

SOCIO-ECONOMIC IMPACT ASSESSMENT REPORT

Kalgold Expansion Project

Ratlou Local Municipality, North West Province

DECEMBER 2021





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8 December 2021

DECLARATION OF INDEPENDENCE

I, Nonka Byker, as duly authorised representative of NLN Consulting, hereby confirm my independence (as well as that of the Company) as a specialist and declare that neither I nor NLN Consulting have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Environmental Impact Management Services (EIMS) was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed, specifically in connection with the **Socio-Economic Impact Assessment** for the **Kalgold Expansion Project** in the **Ratlou Local Municipality**, North West Province. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.

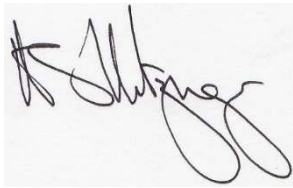


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DECLARATION OF INDEPENDENCE

I, Anna Sophia Kritzinger, hereby confirm my independence (as well as that of the Company) as a specialist and declare that I have no interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Environmental Impact Management Services (EIMS) was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed, specifically in connection with the **Socio-Economic Impact Assessment** for the **Kalgold Expansion Project** in the **Ratlou Local Municipality**, North West Province. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.



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EXECUTIVE SUMMARY

Harmony Kalgold operation wishes to expand its current production from the current production rate of 130 000 tons per month to 300 000 tons per month.

This report presents the results of the Socio-Economic Impact Assessment (SIA) for Harmony Gold's proposed Kalgold Expansion Project near Mahikeng in the North West Province, South Africa. The SIA is one of a suite of specialist studies conducted as part of the Environmental Impact Assessment (EIA) for the proposed Project and supports the integrated Environmental Authorisation (EA) application in terms of the National Environmental Management Act (Act No. 107 of 1988 – NEMA) and associated license applications.

The key findings from the baseline profile that informed the likelihood of impacts occurring are as follows:

- The local study area has seen a rather significant change in the size and composition of the local population over recent years. This is suggestive of a changing landscape that leads to a change in economic opportunities, which in turn causes certain segments of the population (e.g. migratory or farm workers) to leave the area, while others enter or return to the area (e.g. mining professionals). It is expected that the project could continue to influence this process as further land use change would further reduce the number of jobs in the agriculture sector (causing out-migration), while on the other hand attracting newcomers and job seekers to the area (causing in-migration).
- Despite a fairly high employment rate, the majority of households still live in absolute poverty. This is indicative of minimum wage labour. This implies a need for fast growing industries to diversify the economy and create employment, but unfortunately many such industries (like the mining industry) are so advanced that they create minimal opportunities for unskilled labour. The Ratlou Local Municipality (RLM) has the lowest employment rate (at around 30%) and it can be expected that they would expect the mine to assist with increasing employment within the area.
- A number of social sensitive receptors have been identified within a 15 km radius of the mining area. The project itself will lead to land use changes from (what is presumably now) agricultural land to mining. This in turn would affect the visual landscape of the area and lead to secondary changes in the biophysical environment and the local economy.
- The baseline municipal profile of especially the RLM suggests that the local authority is taking strain delivering basic municipal services. The supply and quality of such services further diminishes towards the more rural areas where the project is located. This implies that Harmony would likely have to render support to the municipality in service delivery if it is to place additional strain on the system in the form of newcomers (and job seekers) seeking housing and access to services.

Impact assessment:

The social impacts of the project are summarised in the table below.

The termination of employment after closure is the only risk that is rated a high negative. The risk will remain high even after mitigation due to the cumulative impacts of all mining activities and not only the expanded activities terminating at closure. High risk of employment losses after mine closure is specific to mining activities that play a large role in local areas.

The low negative risks during operations (apart from the usual post-closure employment losses) combined with the medium positive impacts related to employment and increased social funds leads to the recommendation of the SEIA that environmental authorisation should be granted for the planned expansion project.

Summary of Socio-Economic Impact Ratings

Socio-economic Impact	Phase	Significance of Impact		
		Pre-mitigation	Post-mitigation	Final Rating
Project induced in-migration	Construction	-4,50	-3,50	Low negative
Increase in Crime	Construction	-4,00	-3,50	Low negative
Nuisance factors	Construction	-6,00	-5,25	Low negative
Employment and income	Construction	12,00	13,00	Medium positive
Poverty reduction	Construction	10,00	11,00	Medium positive
Nuisance factors	Operations	-7,50	-9,00	Low negative
Employment and income	Operations	11,00	12,00	Medium positive
Tax income	Operations	15,00	15,00	Medium positive
Local economic development funds	Operations	4,50	8,25	Low positive
Structural damage from blasting	Operations	-8,25	-11,00	Low negative
Increased economic concentration	Operations	-13,00	-10,50	Low negative
Loss of agricultural land	Operations	-11,00	-11,67	Low negative
External Environmental Costs	Operations	-5,50	-6,67	Low negative
Termination of employment	Closure	-21,25	-25,00	High negative
Termination of LED funds	Closure	-17,50	-15,00	Low negative
Permanent loss of agricultural land	Closure	-17,50	-16,25	Low negative
Safety risks	Closure	-10,50	-8,67	Low negative

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
B-BBEE	Broad-based Black Economic Empowerment
EIA	Environmental Impact Assessment
EIMS	Environmental Impact Management Services
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
FET	Further Education and Training
GN	Government Notice
HDSA	Historically Disadvantaged South African
IDP	Integrated Development Plan
IFC	International Finance Corporation
LED	Local Economic Development
MLM	Mahikeng Local Municipality
MPRDA	Minerals and Petroleum Resources Development Act
NEMA	National Environmental Management Act
NMMDM	Ngaka Modiri Molema District Municipality
PS	Performance Standard
RLM	Ratlou Local Municipality
RLM11	Ratlou Local Municipality Ward 11
SDF	Spatial Development Framework
SIA	Social (or Socio-Economic) Impact Assessment
StatsSA	Statistics South Africa
SLP	Social and Labour Plan
TSF	Tailings Storage Facility

1. BACKGROUND AND INTRODUCTION

1.1 Context and Scope of Work

This report presents the results of the Socio-Economic Impact Assessment (SIA) for Harmony Gold's proposed Kalgold Expansion Project near Mahikeng in the North West Province, South Africa. The SIA is one of a suite of specialist studies conducted as part of the Environmental Impact Assessment (EIA) for the proposed project and supports the integrated environmental authorisation application in terms of the National Environmental Management Act (Act No. 107 of 1988 – NEMA) and associated license applications.

NLN Consulting was appointed by Environmental Impact Management Services (EIMS) on behalf of Harmony Gold to conduct the SIA Specialist Study in accordance with the EIA requirements for a project of this nature. This specialist study was conducted in two phases, namely a scoping phase and an impact assessment phase. The scope of work for the impact assessment phase includes:

- A Updating the socio-economic baseline profile;
- Assessing anticipated impacts during the construction, operations and decommissioning phased
- Formulating a plan to manage socio-economic impacts related to the project that could either mitigate negative risks or enhance positive risks

1.2 Definitions

Vanclay (2002) defines a social impact assessment as follows:

“... the process of analysing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programmes, plans and projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment.”

Given this definition, this study made a distinction between **change processes** and **impacts**. The latter refers to the effects that the project might have on people on either a physical (e.g., health) or cognitive (e.g., fear) level, whereas the former relates to the possible causes of an impact (e.g., a temporary influx of people). Vanclay (2002) defines socio-economic impacts as “the consequences to human populations... that alters the ways in which people live, work, play, relate to one another, organise to meet their needs and generally live and cope as members of a society”.

1.3 Structure of the Report

This report is structured as follows:

- Details of the proposed project are presented in Section 2, which includes background information, as well as a description of the various options that formed part of the assessment.

- Section 3 provides an overview of the regulatory framework guiding the SIA process.
- Section 4 details the methodology employed for the SIA Scoping study and includes details on the study areas, the data collection activities, information on the completion of the baseline profile, as well as the preliminary identification of project-related risks and impacts.
- Section 5 provides a baseline description of the study area, and includes the socio-economic context of all three study areas.
- Section 6 is dedicated to the identification and assessment of potential social risks and impacts as a result both the proposed project, including the identification of “triggers” (if any) that may give rise to additional social risks and impacts.
- Finally, Section 7 presents the summary and conclusions of the SIA .

2. PROJECT DESCRIPTION

2.1 Background and Location

Kalgold mine is an open pit mining operation located some 60 km from Mahikeng in the North West Province. The mine is owned and operated by Harmony Gold, who acquired the mine in 1999. The mine is located in the Kraaipan Greenstone Belt, which is part of the large Amalia-Kraaipan Greenstone terrain. The largest ore body is found in the D-Zone, which was mined out by a single pit operation along a strike length of 1 300 m and to a depth of approximately 290 m below surface. Mining at Kalgold Mine continued at the A-Zone, Windmill and Watertank Open Pits, which are all relatively new opencast operations.

The project footprint is situated in the Kraaipan Greenstone Belt in the Ratlou Local Municipality, located within the Ngaka Modiri Molema District Municipality, North West Province. The project area covers the remainder of portion 1 and portion 5 of the Farm Spanover 249 IO, the Farm Goldridge 632 IO, the remainder portion of Farm Spanover 552 IO and the Farm Ferndale 554 IO. The project area is situated approximately 55 km southwest of the town Mahikeng, 23 km west of the village Maipeng and approximately 15 km north of the village Kraaipan (see Figure 2-1).

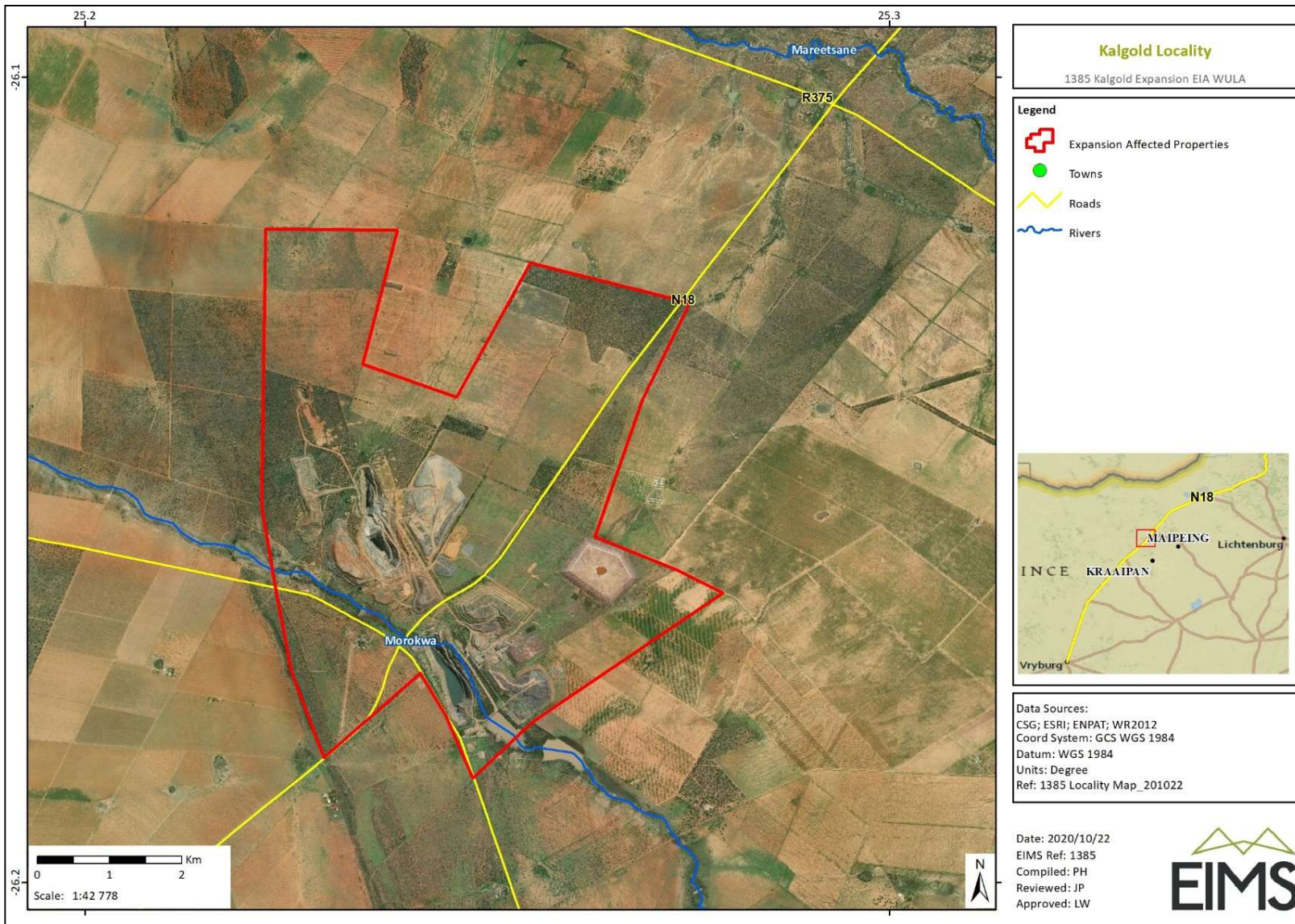


Figure 2-1: Project Location

2.2 Project Activities

Harmony Kalgold operation wishes to expand its current production from the current production rate of 130 000 tons per month to 300 000 tons per month. A pre-feasibility study has been undertaken. The findings of the pre-feasibility study have concluded that the following new activities and expansions must be provided for:

- The pit footprint will increase
- Larger dewatering pipelines (size to be determined after water balance is done)
- Extension to Spanover waste rock dump
- Road from the pit to new ROM pad.
- New ROM pad.
- New plant.
- Recommission old TSF at low deposition rate.
- Increase deposition rate at D zone pit.
- Install pipeline from Central dam to the new plant.
- Install a tailings pipeline from the new plant to old TSF and Dzone pit. (Pipelines for both deposition and also another for return water).
- Install pipeline from old plant raw water pond to the new plant (D zone return water).
- Install two power lines from Ferndale substation to the new plant.
- Install a water treatment plant at the new plant.
- Relocate and expand the explosives magazine.
- Additional new road from the plant to the N18.
- New road from pit to ROM pad
- New road to Spanover waste rock dump extention
- Increase the size of the water pipe from Azone to Central dam.
- Increase the size of the water pipe from Watertank pit to Central dam
- .

See **Figure 2-2** for an overview of the Kalgold proposed expansion layout.

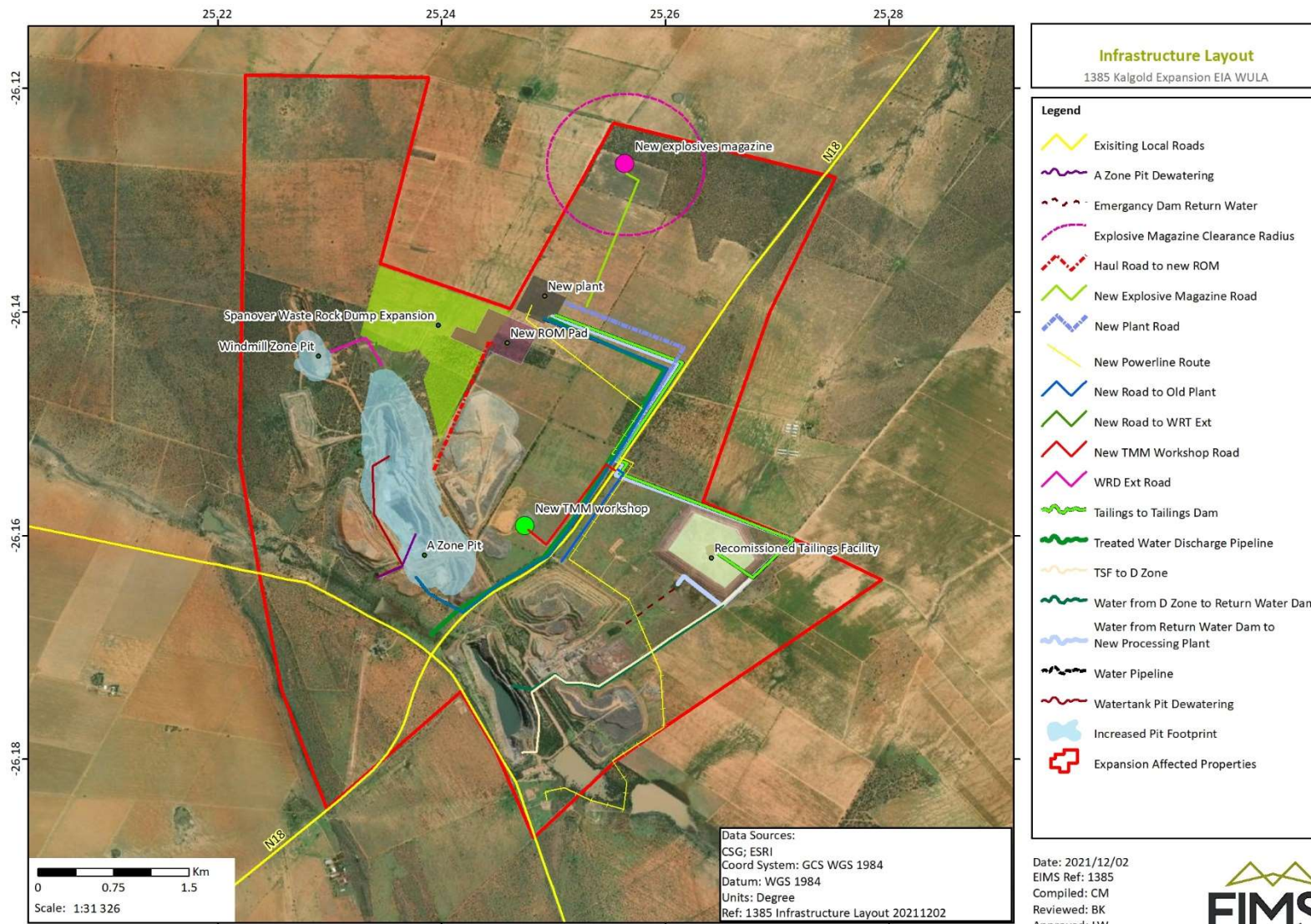


Figure 2-2: Kalgold Proposed Expansion Layout

3. REGULATORY FRAMEWORK

There is currently no legislation in South Africa that has any direct regulatory bearing on SIAs. However, there are laws that govern public participation and stakeholder engagement and these, either directly or indirectly, inform the socio-economic context of SIA studies. The relevant legislation and other regulatory guidelines are briefly summarised in the following subsections.

3.1 The Constitution of South Africa (Act 108 of 1996)

The Constitution mostly speaks of human rights with the intention of establishing “a society based on democratic values, social justice and fundamental human rights”, which is achieved through the promotion of human dignity, equality and the advancement of human rights and freedoms. Some of the human rights that are explicitly stated in the Constitution are a person’s right to equality, freedom of expression and association, political and property rights, housing, healthcare, education, access to information, and access to courts.

Section 24 of the Constitution stipulates that everyone has the right to an environment that is not harmful to their health or wellbeing. It also stipulates measures to be implemented to ensure that the environment is protected for both current and future generations.

Other relevant sections of the Constitution include Section 25 that refers to expropriation of property to enhance land redistribution or to achieve development objectives that are in the public’s interest. This section further prohibits the indiscriminate denial of property and the expropriation of property without just compensation.

3.2 National Environmental Management Act (Act 107 of 1998)

NEMA promotes people’s right to an environment that is not harmful to their health and wellbeing, which ties in with the Constitution as described above. It further stipulates that sustainable development requires an integrated approach to social, economic and environmental factors to ensure that development serves present and future generations. In this regard, NEMA defines “environment” not only as the natural environment, but also as the physical, chemical, aesthetic and cultural properties that influences a person’s health and wellbeing.

One of the core functions of NEMA is to facilitate and promote stakeholder engagement in environmental governance. To this end, NEMA stipulates that one of the general objectives of integrated environmental management is to “ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment”.

Chapter 6 of Government Notice (GN) R659 details the requirements for public participation under NEMA. These requirements can also be applied to stakeholder engagement in general, namely that:

- All relevant information should be disclosed to stakeholders in timely fashion and in an appropriate format; and
- All stakeholders should have reasonable opportunity to participate in the process.

3.3 Mineral and Petroleum Resources Development Act (Act 28 of 2002)

The Minerals and Petroleum Resources Development Act (MPRDA) provides for the equitable access to and the suitable development of the countries mineral and petroleum resources. Upon the acceptance of an application for a mining right, the applicant is required to prepare an Environmental Management Programme (EMP) in accordance with requirements of the MPRDA, to mitigate both biophysical and social impacts of the proposed development.

The MPRDA requires that mining companies assess the socio-economic impacts of their activities from start to closure and beyond. Companies must develop and implement a comprehensive Social and Labour Plan (SLP) to promote socio-economic development in their mine communities (host and labour sending) and to prevent or lessen negative social impacts.

The amendments to the MPRDA Regulations (2020) have included a definition for “mine community” to include communities where mining takes place, major labour sending areas of adjacent communities within a local or district municipality. It furthermore expanded on the definition of an “interested and affected party” to specifically refer to host communities, neighbouring landowners, traditional authorities, land claimants, lawful land occupiers, holders of informal rights, the Department of Agriculture, Land Reform and Rural Development, any persons whose socio-economic conditions may be directly affected by the proposed mining operation, the local municipality and other relevant government departments, agencies and institutions responsible for various aspects of the environment and infrastructure that might be affected by the proposed project. In addition, the amendment of 2020 envisages “meaningful consultation” as engaging with stakeholders in such a manner that they are given reasonable opportunity to provide comments and make informed decisions regarding the impact of the proposed project on their daily lives.

3.4 Municipal Systems Act (Act No. 32 of 2000)

The Municipal Systems Act provides for the principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities, and to ensure universal access to essential services that are affordable to all. In accordance with this Act, all municipalities are required to develop and implement a five-year Integrated Development Plan (IDP) and Spatial Development Framework (SDF) for their areas of jurisdiction.

Section 35 of the Act confirms the statutory status of the Municipal IDP and SDF. The Act also states that apart from serving as principal strategic planning instruments to guide and inform municipal decisions on land use, the SDF and IDP binds a municipality in the exercise of its executive authority. However, where there is an inconsistency between a municipality’s policy and national or provincial legislation, national legislation should prevail.

The relevance of this Act for the project stems from the fact that development of the mining site would need to be compatible with the local municipality’s SDF, while SLP-related development projects should be consistent with priority areas identified in the local municipality’s IDP.

3.5 Mining Charter 2018

The Mining Charter of 2018 requires that, for a new mining right to be issued, neighbouring communities must hold 8% of that mining right. This is likely to be done through community trusts. The updated charter also has a requirement that 1% of earnings before interest, taxes, depreciation and amortisation is paid to communities and employees as a trickle dividend from year 6 of the mining right. The target to procure services from Broad-based Black Economic Empowerment (B-BBEE) entities increased from 70% to 80% and the target to procure goods from such entities increased to 70%. The draft charter requires 50% Historically Disadvantaged South African (HDSA) Board representation, of which 20% must be female.

The MPRDA also requires a mining right applicant to prepare an Environmental Management Programme (EMPR) to mitigate the environmental and social impacts of the project.

3.6 International Guidelines

As previously stated, national legislation in South Africa do not explicitly address issues related to the undertaking of a SIA. In view of this gap in national legislation, the SIA also adopts the guiding principles set out in the International Finance Corporation's (IFC) Performance Standard (PS) 1.

PS 1 deals with the assessment and management of environmental and social risks and impacts and highlights the importance of:

- An integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects;
- Effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and
- Management of environmental and social performance throughout the life of the project.

The specific objectives of PS 1 are:

- To identify and assess social and environmental impacts, both adverse and beneficial, in the project's area of influence;
- To avoid, or (where avoidance is not possible,) minimise, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment;
- To ensure that affected communities are appropriately engaged on issues that could potentially affect them; and
- To promote improved social and environmental performance of companies through the effective use of management systems.

4. METHODOLOGY

The activities undertaken as part of the assessment are outlined below.

4.1 Definition of Study Area

Socio-economic impacts can usually be divided into three broad categories, namely:

- **Physical intrusion** refers to project infrastructure and project-related activities' in the area. These typically impact on things like land use, nuisance factors, a change in the visual appearance of the area, etc. These impacts are more immediate to the site and its surrounding landowners and are usually negative in nature.
- As the name implies, **economic pull** occurs when the project attracts job seekers or other investors into the area who view the projects as economically attractive. Impacts related to in-migration is usually felt in the residential areas or towns closest to the project site. Impact associated with economic pull can be either positive (e.g. local job creation) or negative (e.g. an accumulation of job seekers in an area with poor services).
- **Indirect or induced impacts** are unintended by-products of the two socio-economic impacts mentioned above and usually have a wide geographic reach. Induced impacts can also be either positive (e.g. an increase in the district's tax base that enables development of further services), or negative (e.g. an increase in social ills such as an increase/expansion of informal settlements).

The relevance of mentioning these categories is that the type and level of baseline information required to inform the assessment of impacts, differs between these three categories. Accordingly, three types of study areas were identified – each area roughly corresponds to the geographical extent of one of the categories described above, while at the same time considering the manner in which publicly-available data is aggregated (i.e., the study areas were defined to correspond to existing administrative boundaries as per the 2016 municipal and ward boundary delineations). For the purpose of the SIA, the three study areas were defined as follows:

- **Regional**, i.e. the area likely to experience indirect or induced impacts. This is defined as the Ngaka Modiri Molema District Municipality;
- **Local**, i.e. the area likely to experience the effects of economic pull. In this instance it is defined as the wider municipal area (Ratlou) and the Mahikeng Local Municipality (Mahikeng being the closest major town to the mine); and
- **Site-specific**, i.e. the area likely to experience impacts from physical intrusion of project infrastructure. It is defined as the local municipal ward within which the project is located (i.e. Ward 11 of the Ratlou Local Municipality).

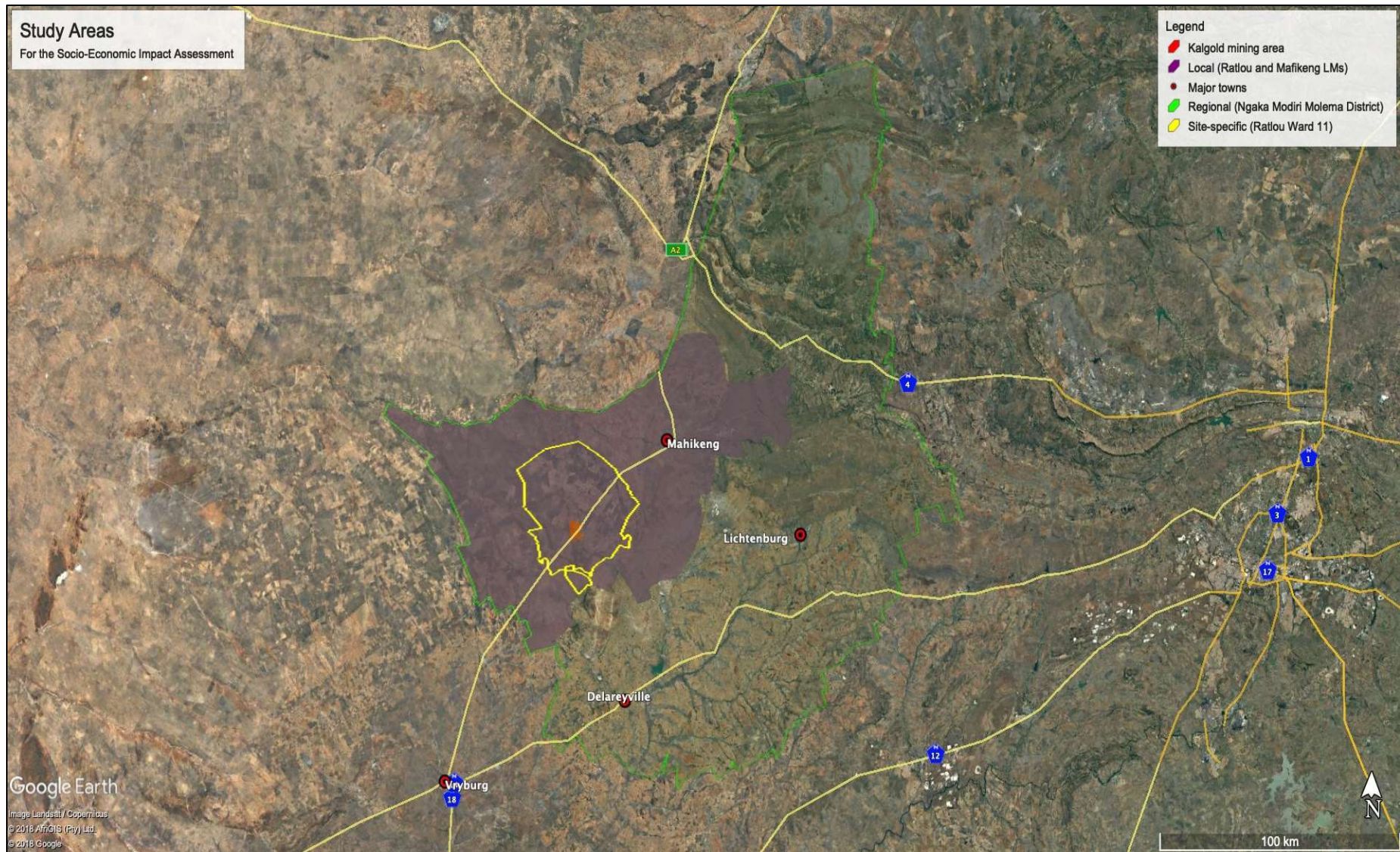


Figure 4-1: Overview of the Study Areas for the SIA

4.2 Data Collection

The information presented in this document was obtained through primary and secondary data sources (see data sources in Section 8 below) as well as economic modelling. **Primary data** sources include interviews with farmers adjacent to the project area as well as information supplied by the developer, Harmony Gold.

The **literature review** of readily available documents to obtain relevant baseline socio-economic information on the different study areas. Documents reviewed include the following:

- Integrated Development Plans (IDPs) and Spatial Development Plans (SDFs) of the local and district municipalities;
- Census 2001 and 2011 and Community Survey 2016 data;
- Kalgold Mine's Social and Labour Plan (SLP) (2012-2017); and
- Available maps and satellite imagery
- The Social Accounting Matrix (2018 prices) of North West

Secondary data from Census 2011 and Community Survey 2016 was obtained from Wazimap (www.wazimap.co.za), an online open-source census data management database that reprocessed census data to conform to the new municipal ward boundaries established in 2016. Data obtained from Wazimap was processed in MS Excel and compared on various levels to determine socio-economic trends in the area. This data, together with the information obtained from the IDPs, were used to compile the baseline socio-economic profile.

Economic Modelling: Input-output (I/O) modelling was used to assess the project's potential impact on employment and economic output. The I/O analyses is based on i) direct impacts (income and employment created due to employment by the project itself) ii) indirect impacts (backward linkages to local suppliers) and iii) induced impacts due to the overall increase in income levels and increased spending on goods and services which could lead to a further increase in production and employment in the local area.

4.3 Compilation of a Socio-Economic Baseline Profile

On the basis of the information collected through the desktop review, a socio-economic baseline profile was compiled of the study areas defined in Section 4.1. Topics considered as part of this profile include the following:

- **Demographic processes**, i.e. the composition of the local communities, considering variables such as population size, growth rate, migration, etc.
- **Economic processes**, i.e. livelihoods and economic activities of the local society;
- **Geographical processes**, i.e. land use patterns;
- **Institutional processes**, i.e. people's access to services and the capacity of local government to deliver the required services; and
- **Socio-cultural processes**, i.e. the culture and dynamics of the local society.

The social baseline profile starts with a broad overview of the regional and local study areas, followed by a more detailed description of the site-specific study area, where most of the direct impacts are expected.

4.4 Identification of Potential Social Risks and Impacts

Based on the results of the baseline profile, the social sensitivity map, and the professional experience of the specialist, the social team were able to identify possible change processes that could be expected in the project area..

4.5 Impact Assessment Methodology

Potential impacts were assessed following the impact assessment methodology provided by EIMS as described in the following subsections.

4.5.1 Method of Assessing Impacts

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2014). The broad approach to the significance rating methodology is to determine the **environmental risk (ER)** by considering the **consequence (C)** of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the **probability/likelihood (P)** of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a **prioritisation factor (PF)** which is applied to the ER to determine the overall **significance (S)**.

4.5.2 Determination of Environmental Risk

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact. For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R) \times N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 4-1.

Table 4-1: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e., limited to the area applicable to the specific activity)
	2	Site (i.e., within the development property boundary),
	3	Local (i.e., the area within 5 km of the site),

Aspect	Score	Definition
	4	Regional (i.e., extends between 5 and 50 km from the site)
	5	Provincial / National (i.e., extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 4-2.

Table 4-2: Probability Scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 4-3: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
Probability						

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 4-4.

Table 4-4: Significance Classes

Environmental Risk Score	
Value	Description
< 9	Low (i.e., where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e., where the impact could have a significant environmental risk),
≥ 17	High (i.e., where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (**pre-mitigation**), as well as post implementation of relevant management and mitigation measures (**post-mitigation**). This allows for a prediction in the degree to which the impact can be managed/mitigated.

4.5.3 Impact Prioritisation

In accordance with the requirements of Appendix 3(3)(j) the 2014 EIA Regulations (GNR 982), and further to the assessment criteria presented in the Section above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition, it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision-making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 4-5: Criteria for Determining Prioritisation

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 4-5. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{PR} + \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to Table 4-6).

Table 4-6: Determination of Prioritisation Factor

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e., if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 4-7: Final Environmental Significance Rating

Environmental Significance Rating	
Value	Description
< 10	Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
≥10 <20	Medium (i.e., where the impact could influence the decision to develop in the area),
≥ 20	High (i.e., where the impact must have an influence on the decision process to develop in the area).

5. SOCIO-ECONOMIC BASELINE PROFILE

5.1 Demographic Baseline Profile

Demographic processes, according to Vanclay (2002), are those changes that affect the movement and/or composition of people in an area. However, to determine what these changes are and if they do occur, the baseline profile considers aspects such as current population size and composition, migration patterns, etc. The following subsections consider these aspects for the three study areas.

5.1.1 Regional Study Area

The regional study area is defined as the Ngaka Modiri Molema District Municipality (NMMDM). The district covers a geographical area of 28 440 km² and is bordered by Botswana to the north and west, the Dr Ruth Segomotsi Mompati District to the southwest, the Dr Kenneth Kuanda District to the southeast and the Bojanala District to the east. The district is one of four districts of the North West Province and consists of five local municipalities (Ratlou, Mahikeng, Ramotshere Moila, Ditsobotla and Tswaing).

In 2016, the NMMDM had a total population of 889 108 people, indicative of a fairly large population growth rate compared to 2011's population of 842 699 people (i.e., a population growth rate of around 1.1% p.a.). Based on the population growth, the 2018 population is an estimated 908 668 people. Given an increasing population size, it is to be expected that the population distribution would get denser – from 29.6 people per km² in 2011, to 31.3 in 2016 (and an estimated 32 in 2018).

The majority of the population are Black African (95.7% in 2016; 93.9% in 2011), followed by White (2.5% in 2016; 3.7% in 2011). There is an almost equal split between males and females with slightly more females in 2016 (50.6%) and in 2011 (50.9%). Setswana is the most predominant language spoken in the district (80.9%). By far the majority of the population (90.2%) are native to the North West Province – where people do not readily move away from an area, it is indicative of a strong sense of place attachment. Just over half of the population (54.5% in 2011; 58.1% in 2016) are in the economically active age range.

In 2016, slightly more than a quarter (27.3%) of the adult population have completed Grade 12 (up from 2011's 23.3%) with a further 5% (4.8% in 2011) who have completed tertiary education (undergrad and post-grad).

5.1.2 Local Study Area

In 2016, the Ratlou and Mahikeng Local Municipalities had a combined total population of 420 502 people, of which 75% (or around 314 400) lived in the Mahikeng municipal area. The Mahikeng Local Municipality (MLM) also has a much higher population density than that of the Ratlou Local Municipality (RLM) – 86.1 persons per km² in MLM compared to RLM's 21.7 per km². The RLM experienced a slight population decline between 2011 and 2016 with around 1 230 people leaving the area (average population decrease of -0.2% p.a.), whereas the MLM experienced a population increase over the same period with an additional 22 866 people arriving in the area (average population increase of 1.6% p.a.). Assuming this trend continued over the past 2 years, the 2018 population size in the local study area is an estimated 430 139 people.

By far the majority of the 2016 population in the study area are Black African (98.7% in the RLM and 97.1% in the MLM). Setswana is the most widely spoken language in the area – 90.9% in the RLM and 84.8% in MLM. Slightly more than half of the local study area's population is female (52.7% in the RLM and 51.3% in MLM) and, similar to the site-specific area, fall within the economically active age range (50.6% in RLM and 61.9% in MLM).

As is the case for the site-specific study area, the education levels in the local study area are also fairly low – in 2016, more so in the RLM where only 14.4% (up from 12.7% in 2011) of the adult population completed Grade 12. More than double that (32.2%, 29.6% in 2011) have completed their secondary schooling in the MLM.

5.1.3 Site-Specific Study Area

The Kalgold mining area (including all existing and newly proposed infrastructure) is located in Ward 11 of the Ratlou Local Municipality (RLM11). RLM11 covers a geographical area of 1 589 km² and in 2011, was home to 7 155 people (with a population density of 4.5 people per km² – indicative of an area that is largely rural in nature). In 2001 the ward had a total

population of 6 489 people, which means that the area experienced a positive population growth rate of around 1.03% per annum. Based on this growth rate, the 2018 population size is an estimated 7 670 people.

The majority of the current population in RLM11 are Black African (92.8%), followed by the White (6.1%) population group. Although more new Black African people settled in the ward (381), the largest proportional in-migration was under the White population group who more than doubled in population size – from 171 people in 2001 to 438 in 2011.

An overview of the change in population composition between 1996, 2001 and 2011 is shown in Figure 5-1.

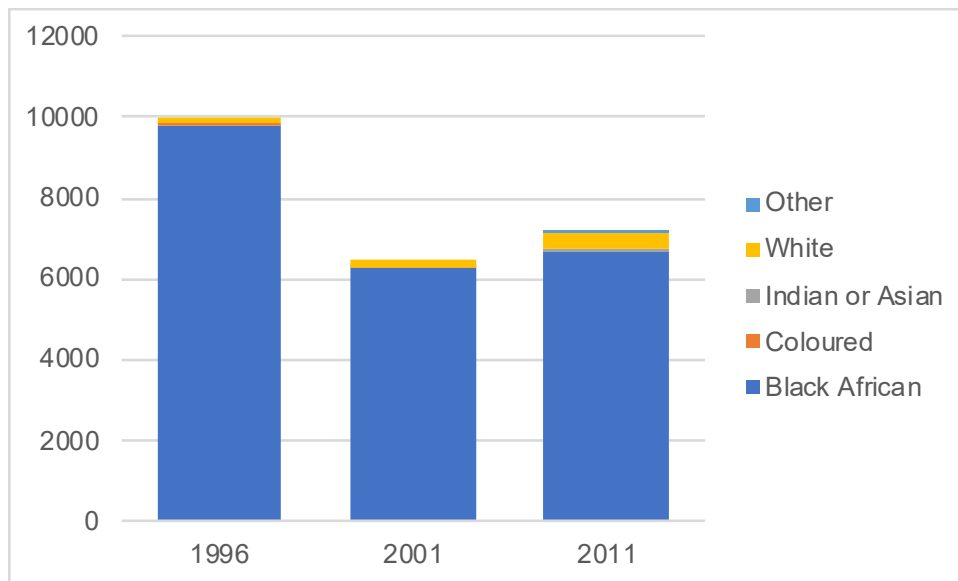


Figure 5-1: Overview of RLM11's population between 1996 and 2011

The most widely spoken languages in the ward are Setswana (85.9%) and Afrikaans (6.2%). All the other official languages together account for the remaining 7.9%.

The majority of RLM11's population (96.4%) are South African and native to the North West Province (91.4%). There has been a definite increase in the male population in RLM11 between 1996 (46.8%) and 2001 (49.2%) and 2011 (54.0%). This, coupled with the fact that the majority of the population are in the economically active age group of 15-64 (58.9%) and the positive population growth rate in a predominantly rural ward, is indicative of existing population in-migration, i.e., it is likely that the mining activities in the ward attract people to the area – either in the form of legitimate mine workers or in the form of job seekers.

The education levels in the ward are fairly low, with only 13.9% of the adult population (those aged 20 years and older) having completed their secondary education (Grade 12). Only 3.1% of the population have completed some form of tertiary education (diploma, degree, etc.). An overview of the educational profile of the ward is provided in Figure 5-2.

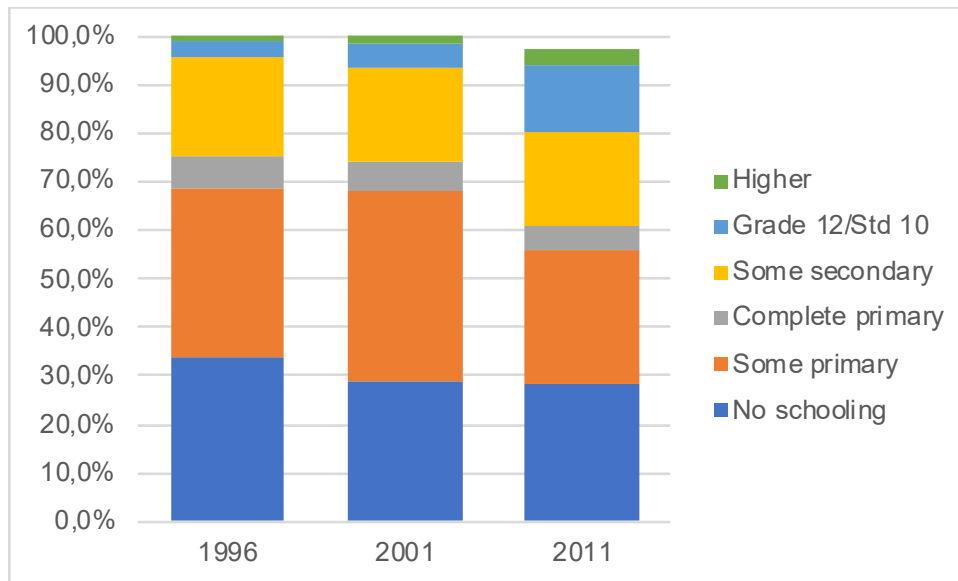


Figure 5-2: Overview of the Education Profile of RLM11 between 1996 and 2011

5.2 Economic Baseline Profile

The economic baseline profile considers the existing economic activities within the region to determine how, if at all, the project could affect the way in which local people make a living or affect the macro-economic factors of society as a whole (Vanclay, 2002). There are a few important concepts to understand when considering the employment profile of the study areas.

The unemployment rate does not refer to the percentage of people in the study area who do not have work, but rather represents the percentage of the labour force that has been jobless during the censuses. The labour force is defined as those who are able and willing to work. Unemployment, therefore, does not take into account minors under the age of 15, the elderly over the age of 64 (regardless of whether they are working), ill or disabled people, students, home-makers and discouraged workers – these are classified as “not economically active” as they do not contribute to the economy by providing goods or services, for financial gain or not. Because of this, the not economically active population was excluded from the unemployment statistics to reflect a more accurate picture of the employment rate in the labour force of the various study areas. People who provide products or services for their own needs, such as subsistence farmers, are considered to be economically active and are counted as part of the labour force and employed.

Census 2011 added the category “discouraged work-seeker” to distinguish people who are economically active (i.e., willing and able), but who, for a variety of reasons, have given up looking for employment. Because these people are not actively seeking employment anymore, they are not counted as part of the unemployed (the latter are unable to find employment despite their efforts to do so).

5.2.1 Regional Study Area

The employment rate in the district is more or less on par with that of the MLM at 56%. Of these, 64.3% are employed in the formal sector. However, despite this high employment rate, more than half (52.8%) of households in the district live in absolute poverty with a further

31.9% who fall in the lower middle-income bracket (defined as an annual household income of between R 19 201 and R 76 800 for a family of 4).

According to the NMMDM IDP (2018/19), mining and quarrying was the biggest contributor the district’s economy with a contribution of close on R47 million to the district’s economy in the 2015/16 financial year.

5.2.2 Local Study Area

Overall, the local study area has a combined employment rate of 53.3% but the employment rate in the MLM is much higher than in neighbouring RLM – 56.4% compared to 39.5%. The RLM also has the highest percentage of discouraged work-seekers – 29.6% compared to the MLM’s 12.3%. This would suggest that the RLM does not have an abundance of employment opportunities apart from the mining and agricultural sectors, and both these sectors are limited in the number of people it can employ. Close on a third of the MLM’s adult population have obtained Grade 12 compared to only 14.4% in RLM, which affects people’s employability.

The majority of those employed in MLM are employed in the formal sector (68.6%) compared to 53.9% in the RLM.

Given the employment rate and the employment sectors, it is to be expected that the household income profiles between the RLM and MLM would differ: in the former close on two thirds (64.2%) of household’s live in absolute poverty, whereas it is the case for just over half (50.8%) of households in MLM. The MLM also has a much larger proportion of middle to higher middle-income households than the RLM – 15.4% and 3.5% respectively against the RLM’s 5.1% and 0.6%. A comparative overview of the monthly household income between the RLM and the MLM for 2011 is provided in Figure 5-3.

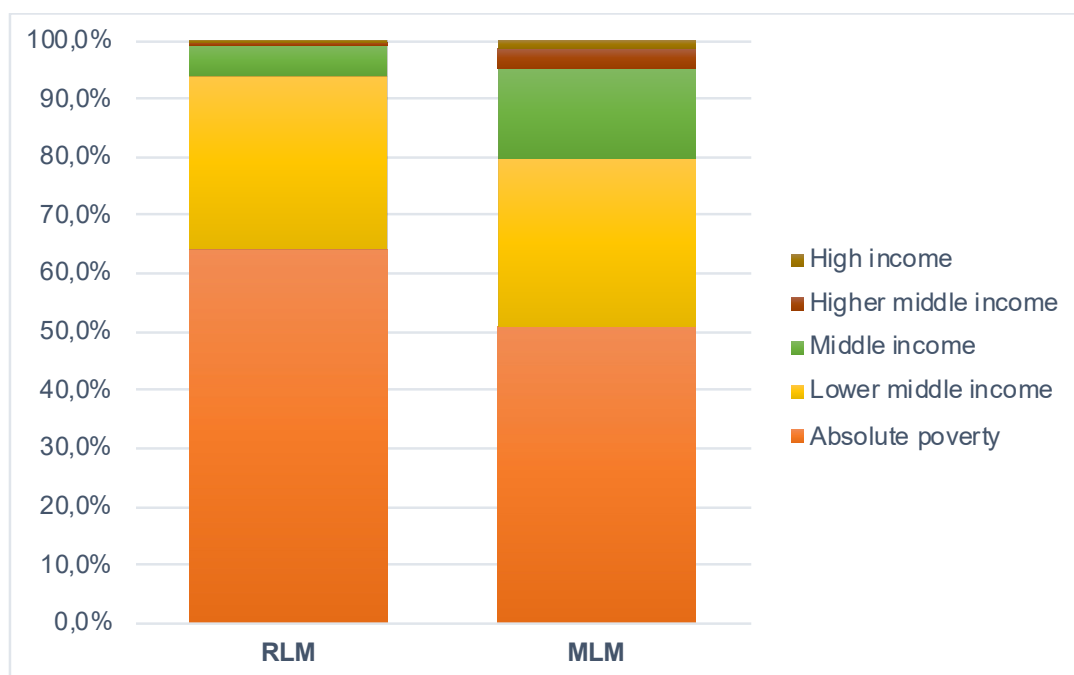


Figure 5-3: Comparative Overview of Monthly Household Income between the RLM and the MLM (2011)

The RLM has developed a Local Economic Development (LED) strategy as part of its Integrated Development Plan (IDP, 2016). The strategy provides the municipality with guidelines on how to create and sustain economic development. The LED strategy was adopted in August 2012 and identified ten short- and longer-term goals to focus the municipalities LED efforts. These include:

- Strengthening the municipality’s local stake in mining;
- Establishing a Further Education and Training (FET) college;
- The development and support of co-operatives;
- Rural development and agrarian reform;
- Branding and marketing;
- The implementation of learnerships, skills programmes and internships;
- Local business support (through procurement of services);
- Local and foreign investment attraction;
- Soft infrastructure development to increase the municipality’s competitive advantage; and
- Development and implementation of a tourism strategy.

5.2.3 Site-Specific Study Area

The employment rate in RLM11 amongst the labour force increased year on year – from 42.1% in 1996 to 57.7% in 2001, to 73.7% in 2011. In other words, in 2011, 73.7% of the site-specific study area’s economically active population (58.9% of the total population) were employed. An overview of the site-specific study area’s employment profile is provided in Figure 5-4.

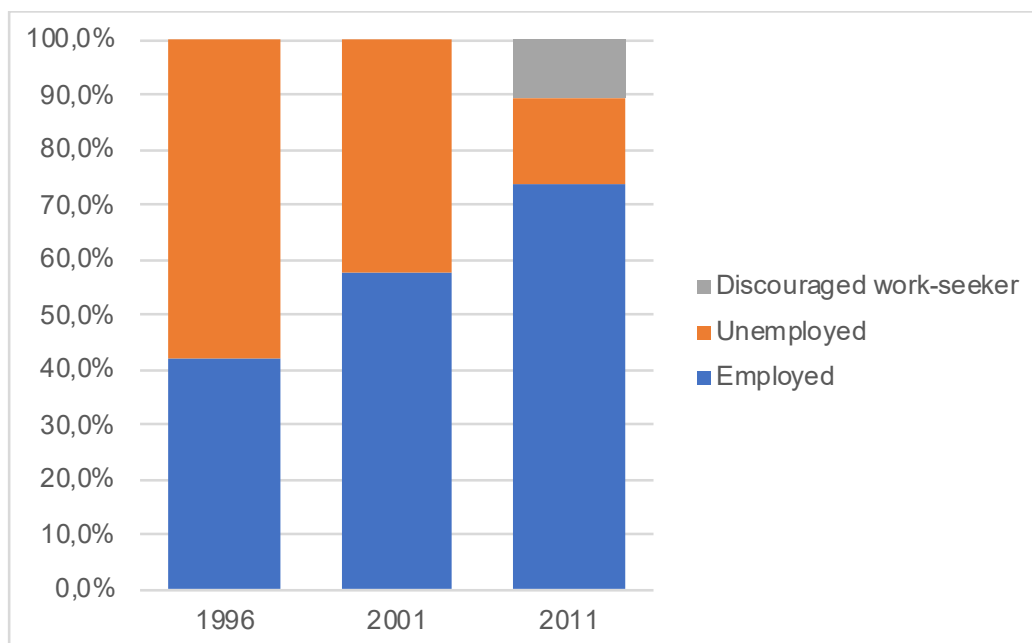


Figure 5-4: Overview of the Site-Specific Study Area’s Employment Profile

However, of those employed, more than half (57.1%) are employed in private households with a further 14.4% employed in the informal sector. Despite there being a consistent improvement in the monthly income profile of the local households (in 2001 almost all of the households in RLM11 - 88.8% - lived in absolute poverty¹, which has been reduced to 58.4% of households in 2011), it would appear that the majority of those employed are still employed in minimum wage jobs (unskilled work such as house-keeping and gardening).

Figure 5-5 provides an overview of the change in monthly income for households in the study area between 2001 and 2011.

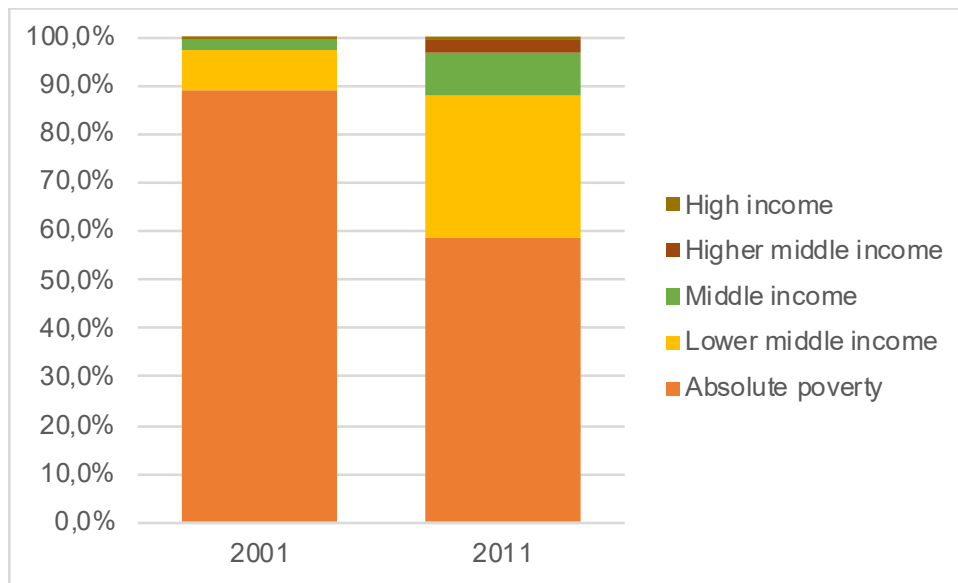


Figure 5-5: Overview of Monthly Household Income between 2001 and 2011

5.3 Geographical Baseline Profile

The geographical baseline profile describes the existing land use patterns at the various study area levels.

5.3.1 Regional Study Area

According to the North West Province’s SDF, the MMDM has distinctive nodes that are linked with activity corridors to stimulate economic growth. The district’s strategic location makes it ideal to connect other development corridors including the Platinum corridor (N4) connecting the district to Botswana, the N18 west frontier corridor, and the N14 traversing the southern portion of the district. Mahikeng is the district’s primary node.

5.3.2 Local Study Area

According to the RLM’s Spatial Development Plan (SDF) (in the RLM IDP, 2016), most people in the municipal area live in rural villages characterised by low economic activity forcing people

¹ Defined as an income of R 1 600 or less per month for a family of 4, i.e. the family is unable to meet their own basic needs.

into subsistence livelihoods. Places of employment are generally far from villages and therefore tend to be inaccessible.

Agriculture is the predominant sector in the Ratlou local economy. Development projects tied to land use in the local study area (as per the SDF), include the following:

- The redevelopment of the Setlagole Commercial Hub (located approximately 15 km southwest of the Kalgold mining development area, in neighbouring Ward 13 of the RLM);
- The provision of new amenity infrastructure with local development nodes determined through the Madibogo, Mareetsane and Kraaipan Local Area Plans (the northern portion of Kraaipan falls into the 15 km sensitivity radius and is ideally situated to experience in-migration impacts);
- Rural development and agricultural reform; and
- The development of the Ratlou Land Use Management Scheme (LUMS).

According to the MLM IDP (2017/18), the overall land use of the municipality is characterised by bushveld and thicket. Broad land-use categories include temporary cultivated semi-commercial, and subsistence dry-land farming, unimproved grasslands, and areas classified as degrade thicket and bushlands. Only a small portion of land in the northeast of the municipal area is considered prime agricultural land. Land in the MLM is generally degraded as a result of over grazing and bad management practices.

5.3.3 Site-Specific Study Area

The site-specific area (the area around Kalgold) is predominantly characterised by agricultural land. A river runs to the southwest of the mine with a number of houses on the banks of the river. Figure 5-6 provides a preliminary indication of the social sensitive receptors in the site-specific study area. The following criteria was applied to determine areas of preliminary social sensitivity:

Table 5-1: Social Sensitivity Criteria

Sensitivity Level	Criteria Description
High	<ul style="list-style-type: none"> • Areas of human activity or settlement within a 5 km radius from roughly the centre point of the mining area (existing and future). • It is expected that these receptors would experience direct impacts on a continuous basis as a result of mining activities (e.g. dust, noise, vibration, blasting, etc.). • Marginal to no buffer between these receptors and the mine (e.g. little to no visual screening).
Medium	<ul style="list-style-type: none"> • Areas of human activity or settlement within a 10 km radius from the centre point of the mining area. • These receptors are further away from the mine's activities and are buffered to some extent by distance and from activities taking place in the 5 km radius.

Sensitivity Level**Criteria Description**

Low

- It is expected that these receptors could still experience some direct impacts (e.g. noise and vibration) but these impacts would be diffused to some extent over the distance.
- Areas of human activity or settlement within a 15 km radius from the centre point of the mining area.
- These receptors are least likely to experience direct impacts on a continuous basis (e.g. dust emanating from the mine likely to have dissipated before it reaches any of these receptors).
- Visual screening occurs naturally due to distance from the mine and activities occurring in the 5- and 10 km radii.
- Likely to experience indirect impacts (e.g. economic pull) as it is close enough to the mine to be attractive as an area of settlement (in Kraaipan, for example).

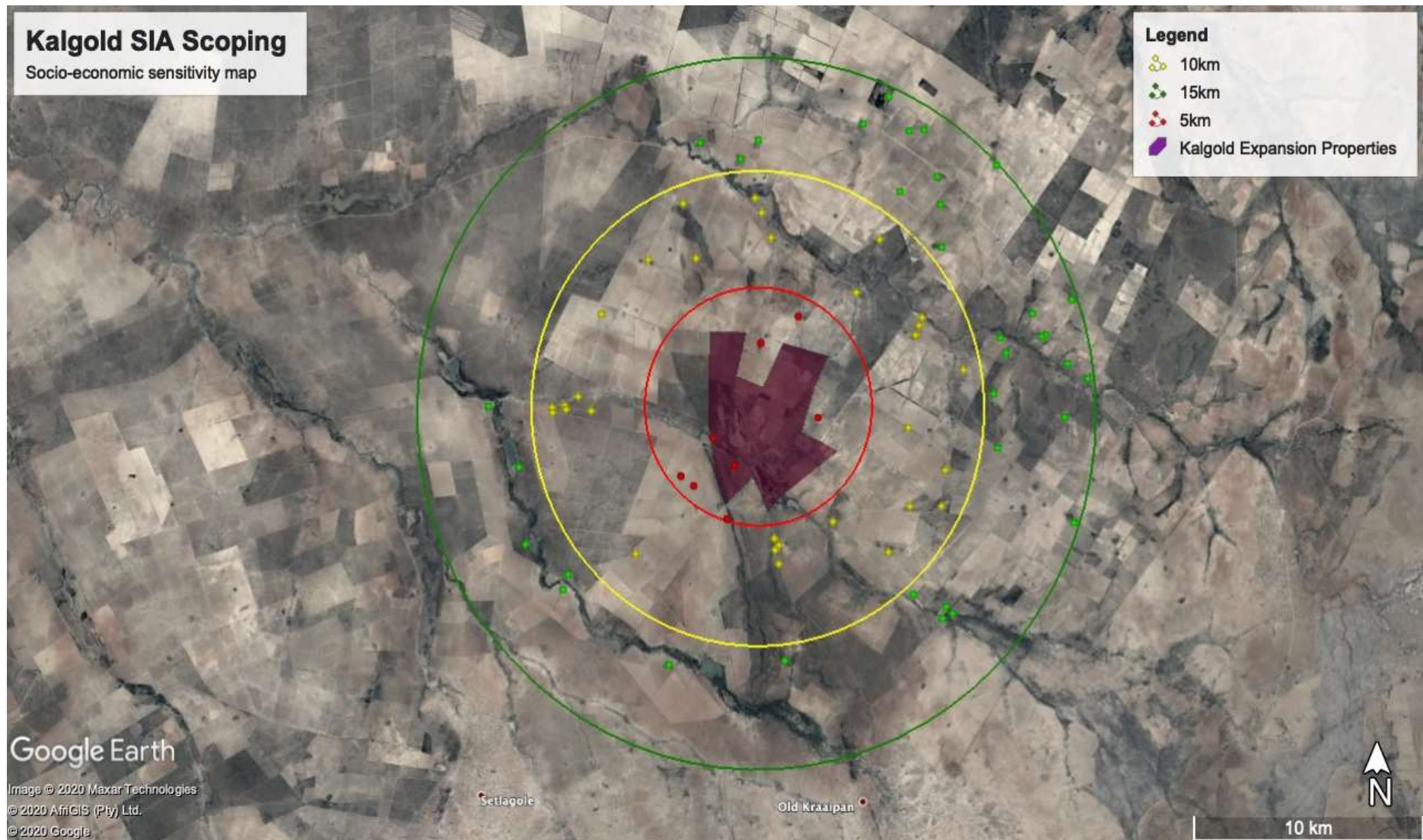


Figure 5-6: Preliminary Social Sensitivity Map

5.4 Institutional Baseline Profile

The institutional baseline profile provides an overview of households' existing access to goods and services and the efficacy of local authorities to provide such services.

5.4.1 Regional Study Area

The NMMDM consists of a total of 269 975 households, of which 38.3% are located in the MLM and 10.8% in the RLM. Of these, 10.9% (or 29 427 houses) are considered informal. This represents an increase in the informal housing sector by approximately 1 000 houses between 2011 and 2016.

Slightly more than half of all households (59.4%) in the district have access to piped water from a regional or local service provider. Most of the households in NMMDM (55.2%) also do not have access to sanitation services on par or above RDP standard (i.e., they make use of pit latrines without ventilation or have no or only informal sanitation services). Only about a third (31.7%) of households have their refuse removed on a regular basis by a local authority or private company. The other two thirds make use of their own waste disposal sites or communal dumps.

5.4.2 Local Study Area

In 2016, the local study area consisted of 132 453 households of which 29 119 were located in the RLM and 103 334 in the MLM. This represents a positive growth rate for both municipalities from 2011, when the RLM had 27 123 households and the MLM had 86 797 households.

Around 8.5% (or 2 475) of houses were considered informal in the RLM in 2016. This suggests an increase in informal settlement in the municipal area, up from 5.2% (or 1 410) of houses in 2011, i.e., an additional 1 065 informal houses over a 5-year period. The extent of informal settlement in the MLM was fairly stagnant between 2011 and 2016 – although the overall percentage of informal houses decreased from 10.1% to 8.4%, the actual number of informal houses slightly increased due to overall increase in the number of households between 2011 and 2016 (from 8 680 up to 8 766 informal houses). The RLM IDP (2016/17) puts the current housing backlog in the RLM area at around 3 760 units.

The majority of households have access to electricity (90.5% in RLM and 94.7% in MLM). Of these, 88.8% of households in RLM and 85.3% in MLM acquired their electricity through an in-house prepaid meter.

Although the majority of households were getting their water from a regional or local water service provider in 2016 (57.9% in RLM and 61.1% in MLM), a fairly large proportion were dependent on boreholes and water schemes (36.4% in RLM and 32.9% in MLM). By far the majority of households in the RLM relied on VIP toilets (86%) – with a further backlog of approximately 6 179 units (RLM IDP, 2016/17).

No residential waste collection services are rendered in the RLM. Instead, residents make use of unlicensed dump sites or through other illegal disposal measures such as burying, burning and dumping. The nature of an unlicensed landfill site means that these sites are not managed

according to the minimum requirements for waste disposal in landfills. The practice of burning waste leads to the release of toxic pollutants into the air, whereas burying waste can have the same effect on groundwater. In contrast, the MLM regularly collects the waste of more than half (58.3%) of its households but this still leaves a large proportion of households who are reliant on their own forms of disposal, having the same effect on the environment and residents as is the case in the RLM.

5.4.3 Site-Specific Study Area

RLM11 consisted of 2 049 households in 2011, which is an increase of almost 500 households over 2001 (1 542). Of these, approximately 3.8% (or 78 houses) were considered informal. More than two thirds of all households (67.7%) are male-headed.

The majority of households use electricity for lighting (78.3%), cooking (62.1%) and heating (44.6%). In the case of cooking and heating, a fairly large segment of the population still makes use of wood for this purpose – 33.3% for cooking and 42.5% for heating. In all cases, it is an improvement over 2001 (and in the case of cooking and heating, a vast improvement) when 77.6% used electricity for lighting, 25.3% for cooking and 19.2% for heating.

The number of houses who use electricity for lighting provides an indication of the overall state of the electricity network in the area, i.e., the majority (78.3%) have access to electricity. The use of electricity as a primary source of energy for cooking and heating is influenced by other factors, such as access to appliances (e.g., a stove and heater), which is a proxy indicator of a household’s general socio-economic wellbeing – for example, a household that uses wood for cooking might do so because they cannot afford to purchase or run an electrical stove.

Figure 5-7 provides an overview of the change in households’ access to electricity in the site-specific study area between 2001 and 2011.

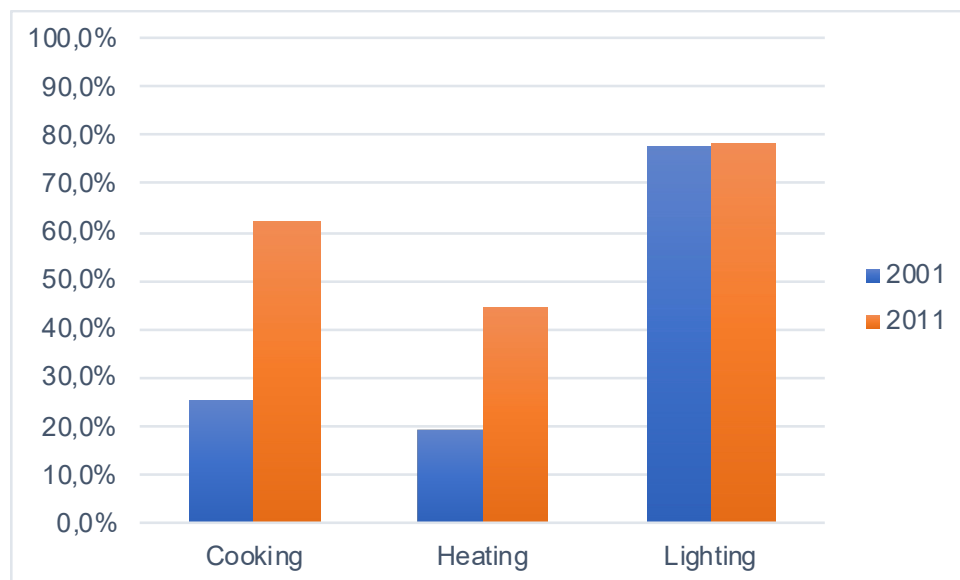


Figure 5-7: Overview of Electricity Use in RLM11 between 2001 and 2011

About half of households have access to piped water supplied by the local authority (50.7%). The remainder are reliant on boreholes (44.3%) and other water sources such as rivers and

streams, which makes them vulnerable in the event of water contamination from mining activities.

Although 69.6% of households had access to toilet facilities on par or above RDP level (classified as at least a ventilated improved pit or waterborne system), more than half of these (54.5%) were dependent on VIP systems. Only 14.3% of all households in RLM11 had access to a flush or chemical toilet in 2011. The number of households who had no access to toilet facilities increased from 21.1% in 2001 to 29.8% in 2011. Also, most of the households (89.5%) do not have their refuse collected on a regular (weekly) basis and have to make use of their own refuse dumps. This is likely because of the rural nature of the area and its remoteness from large urban centres and, in view of the fact that the local authority could not supply the required sanitation services to new households, suggests that the local authority would not be in a position to supply sanitation services to the project, e.g., to temporary construction camps.

5.5 Socio-Cultural Baseline Profile

The socio-cultural baseline profile describes the cultural dynamics of the local population in an effort to determine people's place attachment to the area (e.g., a longstanding resident will have stronger place attachment than a short-term seasonal worker) and their likelihood to try and determine the outcome of the project based on cultural influences and believes.

The entire study area (site-specific, local and regional) used to form part of Bophuthatswana, (meaning "gathering of the Tswana people") and refers to the area that was set up to house Setswana-speaking people (these areas were referred to as "Bantustan" or "homeland"). Bophuthatswana was declared nominally independent from South Africa in 1977 by the then apartheid regime. It was reintegrated into South Africa in 1994 and its territory was distributed between the Free State, Gauteng and Northwest. This is why the modern-day study area is predominantly characterised by Setswana-speaking Black Africans.

5.6 Summary of Baseline Profile

Table 5-2 below provides a summary of the socio-economic baseline profile and the relevance of the findings to the SIA. This table only contains verified data (i.e., StatsSA data from either Community Survey 2016 or Census 2011, whichever was the latest available data).

Table 5-2: Summary of Demographical Baseline Profile

Variable	Regional Study Area	Local Study Area		Site-Specific Area	Relevance to the SIA
	NMMDM (2016)	MLM (2016)	RLM (2016)	RLM11 (2011)	
Geographical area	28 440 km ² (27% of NWP)	3 652 km ² (13% of NMMDM)	4 893 km ² (17% of NMMDM)	1 589 km ² (32% of RLM)	Gives an indication of the proportion of the project footprint in relation to the surrounding geographical area
Population size	889 108 (24% of the NWP)	314 394 (35% of NMMDM)	106 108 (12% of NMMDM)	7 155 (7% of RLM)	See population growth rate.
Population density	31.3 per km ²	86.1 per km ²	21.7 per km ²	4.5 per km ²	Provides an indication of uninhabited land available for development when measured against the geographical area.
Population growth rate	1.1% p.a.	1.6% p.a.	-0.2% p.a.	1% p.a.	The population growth rate provides an indication of the migration patterns (in and out) of an area, which is helpful to determine the level of existing (and likelihood of future) in-migration.
Population group	Black African (96%)	Black African (97%)	Black African (99%)	Black African (93%)	Ethnicity is used to determine the likelihood of cultural influences and place attachment.
Predominant gender	Female (51%)	Female (51%)	Female (53%)	Male (54%)	Gender also plays a role in determining cultural influences (e.g., a number of rural communities are still very patriarchal) and

Variable	Regional Study Area	Local Study Area		Site-Specific Area	Relevance to the SIA
	NMMDM (2016)	MLM (2016)	RLM (2016)	RLM11 (2011)	
					also provides an indication of the composition of the labour pool.
Predominant language	Setswana (87%)	Setswana (85%)	Setswana (91%)	Setswana (86%)	The predominant language(s) spoken in the area coupled with the population group, gives an indication of the cultural dynamics of the area. It is also helpful to be aware of the local languages spoken when preparing project documentation to ensure it is easily understandable.
Predominant age group	Economically active (69%)	Economically active (71%)	Economically active (61%)	Economically active (59%)	The segment of the population who are willing and able to work.
Highest level of education (adults)	Some secondary (33%)	Grade 12 (32%)	Some secondary (32%)	None (28.2%)	Provides an overview of the basic skills set of the project area. It would, for example, be challenging to draw labour from the site-specific study area if the mine requires a post-Matric qualification. It is also useful to know the highest level of education when preparing project documentation to ensure that local stakeholders are able to understand project processes.

Variable	Regional Study Area	Local Study Area		Site-Specific Area	Relevance to the SIA
	NMMDM (2016)	MLM (2016)	RLM (2016)	RLM11 (2011)	
Size of the labour force	613 485	218 140	64 726	4 214	The overall number of people that could possibly be drawn upon for local employment.
Employment rate	56.0%	56.4%	39.5%	73.7%	The higher the unemployment rate, the more likely people will be drawn to the project in search of employment, i.e., the economic pull factor is expected to be higher in areas with low employment rates.
Monthly household income	Absolute poverty (52.8%)	Absolute poverty (50.8%)	Absolute poverty (64.2%)	Absolute poverty (58.4%)	Provides an overview of the overall economic wellbeing of the project area. People living in poverty usually have subsistence-based livelihoods and therefore tend to have higher expectations of projects and developments in terms of job creation of local economic development.
Land use	No data available	No data available	No data available	Predominantly agriculture	Used to determine conflicting land use practices that could affect livelihoods.
Number of households	269 975	103 334 (38.3% of NMMDM)	29 119 (10.8% of NMMDM)	2 049 (7% of RLM)	Governmental priority spend on local infrastructure development will first go to areas with higher/denser human settlement, leaving smaller local government bodies unable to sustain and develop services.

Variable	Regional Study Area	Local Study Area		Site-Specific Area	Relevance to the SIA
	NMMDM (2016)	MLM (2016)	RLM (2016)	RLM11 (2011)	
					These municipalities tend to look to private developers to assist them with local municipal infrastructure development.
Extent of informal settlement	10.9% (29 427 houses)	8.4% (8 766 houses)	8.5% (2 475 houses)	3.8% (78 houses)	In the absence of an income or job security, job seekers tend to gravitate towards informal settlements – any number of job seekers drawn to the area are likely to expand informal settlement and further increase any housing backlogs (residual impact).
Access to electricity (% of households)	92.5%	94.7%	90.5%	78.3%	The availability of electricity is an important factor in determining the type of housing that the area can sustain during construction (and operation) if large-scale influx is expected. Developments are also dependent on electricity for construction and operational activities without placing too much strain on limited resources.
Access to piped water (% of households)	63.9%	61.1%	57.9%	50.7%	Water users who are dependent on natural water resources are more sensitive to groundwater contamination.
Access to sanitation	VIP (61.1%)	VIP (68.4%)	VIP (86.0%)	VIP (54.5%)	The sanitation services in the overall study area (on all levels) appears to be inadequate. Given the baseline profile on sanitation, it is

Variable	Regional Study Area	Local Study Area		Site-Specific Area	Relevance to the SIA
	NMMDM (2016)	MLM (2016)	RLM (2016)	RLM11 (2011)	
					assumed that local authorities will not be able to support the project with such services. Any additional demands on sanitation services could exert too much pressure on the system.
Access to refuse	Own disposal (54.4%)	Service provider (58.3%)	Own disposal (99.7%)	Own disposal (89.5%)	Depicts the local authority's capability to assist with waste management during construction and operation. Only the MLM on a local level might be able to render waste management services but it is expected to be limited.

6. SOCIO-ECONOMIC IMPACT ASSESSMENT

6.1 Potential impacts during the construction phase

6.1.1 Project-Induced In-Migration

Potential Impact: The in-migration of people associated with development is a common phenomenon. It usually occurs on two levels: formal in-migration as a result of the arrival of the construction and operational workforce and informal in-migration due to job seekers.

The first group can be controlled as the size of the construction workforce is limited to a set number of people and, in the case of the construction workforce, only occupy the area for a certain time before they leave the area. No additional workers will be employed during the operational phase. Unlike the regulated circumstances surrounding the construction workforce, the influx of job seekers is unregulated and often very difficult to control. In terms of project-induced in-migration, the following should be noted:

- The construction phase will last for approximately 24 months and could lead to the employment of 300 people over the two years. An additional 300 people in the ward will increase the ward's population by around 4% for a limited period of up to 2 years.
- It is difficult to predict with accuracy how many job seekers could be expected. However, given the low population growth rate in the Project area, it is possible that the number of job seekers from outside the area would be limited.

Potential cumulative impacts: None anticipated

Expected areas of impact: Nearby towns and settlements in RLM (especially Maipeng and Kraaipan) as well as MLM.

The significance of project-induced in-migration is assessed in Table 6-1.

Table 6-1: Project-induced In-migration Impact Assessment

Impact Name	Project induced in-migration				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	2	1
Extent	3	3	Reversibility	1	1
Duration	3	2	Probability	2	2
Environmental Risk (Pre-mitigation)					-4,50
Mitigation Measures					
<ul style="list-style-type: none"> • Prioritise recruitment of local labour as far as possible • No employment at the gate. Rather establish a formal process for employing casual day labour (if required) and communicate this process in the local newspaper, including contact details and employment requirements. • Enter into formal employment contracts with casual labour and the construction staff to ensure that they are aware that employment is for a limited period only and that it is unlikely that the mine will employ construction staff on the mine when in operation. • Communicate redeployment with current operational staff and in the media to prevent word spreading of new job opportunities at the mine. 					
Environmental Risk (Post-mitigation)					-3,50

Impact Name	Project induced in-migration	
Alternative	Alternative 1	
Degree of confidence in impact prediction:	Medium	
Impact Prioritisation		
Public Response	1	
Low: Issue not raised in public responses		
Cumulative Impacts	1	
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.		
Degree of potential irreplaceable loss of resources	1	
Low: Where the impact is unlikely to result in irreplaceable loss of resources.		
Prioritisation Factor	1,00	
Final Significance	-3,50	

Proposed socio-economic monitoring plan:

Monthly monitoring as part of contractor management plan.

Indicators:

Percentage of local people employed.

6.1.2 Increase in Crime

Potential impact: An influx of job seekers could result in an increase in criminal activities. It is also possible that, during the construction phase of the project, an opportunistic criminal element may take advantage of increased activities in certain areas around construction sites. Based on interviews with farmers in the local area, limited security at the mine sometimes provides leeway for illegal hunters passing through the mining area. Due to the widely publicised countrywide spike in violent crimes on farms, isolated households on farmlands around the mine could feel especially vulnerable to crime. This impact is assessed in Table 6-2.

Potential cumulative impacts: None anticipated.

Expected areas of impact: Farmlands around the Kalgold mine and expansion site.

Table 6-2: Increase in Crime Impact Assessment

Impact Name	Increase in Crime					
Alternative	Alternative 1					
Environmental Risk						
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation	
Nature	-1	-1	Magnitude	1	1	
Extent	3	3	Reversibility	2	1	
Duration	2	2	Probability	2	2	
Environmental Risk (Pre-mitigation)						-4,00
Mitigation Measures						
<ul style="list-style-type: none"> Increase security in terms of entry into mining area Liaise with and support local community policing groups / forums to aid proactive policing. 						
Environmental Risk (Post-mitigation)						-3,50
Degree of confidence in impact prediction:						Medium

Impact Name	Increase in Crime
Alternative	Alternative 1
Impact Prioritisation	
Public Response	2
Medium: Issue has received a meaningful and justifiable public response	
Cumulative Impacts	1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.	
Prioritisation Factor	1,17
Final Significance	-4,08

Proposed socio-economic monitoring plan:

Monthly monitoring as part of contractor management plan.

Indicators: Number of crime incidents reported through local community forum.

6.1.3 Increase in Nuisance Factors

Potential impact: An increase in nuisance factors such as noise and dust pollution impact on nearby households and communities' health and wellbeing. Possible health effects of mining operations include air / dust pollution, noise pollution, and light pollution during the construction phase.

Potential cumulative impacts: None anticipated.

Expected areas of impact: There are four receptors less than 2km of the proposed construction activities, a farmstead about 1km north-north east of the TSF; a cluster of farming houses less than 1km east north east from the new explosives' magazine and two farmsteads less than 1,5km south and south-west of the site boundary.

Table 6-3: Nuisance Factor Impact Assessment

Impact Name	Nuisance factors				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	2	1
Extent	3	3	Reversibility	1	1
Duration	2	2	Probability	3	3
Environmental Risk (Pre-mitigation)					-6,00
Mitigation Measures					
<ul style="list-style-type: none"> As per the mitigation measures of the Air quality report Water down dust roads used during construction activities. Alert the area when activities that will increase noise levels will take place. Communicate the mine's grievance mechanism through the local media. Ensure that stakeholders know how to access the grievance mechanism. Address grievances timeously 					
Environmental Risk (Post-mitigation)					-5,25
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1

Impact Name	Nuisance factors
Alternative	Alternative 1
Low: Issue not raised in public responses	
Cumulative Impacts	1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.	
Prioritisation Factor	1,00
Final Significance	-5,25

Proposed socio-economic monitoring plan:

Monthly monitoring as part of contractor management plan.

Indicators: Number of grievances received and resolved related to noise and dust during the construction phase.

6.1.4 Positive Impact on Local Income and Employment

Potential Impact: The duration of the construction works could be effectively completed over two years and could for the short period could lead to the employment of approximately 300 workers, representing close to 3% of the 9,000 people employed in the municipal area in 2011(Stats SA, 2011). Based on the skills distribution in the construction sector the majority of these workers could be semi-skilled (45%) and unskilled (35%).

The flow-on impacts (indirect and induced²) could result in additional employment between 1,200 (maximum) and two years the longer term. The incidence of the flow-on impacts would largely fall outside the RLM area with some anticipated in the MLM and the larger Gauteng region.

The potential income and employment impacts during construction are illustrated in Table 6-1 below. The figures in the table presents a high case scenario and the actual materialisation of these impacts would depend on the employment elasticity of the construction sector at the time of construction.

Table 6-4: Potential direct and flow-on impacts of the Kalgold Project during the construction phase

Economic impact	Year 1	Year 2
Planned construction spending (Rm)	1,300	1,300
Direct GVA ³ (Rm)	430	430
Direct employment	300	300
Flow-on GVA (Rm)	820	820
Flow-on employment	1,200	1,200

Source: Based on information from Harmony Gold; Conningarth (2018) and Stats SA (2019)

Potential cumulative impacts: None foreseen

² Indirect impacts result from spending on suppliers and induced impacts from increased spending due to the increased income from direct and indirect employment

³ GVA = Gross value added consisting of salaries and wages, profit, interest and rent income

Anticipated areas of impact: RLM, MLM and Gauteng regions

Table 6-5: Local Employment and Income Impact Assessment

Impact Name	Employment and income				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	1	1	Magnitude	3	4
Extent	5	5	Reversibility	2	2
Duration	2	2	Probability	4	4
Environmental Risk (Pre-mitigation)					12,00
Mitigation Measures					
<ul style="list-style-type: none"> Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan The objective should be to 100% recruitment of additional/ new unskilled labour from local communities 					
Environmental Risk (Post-mitigation)					13,00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					13,00

Proposed socio-economic monitoring plan:

Monthly monitoring as part of contractor management plan:

Indicators

- Percentage of local labour employed in different skill categories
- Training programmes completed by local labour force
- Percentage of goods and services procured from local community by type of product

6.1.5 Positive Impact on Poverty Reduction

Potential impact: As mentioned above, the construction works could directly employ 35% unskilled workers, i.e. about 105 unskilled workers over 2 years. Assuming an average household size of 3.3 people per poor household, these workers could support 346 people living in low household incomes over the 2year period about 1% of the population that live in poverty.

Potential cumulative impacts: None foreseen

Anticipated areas of impact: RLM and MLM

Table 6-6: Poverty Reduction Impact Assessment

Impact Name	Poverty reduction				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	1	1	Magnitude	2	3
Extent	4	4	Reversibility	2	2
Duration	2	2	Probability	4	4
Environmental Risk (Pre-mitigation)					10,00
Mitigation Measures					
<ul style="list-style-type: none"> Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan The objective should be to 100% recruitment of additional/ new unskilled labour from local communities 					
Environmental Risk (Post-mitigation)					11,00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					11,00

Proposed socio-economic monitoring plan:

- Monthly monitoring as part of contractor management plan

Indicators: Indicators

- Percentage of local labour employed in unskilled categories

6.2 Potential impacts during the Operational phase

6.2.1 Increase in Nuisance Factors

Potential Impact: An increase in nuisance factors such as noise and dust pollution impact on nearby households and communities' health and wellbeing. Possible health effects of mining operations include air / dust pollution, noise pollution, and light pollution. There are four possible receptors less than 2km from the site boundary that could possibly be impacted by noise and dust pollution. The receptors include a farmstead about 1km north-north east of the TSF; a cluster of farming houses less than 1km east north east from the new explosives' magazine and two farmsteads less than 1,5km south and south-west of the site boundary.

Potential cumulative impacts: None anticipated.

Expected areas of impact: Farmlands around the Kalgold mine and expansion site.

Table 6-7: Nuisance Factor Impact Assessment

Impact Name	Nuisance factors				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	2	1
Extent	3	3	Reversibility	1	1
Duration	4	4	Probability	3	3
Environmental Risk (Pre-mitigation)					-7,50
Mitigation Measures					
<ul style="list-style-type: none"> As per the mitigation measures of the Air quality report Water down dust roads used during construction activities. Alert the area when activities that will increase noise levels will take place. Communicate the mine's grievance mechanism through the local media. Ensure that stakeholders know how to access the grievance mechanism. Address grievances timeously 					
Environmental Risk (Post-mitigation)					-6,75
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					2
Medium: Issue has received a meaningful and justifiable public response					
Cumulative Impacts					2
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,33
Final Significance					-9,00

Proposed socio-economic monitoring plan:

Quarterly monitoring as part of stakeholder engagement plan.

Indicators: Number of grievances received and resolved related to noise and dust during the operational phase.

6.2.2 Positive Impact on Local Impact and Employment

While Harmony Kalgold operation wishes to more than double its current production from the current production rate of 130 000 tons per month to 300 000 tons per month, direct employment at the mine is not expected to increase.

Higher production volumes could however be associated with higher operational spending. Based on 2016 production and cost ratios, income generated from increased indirect spending on suppliers could generate an additional R 343m per annum during the lifetime of the mine as well as an additional 330 supply-linked jobs. Only a fraction (3,4%) of spending on suppliers is however spend on local suppliers (mainly located in MLM. The spending and induced impacts related to the mine expansion is illustrated in Table 6-8 below. As indicated in the table an additional 18 jobs could result from operational spending of the mine in the local area.

Table 6-8: GVA and Employment Impact of the planned Kalgold Expansion

Impact	total	local area (mainly MLM)
Indirect GVA (Rm)	217	74
Induced GVA (Rm)	126	4
Total GVA (Rm)	343	78
Indirect employment	330	11
Induced employment	191	6
Total employment	521	18

Source: Based on information from Harmony Gold; Conningarth (2018) and Stats SA (2019)

Potential cumulative impacts: None foreseen

Anticipated areas of impact: Mainly regional and MLM

Table 6-9: Local Income and Employment Impact Assessment

Impact Name	Employment and income				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	1	1	Magnitude	2	3
Extent	4	4	Reversibility	1	1
Duration	4	4	Probability	4	4
Environmental Risk (Pre-mitigation)					11,00
Mitigation Measures					
<ul style="list-style-type: none"> Develop a database of goods and services that could potentially be outsourced to the local community Establish a supplier development programme as part of the Local Economic Development component of the SLP. The programme should focus on small businesses in MLM and RLM that could supply to the mine (e.g. catering and cleaning) as well as larger businesses within the region. The focus of the fund should be on the development of HDI owned and controlled businesses with less than a R 50 million turnover 					
Environmental Risk (Post-mitigation)					12,00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					12,00

Proposed socio-economic monitoring plan:

Annual monitoring as part of the SLP.

Indicators: Percentage of spending on local suppliers.

6.2.3 Increase in Tax Revenues

Potential impact: The Kalgold extension is expected to generate an additional GVA of R343m per annum as indicated in Table 6-8 above as well. In addition, its profits (direct GVA) could increase by an additional R200m per annum. Assuming the average tax: GVA ratio for the national economy of 26%, the extension could annually generate additional tax in the region of R144m.

Potential cumulative impacts: None

Anticipated areas of impact: National economy

Table 6-10: Tax Income Impact Assessment

Impact Name	Tax income				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	1	1	Magnitude	3	3
Extent	4	4	Reversibility	1	1
Duration	4	4	Probability	5	5
Environmental Risk (Pre-mitigation)					15,00
Mitigation Measures					
None					
Environmental Risk (Post-mitigation)					15,00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					15,00

Proposed socio-economic monitoring plan: None

6.2.4 Local Economic Development Funds

Potential impact: Mining legislation specifies that mining operations should contribute to the economic development of the affected local community as per a Social and Labour Plan (SLP). The Local Economic Development plan should be aligned to the local, provincial and national development priorities. The local communities should furthermore be consulted. Both income generating activities and social infrastructure should be implemented as part of the plan.

While the old (2010) mining guidelines did not specify a specific portion of turnover or profit to be allocated to such a fund, a generally good practice among mining companies was to set

aside 1% of net profits after tax. The 2018 Mining Charter targets an equity equivalent benefit to the minimum of 5% to be allocated to the socio-economic development of local communities. Mining legislation furthermore specifies that 0.5% of income that multinational suppliers receive from the mining operations must be contributed to a social development fund.

The SLP for Kalgold (2018-2022) makes provision for some R 9.2 million (2018 prices) to the local community for local economic development over the five-year period from 2018 to 2022 i.e. on average close to R 1,8 million per annum. This represents around 1,1% of net profits after tax. With profits estimated to increase due to the expansion, the social contribution is expected to increase as well.

Potential cumulative impacts: None

Anticipated areas of impact: Local communities within RLM and MLM.

Table 6-11: Social Fund Impact Assessment

Impact Name	Local economic development funds				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	1	1	Magnitude	1	3
Extent	3	3	Reversibility	1	1
Duration	4	4	Probability	2	3
Environmental Risk (Pre-mitigation)					4,50
Mitigation Measures					
<ul style="list-style-type: none"> Ensure that the updated SLP (2023- 2028) takes the increased profits into account due to the extension and adjusts the social funds in line with the targets of the Mining Charter of 2018 Prioritise immediate adjacent communities of RLM for additional funds allocated to the SLP Monitor and manage the social contribution of multinational suppliers (in-house as well as suppliers to contractor and direct service providers) 					
Environmental Risk (Post-mitigation)					8,25
Degree of confidence in impact prediction:					Low
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					8,25

Proposed socio-economic monitoring plan:

- Report annually on LED projects as part of reporting on progress on the SLP
- Report annually on the social contribution of multinational suppliers

Indicators:

- Social and economic impact of SLP’s socio-economic development programmes
- Monetary value of the social contribution of multinational suppliers

6.2.5 Structural Damages due to Blasting Activities

Potential impact: Based on interviews with adjacent farmers, there are concerns around blasting activities related to current Kalgold mining activities causing structural damage to properties close to the mining area. The expansion would increase blasting activities and the area as well as the real or perceived risks related to structural damage to properties.

Potential cumulative impacts: Existing mining activities

Anticipated areas of impact: Local farmers close to the extended mining activities.

Table 6-12: Blasting Impact Assessment

Impact Name	Perceived structural damage from blasting				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	2	2
Extent	3	3	Reversibility	2	2
Duration	4	4	Probability	3	3
Environmental Risk (Pre-mitigation)					-8,25
Mitigation Measures					
<ul style="list-style-type: none"> • Communicate blasting timelines to local farmers • Monitor grievances voiced by adjacent farmers • Compensate affected parties in case of proof of damage from blasting 					
Environmental Risk (Post-mitigation)					-8,25
Degree of confidence in impact prediction:					Low
Impact Prioritisation					
Public Response					2
Medium: Issue has received a meaningful and justifiable public response					
Cumulative Impacts					2
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,33
Final Significance					-11,00

Proposed socio-economic monitoring plan:

- Monitor per individual grievances

Indicators:

- Number of grievances related to blasting recorded and resolved

6.2.6 Increased Economic Concentration

Potential impact: As discussed above, the local economy of RLM is dominated by mining and agricultural activities. Both sectors are vulnerable to exogenous shocks either in the form of the weather or international commodity prices. For the stability of local output in an economy, it makes sense to have a more diversified economic base, thereby mitigating the effect of exposure to external variables usually influencing a specific sector, e.g. international commodity prices in the case of the mining sector. Due to the large exposure of the local economy towards mining output however, one could expect the mining sector cumulatively to have some destabilising influence on local output levels. The extension will increase the concentration of economic activities in the mining sector and could restrict the local adjustment process towards a post-mining economy. The impact on economic diversity is assessed in Table 6-13.

Potential cumulative impacts: Existing Mining Activities

Expected areas of impact: RLM

Table 6-13: Impact on Economic Diversity

Impact Name	Increased economic concentration				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	4	3
Extent	3	3	Reversibility	2	2
Duration	4	4	Probability	4	3
Environmental Risk (Pre-mitigation)					-13,00
Mitigation Measures					
<ul style="list-style-type: none"> Focus on the support of non-mining related activities in community development programmes and business support programmes Focus additional local procurement programme related to the extension on non-core mining inputs (e.g. catering, accommodation) . Currently close to 57% of local spending is on non-core items. This percentage could be higher to shield to local economy against concentration of economic activities around the mining sector 					
Environmental Risk (Post-mitigation)					-9,00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					2
Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,17
Final Significance					-10,50

Proposed socio-economic monitoring plan:

- Annual reporting as part of SLP report

Indicators:

- Percentage of local procurement on non-core mining goods and services
- Support to non-mining local activities as part of the local social investment plan

6.2.7 Loss of Agricultural land

Potential impact: The project area is around 200 hectares of which the larger percentage (57%) have been classified as arable land; 7% as grazing areas and 36% as disturbed areas. According to the agricultural impact study that form part of the EIA, the proposed expansion will result in the stripping of topsoil and alterations to the existing land uses. It is possible that suitable agricultural land could become fragmented, resulting in these smaller portions no longer being deemed feasible to farm. The removal of vegetation and changes to the local topography could result in an alteration to surface run-off dynamics. The soils in the project area are generally characterised by excessive drainage and also high erodibility. This could result in further loss of topsoil, and soil forms suitable for agriculture (The Biodiversity Company, 2021).

Potential cumulative impacts: Existing mining activities

Anticipated areas of impact: Mining area

Table 6-14: Impact on Agricultural Land

Impact Name	Loss of agricultural land				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	2	1
Extent	2	2	Reversibility	3	3
Duration	4	4	Probability	4	4
Environmental Risk (Pre-mitigation)					-11,00
Mitigation Measures					
<ul style="list-style-type: none"> • Mitigation measures as per agricultural impact study • On-going rehabilitation as per mine rehabilitation plan 					
• Environmental Risk (Post-mitigation)					-10,00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					2
Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,17
Final Significance					-11,67

Proposed socio-economic monitoring plan:

Part of rehabilitation plan

Indicators:

- Hectares of degraded mining area

6.2.8 Increase in External Environmental Costs in Local Area

Potential Impact: Increase in environmental costs to local area (could include costs related to externalities of soil pollution, traffic flow; water pollution, air pollution, rising crime levels. The external costs on the local community due to soil pollution, increased traffic, air pollution and rising crime levels are considered to be low.

The only major external costs anticipated during extended mining operations include potential impacts on availability of groundwater that could affect one or two boreholes close to the project area. During opencast mining groundwater will flow into the workings, which will then be pumped out. This will result in the lowering of the groundwater levels in the vicinity of the open pits during the operational phase of the mining operation. The extent of this dewatering cone is important as it can potentially impact on private groundwater users and in extreme situations may cause boreholes to dry up. After mining ceases the groundwater levels are expected to recover and this risk will no longer be applicable (MvB Consulting, 2021).

Potential cumulative impacts: Existing mining activities

Anticipated areas of impact: Farmers adjacent to the mining activities.

Table 6-15: External Environmental Costs

Impact Name	External Environmental Costs				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	2	1
Extent	3	3	Reversibility	2	2
Duration	4	4	Probability	2	2
Environmental Risk (Pre-mitigation)					-5,50
Mitigation Measures					
<ul style="list-style-type: none"> • As per the geohydrological report • Compensate affected farmers if evidence is found that mining activities negatively impact in groundwater levels 					
Environmental Risk (Post-mitigation)					-5,00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					2
Medium: Issue has received a meaningful and justifiable public response					
Cumulative Impacts					2
Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,33
Final Significance					-6,67

Proposed socio-economic monitoring plan:

Part of groundwater monitoring plan

Indicators:

- Number of complaints related to external costs received and resolved

6.3 Potential impacts during the Decommissioning

6.3.1 Termination of Employment and Income Opportunities

Potential Impact: Although the mine extension will not result in additional employment directly at the mine, the increased spending on suppliers will result in indirect and induced employment impacts during the operational phase. After mine closure jobs associated with supply spending will cease. The decommissioning of the mine will also have some high cumulative impacts as the whole mine (including original activities) will also cease. This will lead to the termination of an additional 690 positions of workers directly employed by the mine.

Potential cumulative impacts: Current mining activities

Anticipated areas of impact: MLM and larger region.

Table 6-16: Job and Income Losses

Impact Name	Termination of employment				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	3	2
Extent	4	4	Reversibility	5	4
Duration	5	5	Probability	5	5
Environmental Risk (Pre-mitigation)					-21,25
Mitigation Measures					
<ul style="list-style-type: none"> • As per the SLP (section 6) develop mechanisms to assist employees, prior to retrenchment date in the transition phase after closure of the operations, including portable skilled development programmes during the operational phase of the mine, providing assistance in accessing available and suitable jobs with other local mines or companies etc. • Focus on non-core related local supply links during the operational phases of the mine to facilitate easier transitioning of local suppliers to other industries 					
Environmental Risk (Post-mitigation)					-18,75
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					3
High: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,33
Final Significance					-25,00

Proposed socio-economic monitoring plan

- Monitor per the SLP plan that should be updated on a regular basis

Indicators:

- Number of employees that received portable skills training
- Local spending on non-core mining inputs

6.3.2 Termination of Local Economic Development Funds

Potential impact: The proponent’s regulatory commitment with regards to social and economic development is expected to decrease during the decommissioning and closure of the mine. The risk exist that projects are dependent on the funding that they receive from the proponent and that projects will fail due to the decrease in funding.

Potential cumulative impacts: None

Anticipated areas of impact: RLM and MLM

Table 6-17: Termination of Social Funds

Impact Name	Termination of Social funds				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	1	1
Extent	3	3	Reversibility	5	4
Duration	5	4	Probability	5	5
Environmental Risk (Pre-mitigation)					-17,50
Mitigation Measures					
<ul style="list-style-type: none"> • Develop a community investment strategy in conjunction with the local communities. • Develop and implement community investment projects in participation with beneficiaries. • Plan projects with an exit strategy of which beneficiaries are aware of 					
Environmental Risk (Post-mitigation)					-15,00
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					-15,00

Proposed socio-economic monitoring plan:

- Monitor per the SLP plan that should be updated on a regular basis

Indicators:

- Ownership and sustainability of development projects after closure

6.3.3 Permanent Loss of Agricultural Land

Potential impact: The mining method to be used is opencast which entails progressive backfilling and rehabilitation of disturbed land. It is unlikely that the land capability will be rehabilitated back to its full potential after mining. It is likely that 57% of the land area that can be classified as arable land will be used for grazing area after rehabilitation.

Potential cumulative impacts: Other mining activities in the local area

Anticipated areas of impact: Mining area

Table 6-18: Permanent Loss of Agricultural Land

Impact Name	Permanent loss of agricultural land				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	3	2
Extent	2	2	Reversibility	4	4
Duration	5	5	Probability	5	5
Environmental Risk (Pre-mitigation)					-17,50
Mitigation Measures					
As per the mine rehabilitation plan					
Environmental Risk (Post-mitigation)					-16,25
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					1
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					-16,25

Proposed socio-economic monitoring plan:

- Regular update on mine closure plan as per legislation

Indicators:

- Productive potential of rehabilitated mine area

6.3.4 Residual Safety Risks

Potential impact: After mine closure there is a risk that remaining infrastructure could pose a safety risk for the adjacent communities and their livestock. While there are currently no illegal mining activities in the local area, the closure of the mine could attract illegal miners to the local area.

Potential cumulative impacts: Existing mining activities

Anticipated areas of impact: Mining area

Table 6-19: Residual Safety Risks

Impact Name	Safety risks				
Alternative	Alternative 1				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	3	2
Extent	3	3	Reversibility	3	3
Duration	5	5	Probability	3	2
Environmental Risk (Pre-mitigation)					-10,50
Mitigation Measures					
<ul style="list-style-type: none"> Establish community safety forum Link safety forum to initiatives to combat illegal mining (e.g. Minerals Council) Demolish all infrastructure that pose safety hazards to the local community 					
Environmental Risk (Post-mitigation)					-6,50
Degree of confidence in impact prediction:					Low
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					3
Low: Where the impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,33
Final Significance					-8,67

Proposed socio-economic monitoring plan:

- Regular update on mine closure plan as per legislation

Indicators:

- Community safety forum established prior to closure

7. CONCLUSION

The pre- and post-mitigation ratings assigned to the various impacts discussed in the report are summarised in Table 7-1.

The project holds positive potential (medium) in terms of job and income creation for the local community, the generation of local development funds as well as public revenues in the form of taxes and royalties.

Stakeholders that carry economic risks related to the project include local farmers adjacent to the project area. Most of these risks related to nuisance factors, project-induced in migration, external costs etc. are however rated low.

The termination of employment after closure is the only risk that is rated a high negative. The risk will remain high even after mitigation due to the cumulative impacts of all mining activities and not only the expanded activities terminating at closure. High risk of employment losses after mine closure is specific to mining activities that play a large role in local areas.

The low negative risks during operations combined with the medium positive impacts related to employment and increased social funds leads to the recommendation of the SEIA that environmental authorisation should be granted for the planned expansion project.

Table 7-1: Summary of Socio-Economic Impact Ratings

Socio-economic Impact	Phase	Significance of Impact		
		Pre-mitigation	Post-mitigation	Final Rating
Project induced in-migration	Construction	-4,50	-3,50	Low negative
Increase in Crime	Construction	-4,00	-3,50	Low negative
Nuisance factors	Construction	-6,00	-5,25	Low negative
Employment and income	Construction	12,00	13,00	Medium positive
Poverty reduction	Construction	10,00	11,00	Medium positive
Nuisance factors	Operations	-7,50	-9,00	Low negative
Employment and income	Operations	11,00	12,00	Medium positive
Tax income	Operations	15,00	15,00	Medium positive
Local economic development funds	Operations	4,50	8,25	Low positive
Structural damage from blasting	Operations	-8,25	-11,00	Low negative
Increased economic concentration	Operations	-13,00	-10,50	Low negative
Loss of agricultural land	Operations	-11,00	-11,67	Low negative
External Environmental Costs	Operations	-5,50	-6,67	Low negative
Termination of employment	Closure	-21,25	-25,00	High negative
Termination of LED funds	Closure	-17,50	-15,00	Low negative
Permanent loss of agricultural land	Closure	-17,50	-16,25	Low negative
Safety risks	Closure	-10,50	-8,67	Low negative

8. SOURCES

8.1 Literature

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8.2 Interviews

Stakeholder name	Position	Date of interview
Deon Bothma	Adjacent farmer: north and south	2 December 2021
Marnus Bothma	Adjacent farmer: north and south	2 December 2021
Willem de Chavonne	Adjacent farmer: north and south.	2 December 2021
Norman Meyer	Adjacent farmer: surrounding the mine including to the south east	2 December 2021
Cornelius Meyer	Adjacent farmer	2 December 2021