symbol "LUC". Lucara is certified under the Responsible Jewellery Council Code of Practices, complies with the Kimberley Process, is a Participant of the United Nations (UN) Global Compact, and supports the UN Sustainable Development Goals (SDGs).

In March 2021, Lucara executed a mandate for a senior secured project financing package of up to US\$220 million to fund the underground expansion of KDM. A syndicate of five international financial institutions, including ING Bank N.V., Natixis, Societe Generale, London Branch, Africa Finance Corporation, and Afreximbank will act as the Mandated Lead Arrangers.

On July 12, 2021, Lucara announced the signing of the loan documentation in relation to previously executed mandate for the Project financing. First draw down under the facilities is anticipated to take place early in Q3/21. On July 15, 2021, Lucara announced the closing of a previously announced bought deal financing as well a previously announced concurrent private placement for an aggregate gross proceeds of approximately C\$41.4 million. The project financing package and additional contributions from the Lucara share equity raise ensure the Project is fully funded.

### 2.2 Karowe Diamond Mine

KDM is an existing grid-connected, conventional drill and blast open pit operation with diesel excavators and trucks providing an average annual 2.6 million tonnes of kimberlite feed to the diamond processing mill. The mine is located 15km southwest of Letlhakane village (27,000 inhabitants), Boteti Sub-District, Botswana. KDM was commissioned in October 2011 and achieved commercial production in July 2012.

In 2020, KDM had a total workforce of approximately 1,100, a very low lost time injury frequency rate of 0.09, zero non-compliances, spills and fines, zero effluent discharges, invested \$1.23 million in social programs, and recorded one labor and one community grievances, each, which were amicably resolved. The annual ESG performance of the operation has been disclosed since 2012, which has been subject to external assurance since 2016 (see <https://lucaradiamond.com/sustainability/sustainability-reports/>).

The brownfield nature of KDM means that the Project's baseline conditions include existing, appropriately scaled infrastructure, a mineral processing plant, access control arrangement, administrative offices, main substation, a water treatment plant, mine vehicle workshops, a slimes dam, a coarse tailings stockpile, geological buildings, yards and core storage facilities, various product stockpiles, waste rock dumps, internal roads and contractor areas for the mining and process operations contractors including a 15km gravel access road, a private air strip, a pit-dewatering well network, storm water management pond, process water ponds, and reverse-osmosis water plant and other miscellaneous infrastructure. Other infrastructure includes a bulk fuel tanks, workshops, explosives magazines, administration block, medical facilities, laboratories, service buildings, an electrical substation, and telecommunication land link.

In January 2021, Lucara announced that its application for the renewal of Mining License No 2008/6L in respect of the Karowe Mine had been approved by Botswana's Minister of Mineral Resources, Green Technology and Energy Security. The renewal was effective January 4, 2021, for a period of 25 years, securing Lucara's mining rights to 2046. KDM is located within a prolific diamond mining district. Other regional diamond mines include Orapa, Letlhakane, Damtshaa, and BK11/Firestone (currently under care and maintenance). Diamond mining in this region, through open pit operations, has been ongoing without interruption for almost 50 years.



### 2.3 About the Project

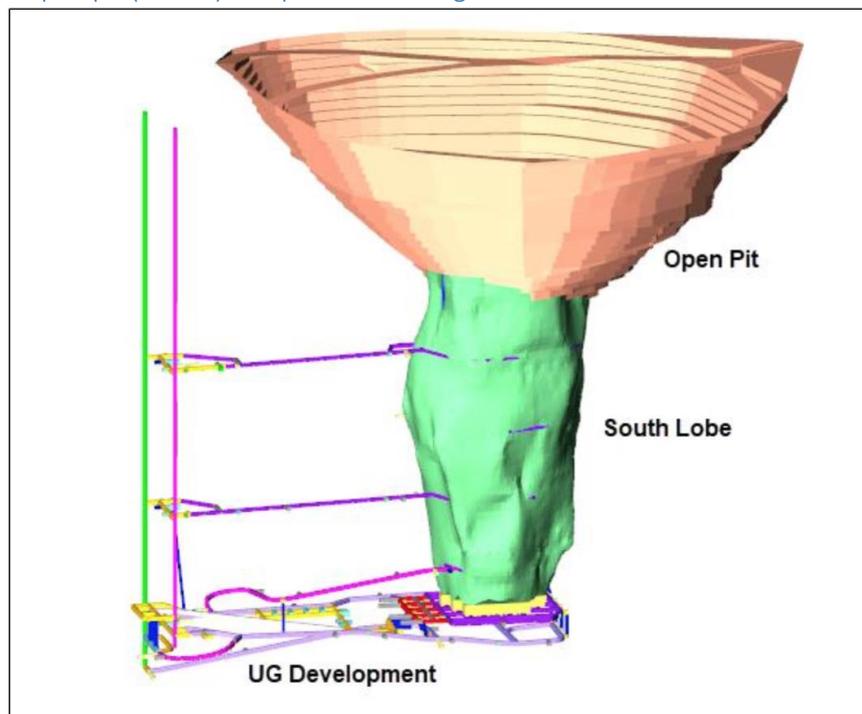
The transition from open pit ore production to underground mine production of the same diamondiferous kimberlite deposit is planned for approximately 2025. A change to underground mining activities would result in a Life of Mine extending to 2040.

The Project is targeting the substantial diamond resources remaining below the economic extents of the open pit in the South Lobe. A 7,200 tpd shaft operation utilizing long hole shrinkage (LHS) mining will provide an additional 13 years of mine life to the Karowe operation after a five-year construction period. The mine will be accessed from a vertical 767m deep production shaft, 8.5m in diameter, driven from surface. This shaft will also serve as the main fresh air intake to the mine. A second vertical shaft, 6.0m in diameter, driven 733m deep from surface, will form the main ventilation exhaust pathway.

The LHS method is planned to systematically drill and blast the entire lobe on a vertical retreat basis. In LHS, a significant proportion of the blasted muck is left in the stope during blasting and stoping to stabilize the host rock with only the swell extracted during the drill and blast phase. Once the column is fully blasted, the stope will be drawn empty by mucking the draw points. The bottom-up approach of the LHS mining method takes advantage of the higher value kimberlite at depth of KDM's South Lobe.

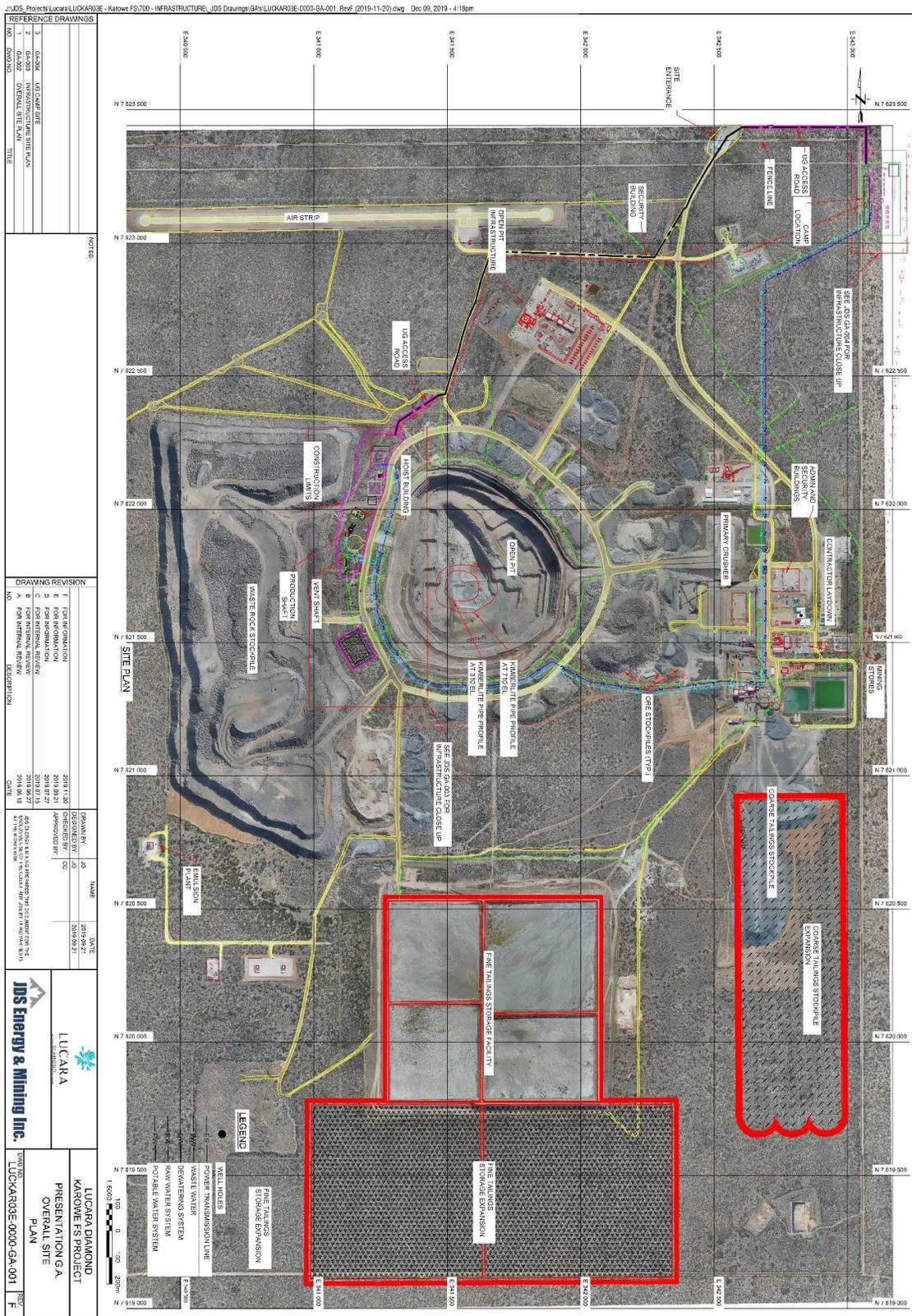
The transition and execution of the Project will require additional infrastructure, such as expansion of the waste rock storage, coarse and fine tailings facilities, the on-site landfill, and a 200-person contractor's camp. All of these will be built within the KDM mine lease area. Figure 2 shows the approximate location of the new or expanded additional surface-based infrastructure, which is expected to expand during detailed engineering to address recommendations related to the new Global Industry Standard on Tailings Management (GISTM).

Figure 2: KDM's open pit (brown) and planned underground mine



Source: Lucara in Digby Wells, 2020

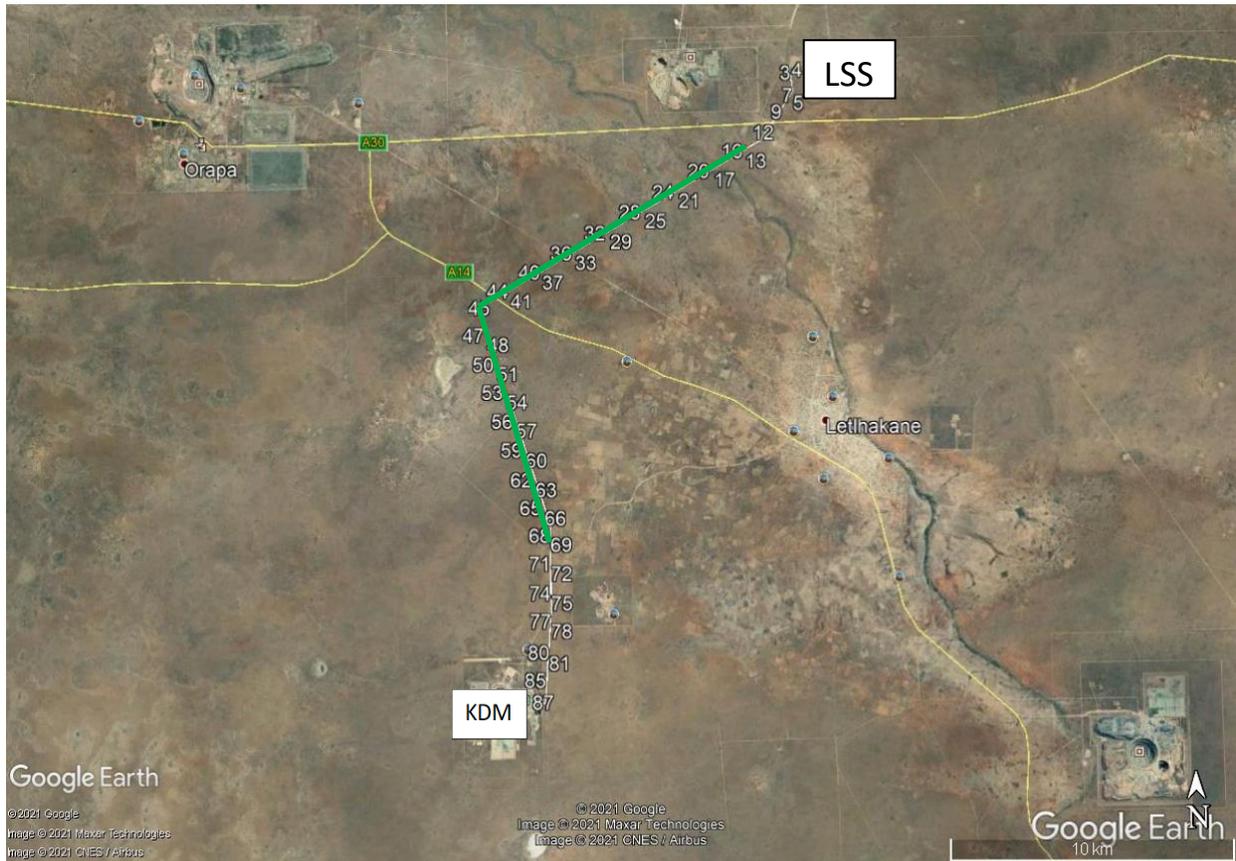
Figure 3: Layout of KDM mine lease area with major additional infrastructure



Source: JDS, 2019. The footprint of tailings facilities (red) will expand and remain within mine lease area.

In addition, the Project requires a new, approximately 30km long 132 kV transmission line (T-line) and two electrical substations to be constructed by the Company, increasing the bulk power supply to support the underground mine operations. The T-Line will be built immediately adjacent and parallel to existing transmission lines owned and operated by the Botswana Power Corporation (BPC), the parastatal utility provider. Once completed, the new 132kV line will be handed over to, and owned and operated by BPC.

Figure 4: Location of the planned 132kV transmission line connecting KDM with Letlhakane Substation

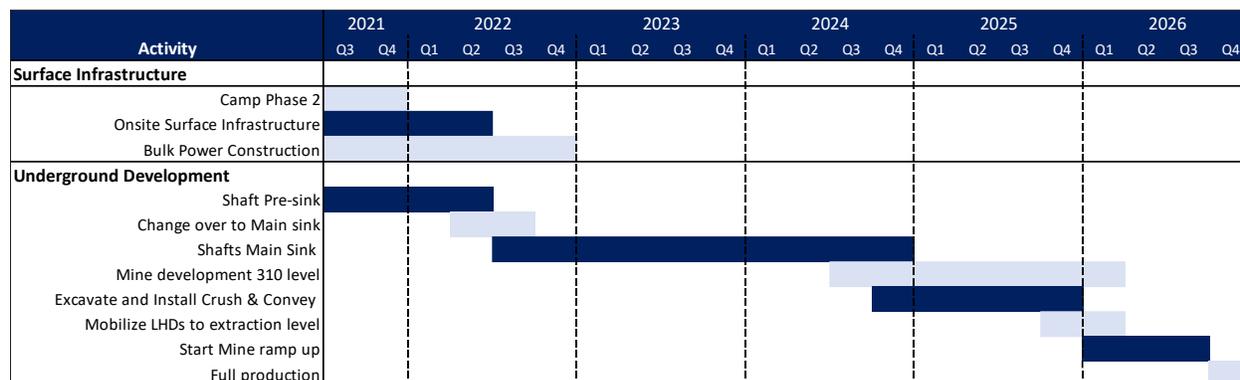


Note: KDM – Karowe Diamond Mine, LSS – Letlhakane Substation; Transmission lines section marked in green part of designated areas for bird mitigation (deflectors). Source: Lucara and contractors.

## 2.4 General Project Schedule

The general Project schedule is presented in Figure 5, overleaf, showing mine ramp up and full production from underground mining activities starting in 2026 after the construction period.

Figure 5: General Project construction schedule



Source: Lucara, 2021

## 2.5 Zone of Influence

There are no villages or towns, or any permanent surface water bodies in the immediate proximity to KDM. The nearest social receptors comprise small farms and cattle posts at distance of approximately 3-5 km from their nearest KDM’s perimeter fence lines.

The nearest village to KDM is Lethlakane, with a population of approximately 27,000. It is connected to KDM via a well-maintained gravel access road approximately 15km in length that connects to the national Highway A14 linking Serowe to Maun via Lethlakane and Orapa. Lethlakane is considered a “dormitory village” for mineworkers of three major mining operations in the area. Other more distance villages include Mmatshumo, Mosu, Mopipi, Moxobane, Orapa and Khwee. The closest airport that is serviced by commercial flights is in the regional centre of Francistown, approximately 200 km away or a two-and-a-half-hour drive. There is also an airstrip within the nearby Debswana controlled Orapa Township. The Karowe Mine site has its own 1,500 m gravel airstrip.

A study of social impacts of the new 132kV transmission line, which will be constructed immediately adjacent and parallel to existing 400kV and 33kV transmission lines, identified one farm which will experience economic displacement.

Table 1: Population structure of villages in the region hosting KDM

| Village           | Driving Distance from KDM | Total Population | Males  | Females |
|-------------------|---------------------------|------------------|--------|---------|
| <b>Mmatshumo</b>  | 61 km                     | 1,122            | 524    | 598     |
| <b>Mosu</b>       | 119 km                    | 2,694            | 1,298  | 1,396   |
| <b>Mopipi</b>     | 100 km                    | 3,912            | 1,785  | 2,127   |
| <b>Mokoboxane</b> | >100km                    | 1,594            | 726    | 868     |
| <b>Lethlakane</b> | 18.2 km                   | 26,393           | 13,187 | 13,206  |
| <b>Orapa</b>      | > 40 km                   | 10,062           | 4,948  | 5,114   |
| <b>Khwee</b>      | >100 km                   | 1,196            | 578    | 618     |

Source: Digby Wells, 2020 and Botswana Demographic Survey Report 2017<sup>1</sup>

<sup>1</sup><https://www.statsbots.org.bw/sites/default/files/publications/Botswana%20Demographic%20Survey%20Report%202017.pdf>

## 2.6 Non-technical Summary

This NTS was developed and relies on a numerous Project-related studies and reports, including those generated following the completion of the EMP to further align the Projects with the IFC IPS and EP (see Table 2).

Table 2: Key Project-related studies and reports (in chronological order)

| Key Study or Activity  | Date       | Status or Comments   |
|--|------------|--|
| <b>Karowe Mine Underground Feasibility Study Technical Report</b>  | Dec. 2019  | Basis for ESIA/EMP, updates  |
| <b>Biodiversity Management Plan and Wildlife Hazard Management Plan for KDM by Ecosurv</b>               | Jan. 2021  | Updated to further align with IFC PS6 and include IUCN   |
| <b>Independent Engineer Report on the Karowe Underground Project, Botswana</b>                           | April 2021 | Draft Report, also contains Project categorization and applicable IFC PS   |
| <b>Environmental Management Plan (EMP) for Karowe Underground Project by Digby Wells</b>                 | May 2020   | EIA/EMP for Project, Approved  |
| <b>GHG Footprint of Lucara's Underground Mining Project and Alternatives Analysis by Prizma</b>          | May 2021   | Lucara publishes GHG data, committed to prefeasibility study to review option to add renewable energy to its power mix |
| <b>Review of On-site Landfill Capacity for KDM Underground Expansion Project by Prizma</b>               | May 2021   | Identified need for capacity expansion and available space within lease area   |
| <b>Air Quality Impact Assessment for Lucara Botswana: Karowe Diamond Mine</b>                            | May 2021   | Account also for emissions from power generators   |
| <b>Annual Sustainability Report by Lucara</b>  | Jun 2021   | ESG performance and status   |
| <b>Social Review of 132kV Power Transmission Line for KDM Project by Prizma</b>                          | June 2021  | Confirmed only one farm will experiencing economic displacement  |
| <b>Biodiversity Field Survey of 132kV Transmission Line from Letlhakane Substation to KDM by Prizma</b>  | June 2021  | Regional presence of vulture and defined placement areas of bird deflectors  |
| <b>Assessment of E&amp;S Impacts associated with the Expansion of Fines Residue Dam at KDM by Prizma</b> | June 2021  | Established need for pre-construction survey and transplantation of two plants, if identified during survey            |
| <b>A Desk Review of Human Rights Issues for Lucara's KDM by Prizma</b>                                   | June 2021  | Access to water identified as potential salient issue  |

Source: Prizma

## 3.0 Standards & Consultation

### 3.1 Impact Assessment

In line with Botswana’s regulatory requirements, an Environmental Impact Assessment (EIA) and an Environmental Management Plan (EMP) were submitted and approved for KDM in 2008 and 2010, respectively, with subsequent updates completed in 2013, 2016, and 2020. The EIA and EMP study was guided by the Environmental Assessment Act No. 10 of 2010 and the associated Environmental Assessment Regulations of 2012. Statutory Requirements for the EIA process and development of the EMP follow on a number of key legislations and regulations are pertinent to the Karowe Diamond Mine operations. These are tabulated below.

Table 3: Pertinent legislation and policies

| Topic                                       | Legislation/Policy   |
|---|--|
| <b>Air pollution</b>                        | Atmospheric Pollution (Prevention) Act (1971), Mines, Quarries, Works and Machinery Act (1978)   |
| <b>Waste rock and residue disposal</b>      | Environmental Assessment Act (2010), Mines and Mineral Act (1999), Monument and Relics Act (2001), Herbage Preservation (Prevention of Fires) Act (1978) |
| <b>Hazardous waste</b>                      | Mines and Minerals Act (1999), Mines, Quarries, Works and Machinery Act (1978)   |
| <b>Land rehabilitation</b>                  | Waste Management Act (1998), Basel Convention, Mines, Quarries, Works and Machinery Act (1978)   |
| <b>Land reclamation</b>                     | Mines and Mineral Act (1999)   |
| <b>Archaeological artefacts disturbance</b> | Monuments and Relics Act (2001)  |
| <b>Soil conservation</b>                    | Agricultural Resources Conservation Act (1974)   |
| <b>Waste management</b>                     | Waste Management Act (1998), Public Health Act (2013)  |
| <b>Water pollution</b>                      | Water Act (1968), Waterworks Act (1962), Waste Management Act (1998), Public Health Act (2013)   |
| <b>Water supply</b>                         | Water Act (1961), Waterworks Act (1962)  |
| <b>Accident and welfare of employees</b>    | Mines and Mineral Act (1999), Mines, Quarries, Works and Machinery Act (1978), Factories Act (1979)  |
| <b>Operational safety</b>                   | Mines, Quarries, Works and Machinery Act (1978), Factories Act (1979), Public Health Act (2013)  |
| <b>Land rights</b>                          | Land Control Act, (1975, 1986)   |
| <b>Mining activities</b>                    | Mines and Mineral Act (1999),  |

| Topic                                | Legislation/Policy   |
|--------------------------------------|--|
|                                      | Mines, Quarries, Works and Machinery Act (1978)  |
| <b>Security</b>                      | Mines and Minerals Act (1999), Mines, Quarries, Works and Machinery Act (1978)   |
| <b>Radiation protection</b>          | Radiation Protection Act 2006  |
| <b>Blasting</b>                      | Explosives Act (1961)  |
| <b>Lucara Botswana Mine policies</b> | Occupational Health and Safety Policy (2013), Environmental Policy (2013), Corporate Social, Responsibility Charter (2013)   |
| <b>Land rights</b>                   | Land Control Act, (1975, 1986)   |
| <b>Mining activities</b>             | Mines and Mineral Act (1999), Mines, Quarries, Works and Machinery Act (1978)  |
| <b>Security</b>                      | Mines and Minerals Act (1999), Mines, Quarries, Works and Machinery Act (1978)   |
| <b>Radiation protection</b>          | Radiation Protection Act 2006  |
| <b>Blasting</b>                      | Explosives Act (1961)  |
| <b>Lucara policies</b>               | Occupational Health and Safety Policy (2013), Environmental Policy (2013), Corporate Social, Responsibility Charter (2013), Responsible Mining Policy (2021), Human Rights Policy (2021) |

Source: Digby Well and Lucara

In June 2020, the Botswana Department of Environmental Affairs (DEA) approved the Environmental Impact Statement (EIS) for Proposed Update of the Existing Environmental Management Plan and Mine Closure (EMP) for the Project. The EMP contains a comprehensive listing of applicable legislative instruments which apply to the Project. As typical for on-going mining operations, the Project will need to continue to obtain additional approvals for specific infrastructure or activities from time-to-time, such as those required for its landfill, incinerator, and other facilities and activities.

### 3.2 Public Consultation

As part of the impact assessment and EMP development, a series of public consultation meetings were conducted to identify and inform diverse stakeholders, solicit their views and opinions, consider alternatives, and identify suitable mitigation measures to avoid or minimize adverse impacts. The key issues identified during the process are summarized below.

- Additional health and safety concerns related to underground mining
- Local employment procurement, community development opportunities
- Dewatering impacts, water supply challenges, impacts on flora and fauna
- Buffer zones, compensating affected properties
- Pollution, noise, vibration impacts, waste management, upgrade power line

### 3.3 Human Rights

The Government of Botswana has ratified numerous international Conventions, Covenants, Protocols and Declarations concerned with human rights. These include International Labor Organization (ILO) Conventions, the UN human rights covenants and the universal declaration, the African Charter on Human and Peoples' Rights, and it also supports the (non-binding) UN Declaration on the Rights of Indigenous Peoples (UNDRIP).

In June 2021, Lucara commissioned a desk review of KDM against 44 human rights contained within the legal instruments mentioned above. This review identified the Right to Water as a potentially salient human right relevant to KDM. The participants in village consultation meetings on the EIA/EMP and mine closure raised concerns that may have human rights implications.

- Concerns over inadequate water supply from the Water Utilities Corporation and overtures to mines in the area to lend assistance.
- Concerns over falling water table levels and the possible link to mines operating in the area.

Given that access to water is an absolute necessity, Lucara must consider that the human right to water may be a potential salient human rights impact in the future, especially due to growing climate change impacts.

### 3.4 Equator Principles Categorization

An Independent Engineer engaged to review the Project on behalf of the lending agencies, deemed it an Equator Principles (EP) Category B project. This means that the Project is expected to have limited adverse environmental and social risks, and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.

### 3.5 IFC Performance Standards

In addition to meeting national requirements of Botswana, Lucara also adopted the IFC Performance Standards (IFC PS, 2012) and the World Bank Group's (WBG) Environmental, Health and Safety (EHS) Guidelines for Mining (2007) for the development of the Project.

The Independent Engineer also determined that the following IFC Performance Standards (PS) apply to the Project:

- PS1: Assessment and Management of Environmental and Social Risks and Impacts.
- PS2: Labor and Working Conditions.
- PS3: Resource Efficiency and Pollution Prevention.
- PS4: Community Health and Safety.

Independent Engineer also determined that the following PS are not triggered by the Project:

- PS5: Land Acquisition and Involuntary Resettlement.
- PS6: Biodiversity Conservation & Sustainable Management of Living Natural Resources.
- PS7: Indigenous People
- PS8: Cultural Heritage.

## 4.0 Baseline Condition

### 4.1 Introduction

One of the significant aspects of the Project is its “operational brownfield” nature and associated marginal additional environmental and social impacts. This refers to the fact that KDM is an existing and operating open pit mine, which will be expanded to enable underground mining activities. This “brownfield” context also applies to the planned 132kV power transmission line. It will follow parallel to an existing, regional 400kV before continuing along two existing 33kV transmission lines, one of which currently provides bulk power to KDM. Therefore, baseline conditions are largely defined by KDM’s existing operations and the existing transmission line corridor.

### 4.2 Physical Baseline

The Orapa-Letlhakane region is generally flat with a slight fall towards the north / northwest. Ground elevation ranges between 1,000 m in the south / southeast and 950 m further towards the northwest. With the exception of KDM’s constructed and engineered ponds related to process water, fine tailings storage and storm water management, there are no permanent surface water bodies at or immediately around KDM.

The region is characterized by a semi-arid to arid climate with hot, wet summers and cold, dry winters and lies on the northern fringe of the Kalahari Desert of central Botswana. The highest temperatures are experienced during summer with maximum and minimum temperature averaging above 30°C and 20°C respectively. During the winter months, the average minimum temperature often falls below 10°C. The wind direction is variable, especially at low speeds (< 7 knots). The majority of the high-speed winds blow to the west and west-northwest. Rainfall in the Letlhakane area is temporary and spatially variable. Typically, most rainfall occurs between September and April, although some events have been recorded between May and August.

The soils of the mining lease area comprise sand savannah arenosols, luvisols and calsisols, covered in mopane tree and shrub, savannah with occasional grassy areas. Most of the surface flow tends to be localized to the numerous pans dotted throughout the region.

### 4.3 Groundwater Resources Baseline

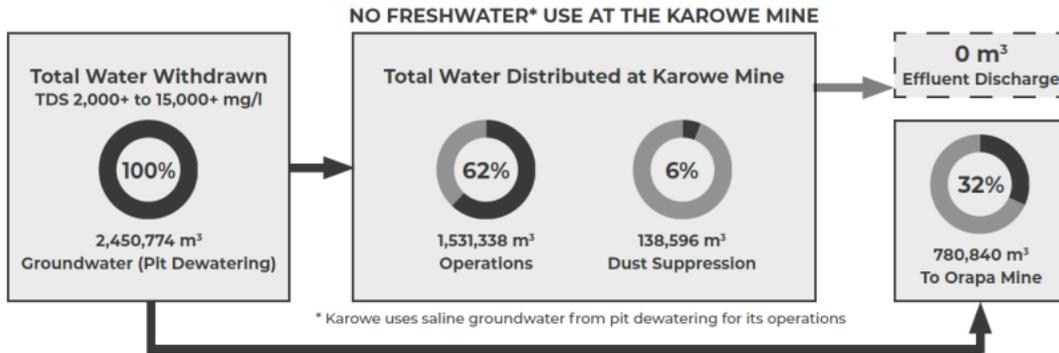
Due to semi-arid to arid climatic conditions, and variable flows of the Boteti River, groundwater resources are critically important sources for water in the region. As noted in section 3.3, the Right to Water was identified as a potential salient human right relevant to KDM.

Groundwater and water management studies in Orapa and Letlhakane region started with diamond mining operations in the Orapa-Letlhakane region in the early 1970’s. The main aquifers have been supplying adjacent mines Orapa, Letlhakane and Damtshaa, referred in this report as Debswana operations, with over 12 million m<sup>3</sup>/year of water for nearly 40 years. The regional groundwater level has experienced a significant drop of the water levels over the past decades.

KDM’s baseline conditions in terms of groundwater use and distribution is depicted further below (Figure 6). The groundwater extracted at Karowe is metered and exhibits significantly elevated total dissolved solids (TDS), ranging from over 2,000 mg/l to over 15,000 mg/l, in line with the geochemistry of the regional aquifers. This defines the groundwater quality as brackish to saline. In contrast,

freshwater is defined by TDS concentrations below 1,000 mg/l. In 2020, approximately 30% of the groundwater withdrawn for pit dewatering was re-directed to Debswana operations.

Figure 6: Water usage at the Karowe Diamond Mine.



Source: Lucara 2020 Sustainability Report

Recent, collaborative groundwater studies, including regional groundwater modelling by Exigo and AQUIsim, provide a detailed understanding of the regional and local aquifer systems, and demonstrate the importance of groundwater to meet current and future needs of mining, domestic/municipal supply, livestock and farming sectors.

KDM operates a wastewater treatment plant, which treated 10,706 m<sup>3</sup> of effluents in 2020. It services the Karowe mine and company-sponsored housing in Lethlakane. It collects and treats sanitary effluents to meet surface water discharge standards, including disinfection of pathogens. The pond used for treated effluent storage is lined. Treated water is used to irrigate lawns and gardens around - office buildings at the Karowe mine. Solid waste from wastewater treatment is either incinerated or stored as fertilizer for future land restoration areas.

#### 4.4 Ecological Baseline

The biological baseline was established with the initial EIA for, what was at the time, the proposed Karowe Open Pit mine (Geoflux) in 2007 and has been updated several times with additional EIAs and Project monitoring from 2012 to present. The mine area can generally be characterised as homogenous shrubland maintaining the same species composition throughout the area with few noticeable changes in species dominance. Ecosystem services in the greater Project area supports mostly grazing, agriculture and wildlife.

Protected from cattle grazing, which is not permitted in the areas within the mine fence, the undeveloped areas within the KDM exhibit relatively more grass and herbage cover and, therefore, more diversity. There are no specific areas of high biodiversity and no Critical Habitat within the mine lease. Two plant species of national conservation concern (but without IUCN listing) were identified within the KDM mine lease area: *Harpagophytum procumbens* (Devil's claw) and *Hoodia currorii* (Hoodia). Their conservation status is tabulated further below. The KDM mine lease area is deemed to be a Modified Habitat as defined by IFC Performance Standards 6.

A mid-2021 pre-construction foot survey undertaken for the proposed new 132 kV T-line did not identify priority plants (i.e. plants with national or international special conservation status) along the corridor. It

is noted that it is relatively easy to miss *Harpagophytum procumbens* as the leaves die back during the dry season and only the fruiting bodies are visible.

During the same pre-construction survey, no birds of conservation concern, nor their nesting sites, were observed along the transmission line corridor, and none were observed in the 500 m distance searched along the fossil river system. A vulture nest of the critically endangered White-backed vulture (*Gyps africanus*) was observed in the vicinity of the transmission line on the edge of a pan, approximately 1.6 km to the western side of its nearest planned transmission tower. Additional White-backed vultures that were continuously circling in the skies across the pan were also observed. Other White-backed vulture nests recorded in previous studies were also mapped.

Species of conservation concern observed or reported within or nearby KDM’s mine lease area are tabulated in Table 3. The range of the endangered White-backed vulture (*Gyps africanus*) and the Hooded vulture (*Necrosyrtes monachus*) are also presented Figure 7. The range map indicates that the footprint of the transmission line does not represent Critical Habitat. However, installation of bird deflectors was recommended, as detailed further in Section 5.

A review of status of White backed and Hooded vultures in relation to the transmission line also revealed that the overwhelming threat to these critically endangered species was illegal poaching and poisoning of all species of vultures in Southern Africa, where in recent years over 2,000 vultures have been poisoned by elephant poachers and for trade of vulture heads as talismans<sup>2</sup>.

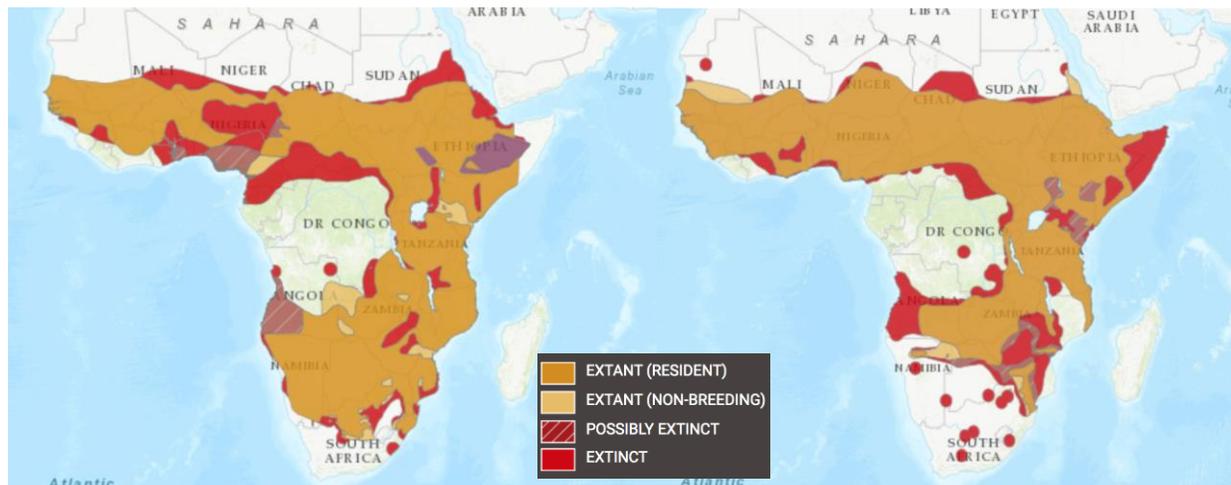
Table 4: Species of conservation concern observed or reported in or near mine lease area or T-line

| Family               | Species                         | English              | IUCN status <sup>1</sup> | National Status <sup>2</sup> CITES Appendix II | RR <sup>3</sup> | EN <sup>4</sup> |
|----------------------|---------------------------------|----------------------|--------------------------|--|-----------------|-----------------|
| <b>Flora</b>         |                                 |                      |                          |  |                 |                 |
| <b>Pedaliaceae</b>   | <i>Harpagophytum procumbens</i> | Devil’s claw         | N/A                      | NT   | no              | no              |
| <b>Apocynaceae</b>   | <i>Hoodia currorri</i>          | Hoodia               | N/A                      | Vu   | no              | no              |
| <b>Large Mammals</b> |                                 |                      |                          |  |                 |                 |
| <b>Felidae</b>       | <i>Panthera leo</i>             | African lion         | Vu                       | ii   | no              | no              |
| <b>Elephantidae</b>  | <i>Loxodonta africana</i>       | African elephant     | EN                       | ii   | no              | no              |
| <b>Hyaenidae</b>     | <i>Parahyaena brunnea</i>       | Brown hyaena         | NT                       |  |                 |                 |
| <b>Felidae</b>       | <i>Panthera pardus</i>          | Leopard              | Vu                       | i  | no              | no              |
| <b>Fauna</b>         |                                 |                      |                          |  |                 |                 |
| <b>Accipitridae</b>  | <i>Harpagophytum procumbens</i> | White backed vulture | CR                       | ii   | no              | no              |
| <b>Accipitridae</b>  | <i>Necrosyrtes monachus</i>     | Hooded vulture       | CR                       | ii   | no              | no              |

1. IUCN Status: CR= Critically Endangered; EN=Endangered; Vu=vulnerable; NT=Near Threatened; LC=Least concern; N/A=Not Available; 2. National Status: i= ii=Partially protected and endangered species; 3. RR: Restricted Range; 4. EN: Endemic to Botswana, T-line – transmission line

<sup>2</sup> <https://www.allaboutbirds.org/news/the-race-to-save-african-vultures/>

Figure 7: Range maps for the White-backed vulture (*Gyps africanus*, left) and Hooded vulture (*Necrosyrtes monachus*, right)



Source: <https://www.iucnredlist.org/species/22695189/126667006> and <https://www.iucnredlist.org/species/22695185/118599398> accessed July 5, 2021

#### 4.5 Climate Change Context

Botswana's Vision 2036 highlights Climate Change risks and need for vulnerability assessment, adaptation, and mitigation. It also notes that the energy sector will be transformed to include renewable sources, and enable related private-public partnerships and investments.

Botswana's Climate Change Policy (2017) is still in draft form and does not include specific and/or scheduled initiatives or targets. For example, no clear intent has been expressed to introduce quantified carbon taxes within a defined timeframe.

Botswana published its Third National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) in 2019. The energy sector's share of GHG emissions for 2015 was 71.2%. Botswana's report also includes results of scenario planning and highlights adaptation measures.

The outcomes of these scenarios constructed for Botswana indicate that, by 2050, the country will be hotter (+1.3 to +2.7 °C), show a marginal change of precipitation, evaporation could increase, and that groundwater abstraction will increase. Livestock productivity is expected to decline. Crop yields can both increase and decrease, depending on the type and location of activities. Adverse health impacts expected include an increase in malaria and malnutrition.

Botswana Government's intended mitigation actions are projected to reduce emission by 12% to 15% by 2030 against a 2010 baseline. The energy sector, which accounts for over 70% of the country's GHG emissions, is expected to provide the most significant emission reductions. The Government indicated its target to increase the renewable energy share of total power consumption to 25% by 2030.

Lucara has been disclosing its GHG emissions (Scope 1 & 2) annually since commencing operation in 2012. In 2020, the Company generated GHG emission totaling 74,135 tCO<sub>2</sub>e.

## 4.6 Social Baseline

### 4.6.1 Mining Context

According to the World Bank, Botswana was one of the world's poorest countries at independence in 1966, and rapidly became one of the world's development success stories. Significant mineral (diamond) wealth, good governance, prudent economic management, and a relatively small population of slightly more than two million, have made it an upper middle-income country with a transformation agenda of becoming a high-income country by 2036.

KDM is mining the AK06 kimberlite pipe, which is one of approximately 83 pipes comprising the Orapa kimberlite field. The operating mines in the region include (a) the Orapa Mine (21 km from KDM), established in 1971, which is the second largest diamond mine in the world, (b) the Letlhakane Mine (22 km from KDM), established in 1977; and (c) the Damtshaa Mine (23 km from KDM), established in 2002, all of which are owned by Debswana Diamond Mining Co (Debswana). The Firestone Mine (5.2 km northeast of KDM), owned by Firestone Diamonds plc, is currently under care and maintenance.

### 4.6.2 Water Context

As noted further above, the area hosting the Project is characterized by a semi-arid to arid climate with hot, wet summers and cold, dry winters. The World Resources Institute's Aqueduct, a tool which identifies and evaluates water risks around the world, categorizes the Central District of Botswana, which also hosts KDM, as a "High Baseline Water Stress" area. Regional groundwater level has dropped by approximately 30 m since the 1970's.

Consultation meetings related to the Project identified concerns over falling water table levels and the possible link to mines operating in the area. Concerns were also noted about inadequate water supply from the Water Utilities Corporation and overtures to mines in the area to lend assistance.

### 4.6.3 COVID-19 Context

The WHO reports that, from 3 January 2020 to 5:05pm CEST, 14 July 2021, there have been 80,153 confirmed cases of COVID-19 with 1,253 deaths in Botswana. As of 13 July 2021, a total of 170,181 vaccine doses have been administered.

The Government of Botswana designated the mining sector as an essential service. This means that mining operations – including KDM - continued operations.

As a country, Botswana has witnessed an increase in the incidence of gender-based violence (GBV) during the COVID-19 pandemic.

### 4.6.4 Zone of Influence

As noted also in Section 2, there are no villages or towns, or any permanent surface water bodies in the immediate proximity to KDM. The nearest social receptors comprise small farms and cattle posts at distance of approximately 3-5 km from their nearest KDM's fence lines. The nearest village to KDM (which has a total workforce of 1,108 by the end of 2020) is Letlhakane, with a population of approximately 27,000. It is connected to KDM via a gravel road that connects to the national Highway A14 linking Serowe to Maun via Letlhakane/Orapa.

Letlhakane is considered a "dormitory village" for mineworkers of three major mining operations in the area (and one additional mine which is currently under care and maintenance). Other more distance villages include Mmatshumo, Mosu, Mopipi, Moxobane, Orapa and Khwee (see Table 1).

A study of social impacts of the new 132kV transmission line, which will be constructed immediately adjacent and parallel to existing 400kV and 33kV transmission lines, identified one farm which will experience economic displacement.

The results of a 3-dimensional, regional groundwater model simulated water level drawdown and modeled impacts from Karowe Mine on the aquifer system in 2030, 2040 and 2050. The radius of influence on the water levels from future abstraction from the Karowe operations is in the order of 25 kilometers for a 1-metre drawdown. The radius of influence at a 10-metre drawdown is in the order of 15 kilometers.

#### 4.6.5 Education

Letlhakane has eight public schools which are four primary schools, three junior-secondary and one senior secondary school. These schools, especially the secondary and senior schools, also receive students from surrounding villages and settlements such as Mosu, Mopipi, Mokoboxane, Khwee and Mmatshumo. In addition to the public schools, there is a private English medium school, and a vocational training technical school.

#### 4.6.6 Cultural Heritage

An Archaeological Impact Assessment carried out in 2008 revealed several archaeological and burial sites within KDM region and along the access road corridor. The known burial ground was identified prior to KDM mine disturbance and is located outside the KDM mine Lease and Project area, is fenced and demarcated and, as such, it is envisaged that the Project poses no risk of direct impact to the burial ground. Artifacts that were discovered included Early Stone Age and Iron Age stone tools, and other pieces of pottery, bones and glass objects. KDM adopted a chance find protocol to address archaeological areas which may be identified during any construction activities. In preparation of the Project, an archeological survey of the KDM site was undertaken in October 2018. No archaeological resources were identified.

In addition, an archeological survey was conducted along the new 132kV transmission line corridor. It identified archeological lithics from the Late Stone Age of low significance. This find was assigned a Botswana National Museum and Monuments (BNMM) mitigation requirement category 5. This means that no further mitigations are required prior to the construction of the transmission line.

#### 4.6.7 Sponsor's Impact Investments

The social baseline conditions include Lucara's on-going impact investment initiatives which have been continuing since approximately 2012. In 2020, these included \$1.24 million to support the development of village farms (produced 115,322 eggs, providing produce to two area schools with 1,200 students), and an abattoir, which is an important infrastructure for local cattle farmers and income source for the local council. In 2020, Lucara also broke ground on a new \$3.2 million sports complex and a school.

In response to the growing GBV during the pandemic, Lucara supported workshops to promote gender equality, initiated a GBV campaign mobilizing 20 villages in the area, and rolled out a GBV awareness campaign for its workforce at KDM. Lucara has also launched the National GBV Campaign lead by the Former President HE Festus Mogae. The aim of the campaign is to aid the country with education on GBV, rape kits, one stop rape service centers, assist volunteers and centers. This has been set up in collaboration with other private sector companies led by Lucara Botswana.

## 5 Key Impacts and Mitigation Measures

### 5.1 Introduction

The Project can be characterized as a “brownfield expansion” resulting in marginal additional environmental and social impacts. With few exceptions, highlighted further below, these predicted impacts and mitigation requirements are similar in nature to those associated with KDM’s on-going activities. In general, these are already being managed through well-developed Environmental and Social Management Systems (ESMS), summarized further below, and performance results are already being publicly reported since 2012 through externally assured annual sustainability reporting in accordance with GRI Standards (see: <https://lucaradiamond.com/sustainability/sustainability-reports/>).

### 5.2 Key Impacts

The 2020 EMP identified the following key Project impacts:

- Biophysical impacts
- Ecological impacts
- Hydrological impacts
- Waste management impacts
- Socio economic aspects
- Public health impacts
- Occupational health impacts

More specifically, from potential impacts reviewed as part of the EMP, those which received “probable” to “definitive” probability ratings, and “high” significance rating comprise the following:

- Employment, business, and local economic opportunities
- Occupational health & safety
- Dust and vibration from blasting
- Risk exposure to underground mining
- Groundwater pollution
- Loss of employment at closure

The EMP for the Project contains detailed EMP tables of action items, which describe the impact and provides mitigation measures, as well as the responsible party for reporting purposes. These approximately 30 items segmented by various phases form a portion of the statutory reporting requirements at KDM. The plans and action items may be assessed, from time to time or on an ongoing basis, to ensure whether the mitigations measures are effective, and can be undertaken by either government departments or agencies and/or self-audits by the company. The EMP is a legally binding document, and it is KDM’s responsibility to appoint compliance review consultant, and ensure that the EMP is implemented.

Based on the local context, including vulnerability of Botswana to Climate Change, review of the Project against IFC PS and EP, and studies completed after the EMP had been developed, such as a desk-top based Human Rights Review noted in Section 3.3, the following topics have also been designated as potentially significant, requiring additional analysis which is summarized in this NTS.

- Cumulative groundwater impacts
- Greenhouse gas emissions

In addition, the new Fine Residue Dam (also referred to as Slimes Dam) has been classified as a high hazard facility and its design is expected to be updated during detailed engineering in 2021. Design work has been initiated for expansion to the Fine Residue dump that is expected to align with industry best practices, including both the Mining Associations of Canada's Toward Sustainable Mining (TSM) and the Global Industry Standard on Tailings Management (GISTM) introduced in August 2020. Additionally, Lucara has completed the Church of England Pension Fund Tailings Safety Disclosure Response which has been posted to the Lucara website ([https://lucaradiamond.com/site/assets/files/62833/2021-06\\_tailings\\_mgt\\_disclosure\\_combined.pdf](https://lucaradiamond.com/site/assets/files/62833/2021-06_tailings_mgt_disclosure_combined.pdf))

### 5.3 Environmental and Social Management System

The Project will benefit from a well-developed and tested ESMS under active implementation at KDM. The presence and status of the ESMS is detailed below.

#### 5.3.1 Policies

Lucara's web-posted corporate governance and policies include its Responsible Mining Policy<sup>3</sup>, which includes a mission statement and covers Environmental and Social Responsibility, Governance, and Planning for a Positive Legacy. Lucara also has a Human Rights Policy<sup>4</sup> and recognizes the risks associated with climate change. A standing Safety, Health, Environmental and Community Relations (SHECR) Committee provides board-level supervision.

#### 5.3.2 Risks & impacts

Lucara, KDM and the Project apply a systematic approach to risk and impact identification common to the mining sector. Examples of related activities include various studies identified in [Table 2: Key Project-related studies and reports](#) and annual public disclosure of performance, which can be accessed here: <https://lucaradiamond.com/sustainability/sustainability-reports/>.

#### 5.3.3 Management programs

KDM has already developed and updated numerous, systematic E&S management programs from time to time, which will also apply to the Project, and all employees and contractors.

At the system level, starting in 2019, KDM started transitioning from the Occupational Health and Safety Assessment Series (OHSAS) 18001 to the International Organization for Standardization (ISO) 45001:2018 management system. By the end of 2020, KDM was over 81 percent alignment with its ISO 45001:2018 adoption plan.

The regulatory approved 2020 EMP is a legally binding document, and comprises the overall environmental management plan for the Project. The EMP is segmented into construction, operation and closure stages. The EMP also includes a Mitigation Plan, which identifies impacts associated with the Project and provides mitigation measures, allocates costs and responsibilities. The EMP also includes a Monitoring Plan and a Decommissioning Program. Based on recent biodiversity surveys among the T-line a recommendation has been made for bird mortality monitoring along the 132kV transmission line as well as additional bird diversion mitigation along power lines (see Figure 4).

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<sup>3</sup> [https://www.lucaradiamond.com/site/assets/files/62581/responsible\\_mining\\_policy\\_march2021.pdf](https://www.lucaradiamond.com/site/assets/files/62581/responsible_mining_policy_march2021.pdf)

<sup>4</sup> [https://www.lucaradiamond.com/site/assets/files/62794/lucara\\_human\\_rights\\_policy\\_2021-02-22.pdf](https://www.lucaradiamond.com/site/assets/files/62794/lucara_human_rights_policy_2021-02-22.pdf)

### 5.3.4 Organizational capacity

KDM's existing capacity is presented in Figure 8, overleaf. It shows an experienced team of 22 staff members covering occupational health and safety, environmental and waste management, fire safety, community relations, sustainability, and administration.

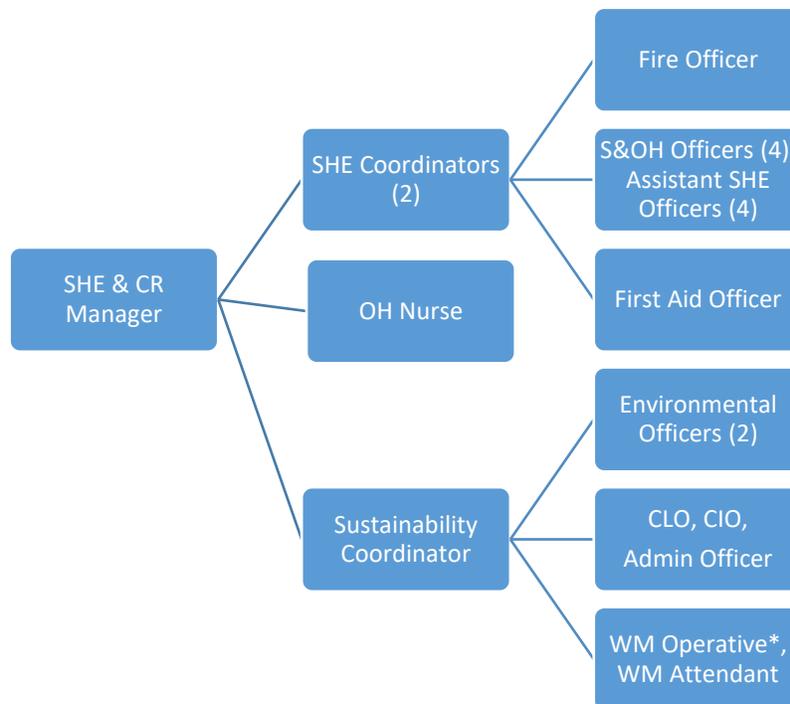
In line with the EMP, the Project is expected to engage an additional Environmental Control Officer during the construction period to monitor compliance.

### 5.3.5 Emergency preparedness & response

KDM maintains a part-time clinic at the mine site. It is staffed by two consulting doctors offering primary health care, a wellness program, and occupational health services to the entire workforce. KDM also maintains an on-site health care unit. It is permanently staffed by a registered nurse. Additional emergency services are contracted to be available, when required.

In addition to conducting pre-employment and periodic medical exams, the medical and health program also covers HIV/AIDS, tuberculosis, obesity, diabetes, and hypertension. In response to COVID-19, KDM also introduced a counselling service for its workforce.

Figure 8: Organigram of KDM's Safety, Health, Environment, and Community Relations Team



Source: Lucara, SHE – Safety, Health and Environment, CR – Community Relations, OH – Occupational Health, CLO – Community Liaison Officer, CIO – Community Investment Officer, WM – Waste Management, \* - Vacancy

KDM's existing emergency response plan, which covers also fires, spills and floods, is expected to be updated in 2021 to also reflect the impacts of potential breach of the fine residue tailings storage facilities. Underground mining operations will also necessitate other adjustments, new capabilities, rescue equipment, and training.

### 5.3.6 Stakeholder engagement

Lucara has long-standing and positive relationships with its local communities. KDM follows a structured engagement program, which integrates also traditional – Kgotla – meetings. KDM maintains a community liaison office in Letlhakane, which features dedicated community liaison staff. The company also maintains a community grievance mechanism, which typically records 1-2 grievance per year (1 in 2020), which have been amicably and promptly resolved.

As part of the development of the 2020 EMP, KDM's stakeholder map, engagement plan, and community grievance mechanisms were updated. These plans still need to be finalized and more explicitly cover vulnerable groups. Additional engagement with farmers proximate to the new transmission line and those who may experience water-related impacts is recommended.

### 5.3.7 Monitoring & review

The regulatory approved 2020 EMP includes a Monitoring Plan and highlights the requirement for the Project to engage an Environmental Control Officer to conduct periodic audits during construction, and annual audits thereafter, and ensure the requirements identified in the EMP are being followed.

In addition to internal and external (including governmental) reviews and audits, the company publishes its detailed economic, environmental, social performance using key performance indicators provided by the GRI Standards.

A standing Safety, Health, Environmental and Community Relations (SHECR) Committee also provides board-level supervision.

## 5.4 Cumulative Groundwater Impacts

A Human Rights Review identified Right to Water as a likely and salient Human Right relevant to KDM and its future developments. During community engagements and feedback related to the Project, participants in village consultation meetings on the EIA/EMP and mine closure raised concerns that may have human rights implications.

- Concerns over inadequate water supply from the parastatal Water Utilities Corporation and overtures to mines in the area to lend assistance.
- Concerns over falling water table levels and the possible link to mines operating in the area.

In collaboration with other regional mining operations, Lucara has developed a 3-dimensional, regional groundwater model to provide a better understanding of impacts, and support monitoring and management

Simulated water level drawdown modeled future impacts from the Project on the aquifer system in 2030, 2040 and 2050. The radius of influence on the water levels from future abstraction from the Karowe operations is in the order of 25 kilometers for a 1-metre drawdown. The radius of influence at a 10-metre drawdown is in the order of 15 kilometers. Climate change impacts, expected to cause lower precipitation and higher temperatures, are expected to cause additional pressure on groundwater resources in the region.

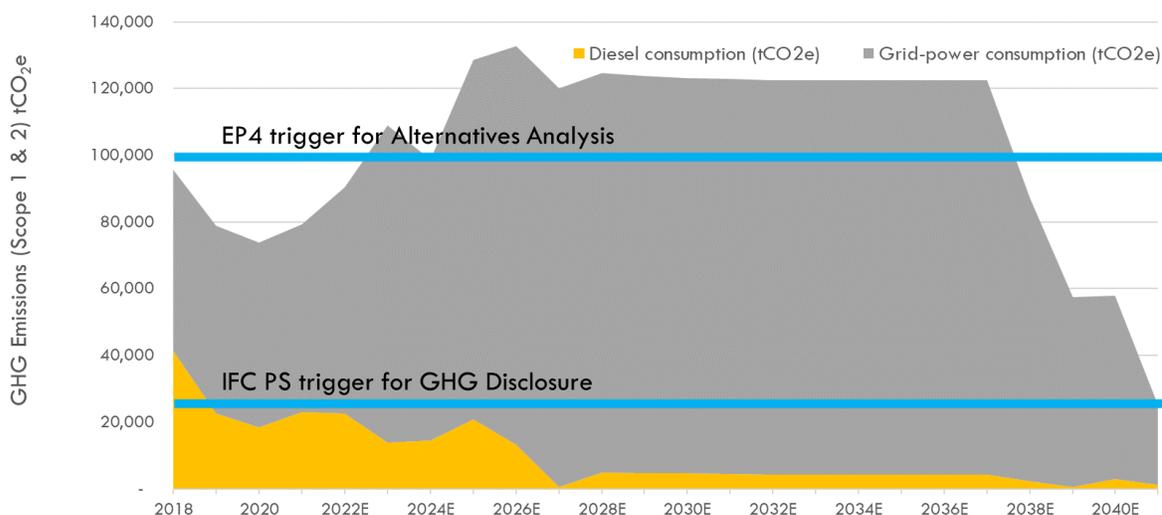
Lucara has been adopting a water stewardship approach (which means considering water as a common resource and collaborating more closely with local stakeholders and water users). Lucara is committed

to continue to adhere to all government regulations regarding water abstraction at the Karowe diamond mine and all required statutory reporting. Furthermore, Lucara is committed to continue to participate in local and national ground water management programs, continue to contribute and be informed by the Regional Ground Water Modelling program with other stakeholders, consult with local farmers and other water users, on water use and any concerns. The company is also planning to install additional monitoring equipment in groundwater wells at farms and cattle posts near its operation to enable better monitoring, modelling and impact mitigation, if required.

### 5.5 Greenhouse Gas Emissions

Lucara estimated its GHG emissions for the Project as illustrated below. The Project’s GHG emissions, as currently designed, are expected to exceed 100,000 tCO<sub>2</sub>e from approximately 2025 onwards. This is largely due to the planned use of Botswana’s GHG-intensive coal-fueled grid power and virtually no presence of renewable power generation in the country.

Figure 9: The Project’s estimated GHG emission profile



Source: Prizma, 2021; Fuel and power consumption forecast by Lucara/JDS, 2021

In response, Lucara commissioned an Alternatives Analysis. It considered energy efficiency opportunities, switching mobile mining to tethered or battery-operated equipment, and adding utility-scale solar PV power plants to the Project’s power mix. All options considered returned a positive Internal Rate of Return (IRR). However, only large-scale renewable energy plants, such as solar PV, would be able to deliver GHG reductions aligned with Botswana’s national commitments or the more ambitious Paris Agreement.

An analysis based in the recommendations of the Task Force for Climate-related Financial Disclosure (TCFD) review and Climate Risks Assessment of Lucara suggests that key transition risk to relate to market positioning and reputational risks. Given KDM’s location (not in coastal area or flood zones, no permanent surface water bodies, semi/arid conditions), physical Climatic risks are expected to be relatively low. In 2021, Lucara plans to conduct a prefeasibility study to explore the use of solar PV as part of its energy mix and cut down on its GHG emissions.

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