

# JACANA ENVIRONMENTALS cc

## RIETKOL MINING OPERATION

**Proposed Mining by Nhlabathi Minerals (Pty) Ltd. on  
Various Agricultural Holdings on the Modder East  
Agricultural Holdings located on the farm Olifantsfontein  
196 IR and portions of the farm Rietkol 237 IR in the Victor  
Khanye Local Municipality, Mpumalanga Province**

**Final Report: Land Trade-Off Study and Macro-Economic  
Impact Analysis of the Proposed Rietkol Mining Project near  
Delmas**

**19 August 2021**

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MOSAKA ECONOMIC CONSULTANTS cc

TRADING AS

CONNINGARTH ECONOMISTS



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## RIETKOL MINING OPERATION

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## COMPANY PROFILE

Mosaka Economic Consultants cc (trading as Conningarth Economists) specialises in macro-economic and micro-economic analyses, regional/sectoral analyses and cost benefit analyses (Conningarth has compiled a Manual on Cost-Benefit Analysis for major capital projects). See Overview of Company at <http://conningarth.co.za/overview/>.

### DETAILS OF THE SPECIALIST WHO PREPARED THE REPORT

Name: William Mullins  
Date of Birth: 19 March 1945  
Nationality: South African  
Current Position: Economist - Agriculture Specialist

#### Academic Qualifications:

1968: UED – University of Free State.

1967 BSc – University of Free State.

#### Other Training:

Excel, MS Word, Mind Manager and Power point.

#### Language Skills:

Language	Reading	Speaking	Writing
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

#### Professional Career:

William Mullins is originally trained as a mathematician and statistician and after a short spell in industry, became a teacher. In 1976, William took over the family farm in Southern KwaZulu Natal, where he farmed until joining by Mosaka Economic Consultants cc in 2000. During his time in farming William Mullins served a period as chairman of the Natal Agricultural Union and was a member of the Regional Development Committee of Region C (RDAC) and the National Regional Development Advisory Committee (NRDAC). He also served as a board member of the KwaZulu Development Corporation and its successor, the Ithala Development Corporation from 1993 to 2001. William was also a member of the KwaZulu Training Trust (KTT) and a board member of the Natal Parks Board.

In the early years of by Mosaka Economic Consultants cc, William worked on projects on a part-time basis and then, in 2000, he joined the organisation as the resident statistician. William's leadership qualities and ability to work with people makes him a natural choice as a project team leader. His extensive experience in the agricultural field means that he is involved in most projects in this field, as well as impact studies on rivers. William has also worked in specialist fields like the SKA Telescope for South Africa study, several impact studies for Eskom and the Bokpoort Project 150 MW CSP Tower Development for ACWA Power.

William is well acquainted with the economic models applied in the study, i.e., Cost Benefit Analysis including the associated Land Trade-off Assessment, Macro-economic Impact Analysis and the Social Accounting Matrix.

#### **EXPERTISE OF MR. WILLIAM MULLINS**

William Mullins is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies.

Some of the mining related projects undertaken by William Mullins include:

- Socio-economic Impact Assessment for the proposed Inyanda Coal Mine Closure. [Exxaro, 2015].
- Socio and Macro-Economic Impact Analysis and Cost Benefit Analysis for The Dual Coal Mine. [Thandululo Coal Mining Propriety Limited, 2015].
- Addendum: Macro-economic Impact Analysis and Cost Benefit Analysis of the Sekoko Coal Waterberg Project. [Sekoko Resources (Pty) Ltd. 2014].
- Socio and Macro-Economic Impact Analysis and Cost Benefit Analysis for the Sefateng Chrome Mine. [Metmar Investments and Resources Propriety Limited, 2013].
- Greater Soutpansberg Project – Mopane Project Macro and Micro-Economic Impact Analysis of the Coal of Africa Generaal Project located near Makhado within the Vhembe District Municipality. [Coal of Africa Limited, 2013].
- Greater Soutpansberg Project – Mopane Project Macro and Micro-Economic Impact Analysis of the Coal of Africa Chapudi Project located near Makhado within the Vhembe District Municipality. [Coal of Africa Limited, 2013].
- Greater Soutpansberg Project – Mopane Project Macro and Micro-Economic Impact Analysis of the Coal of Africa Mopane Project located near Makhado within the Vhembe District Municipality. [Coal of Africa Limited, 2013].
- Socio and Macro-Economic Impact Analysis of the proposed Sekoko Waterberg Colliery near Lephalale in the Waterberg District Municipality to include the additional farms: Swanepoelpan 262LQ Olieboomsfontein 220LQ and Duikerfontein 263LQ. [Savannah Environmental Pty (Ltd), 2013].
- Socio-and Macro-Economic Impact Assessment of the Proposed Makhado Colliery near Louis Trichardt in the Vhembe District Municipality. [Savannah Environmental Pty (Ltd), 2012].
- Macro-Economic Impact Analysis of the Proposed Overvaal Project near Camden in the Msukaligwa Local Municipality, Mpumalanga. [Jacana Environmentals cc, 2012].
- Port and Rail Infrastructure Order of Magnitude Study – Macro-economic Impact Assessment. [Mozambique Coal Industry Export Initiative, 2011].
- Macro-economic Impact Analysis and Cost Benefit Analysis of the Sekoko Coal Waterberg Project. [Lexshell 126 General Trading (Pty) Ltd., 2010].
- Macro-economic Impact Analysis and Cost Benefit Analysis of the Proposed Vele Colliery near Musina, Limpopo. [Naledi Development (Pty) Ltd. 2010].
- Macro-economic Impact Assessment of the Construction of the Proposed New Vale Coal Mine and Coal-Fired Power Station – Application of the Social Accounting Matrix for Mozambique. [Vale Mozambique Limitada, 2010].
- Macro-economic Impact Analysis and Cost Benefit Analysis of the Vlakfontein Colliery. [Jacana Environmental cc. 2010].

- Macro-Economic Impact Assessment for the Construction of a Mine. [Southern African Institute for Steel Construction (SAISC), 2010].
- Macro-economic Impact Assessment of the Construction of a new Coal-Powered Station and the Expansion of Grootgeluk Coal Mine at Lephalale. [Department of Economic Development, Environment & Tourism, Limpopo Provincial Government, 2007].

**PROJECT EXPERIENCE OUTSIDE SOUTH AFRICA:**

Country	Year
Swaziland	1996, 2001, 2006-2007, 2012, 2020
Mozambique	2004-2006, 2008, 2015
Namibia	2002, 2004, 2008, 2017
Botswana	2008, 2019
Ethiopia	2010
Uganda	2011

## DECLARATION OF INDEPENDENCE

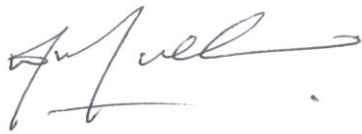
This document has been prepared by Mosaka Economic Consultants cc (trading as Conningarth Economists).

**Name of Project:** Rietkol Mining Operation.

**Report Title:** Land Trade-Off Study and Macro-Economic Impact Analysis of the Proposed Rietkol Mining Project near Delmas.

I, William Mullins, declare that I am the Project Manager and co-author of this Land Trade-off and Macro-Economic Impact Analysis study. I further declare that I am employed by Mosaka Economic Consultants cc, trading as Conningarth Economic Consultants, an independent Macro-Economic Analysis, Regional and Sectorial Analysis and Cost-Benefit Analysis company with 30 years of experience in conducting Macro-Economic and Cost Benefit Analyses.

Mosaka Economic Consultants cc did the Land Trade-Off Study and Macro-Economic Impact Analysis of the proposed Rietkol Mining Operation based on independent research and data provided by the mining company. I hereby confirm that neither I nor the co-authors nor any employee of Mosaka Economists have any business, financial, personal or other interest in the activity or application other than fair remuneration for work performed and that there are no circumstances that may compromise the objectivity of these persons in performing the work as defined under the term "independent" in Chapter 1 of the Environmental Impact Assessment Regulations (2014).



William Mullins – Project Manager

Date: 19 August 2021

## LEGAL REQUIREMENTS FOR ALL SPECIALIST STUDIES CONDUCTED

In terms of the NEMA 2014 EIA Regulations contained in GN R982 of 04 December 2014 (as amended in 2017) all specialist studies must comply with Appendix 6 of the NEMA 2014 EIA Regulations (GN R982 of 04 December 2014).

Legal Requirement		Relevant Section in Specialist study
(1)	A specialist report prepared in terms of these Regulations must contain-	
(a)	details of-	
	(i) the specialist who prepared the report; and	Page ii
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Page iiiv
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page v
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Para 1.4
(cA)	an indication of the quality and age of base data used for the specialist report;	Page 7
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Para 3.5, Tables 3-31 and 3-32
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Page 24 and 25.
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Para 2.2
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	Para 3.1.7
(g)	an identification of any areas to be avoided, including buffers;	N/A
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Pages 29 to 34
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Para 3.1.7
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Chapter 5
(k)	any mitigation measures for inclusion in the EMPr;	Not Applicable
(l)	any conditions for inclusion in the environmental authorisation;	Not Applicable
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n)	a reasoned opinion	N/A
	whether the proposed activity or portions thereof should be authorised;	N/A
	regarding the acceptability of the proposed activity or activities; and	N/A
	if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and	Chapter 5

<b>Legal Requirement</b>		<b>Relevant Section in Specialist study</b>
	mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
<b>(o)</b>	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Para 3.1.2
<b>(p)</b>	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Appendix 11
<b>(q)</b>	any other information requested by the competent authority.	N/A

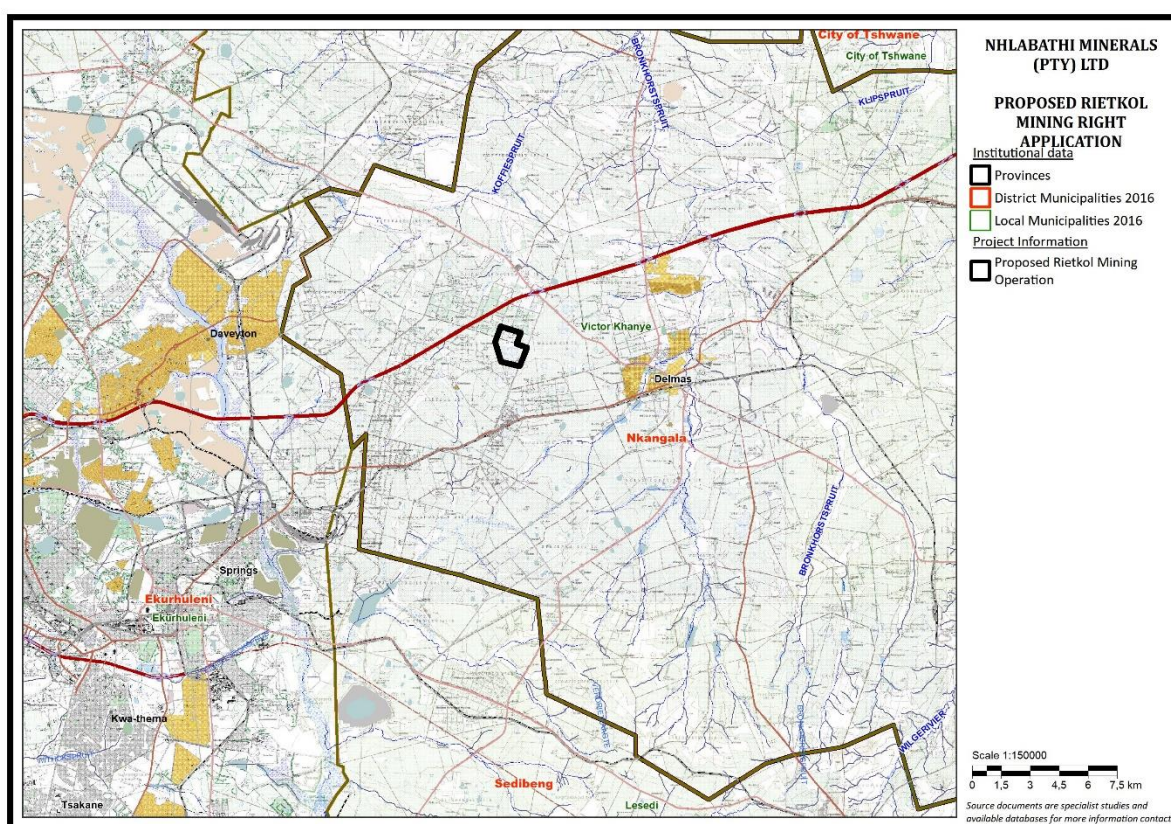


## EXECUTIVE SUMMARY

### INTRODUCTION

Consol Glass (Pty) Limited (Consol) has recently reorganised its mining interests in terms of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act 28 of 2002). An application for a Mining Right to mine silica and associated minerals (clay, sand, etc.), at the Modder East Agricultural Holdings (AHs) and the farm Rietkol 237 IR, was submitted by Nhlabathi Minerals (Pty) Ltd to the Department of Mineral Resources and Energy (DMRE) in terms of section 22 of the MPRDA.

The Modder East AHs and the farm Rietkol 237 IR are located in Wards 8 and 9 of the Victor Khanye Local Municipality and Nkangala District Municipality, Mpumalanga Province. Major routes in the project area include the N12 (north-west), R50 (north-east) and R555 (south). See Figure 1 below for locality.



The Mining Right Application (MRA) area is situated in a mixed land use area approximately 6 km west of the western boundary of the residential area of Delmas and Botleng and approximately 4 km north of the northern boundary of the residential area of the Eloff hamlet as indicated in Figure 1 above.

The MRA area includes part of the Modder East Orchards AHs located on the farm Olifantsfontein 196 IR covering 16 AHs (each AH is approximately 4.0471 ha in extent, total area 64.75 ha) and portions of RE/31/237 and 71/237 on the farm Rietkol 237 IR covering an area of approximately 156.25 ha.

The Victor Khanye Local Municipality (LM) is currently characterised by an increase in coal mining and related activities, the mining of silica sand is also done at large scale and other important sectors in this area are agriculture, agricultural product processing, industrial and manufacturing. Natural resources make a significant and direct contribution to the Municipality's economy.

## OVERVIEW OF THE PROJECT

It is planned that Silica be mined by means of conventional opencast methods to a depth of between 30 and 50 m.b.g.l. The estimated life of mine (LOM) for the proposed Rietkol Project is 20 years. Further exploration drilling will be conducted during the operational phase, which may increase the LOM and mining depth if the resource proves to be viable.

The main reason for this MRA is for the supply of silica sand to various markets, including the glass, foundry and filtration industries in the Gauteng and Mpumalanga regions. In conjunction with this many other local industries rely on various grades of silica sand to manufacture their products. The main products that are envisaged to be sold are River Sand, Amber Sand, Flint Sand, Chemical Sand and Filter Sand

A brief summary on the strategic importance of the proposed Rietkol mining project is:

- Currently Consol, PFG Building Glass Company and Nampak all rely on Thabo Chueu Mining (TCM) as the only source of low iron flint grade silica sand.
- Rietkol is the only known alternative low iron deposit that is situated within a radius to the Consol/PFG/Nampak which would make it an economically viable alternative to TCM.
- The three companies employ in excess of 5 000 people in the glass manufacturing section according to the three Annual Reports.

Roughly 95% of the products will be distributed within the Gauteng and other northern regions while the remaining 5% is destined for the remainder of South Africa and surrounding African countries. Based on the current market structure approximately 70% of the mined material would be supplied to the glass industry.

The approach and contribution of this study to the Environmental Impact Assessment (EIA) study is to determine the current land use and economic activities and then to compare the current situation to the possible impact of the proposed mining of silica. In the process it is necessary to determine the possible negative economic impact of the proposed mine on the local agriculture, especially the AHs and farm portions within a 1 km area surrounding the MRA area and then to establish the economic feasibility of the proposed mine by means of a Cost Benefit Analysis (CBA).

## DEVELOPMENT ALTERNATIVES

At a broad level, investigating impacts on overall welfare requires considering the efficiency, equity and sustainability of the project. Keeping these principles in mind, the core concept applied by the economist when considering trade-offs is “opportunity cost” - the net benefit that would have been yielded by the next best alternative. This is the net benefit that would have been yielded by the next best alternative (for example, whether farming is the next best alternative for a piece of land, then the foregone benefit associated with it will be the opportunity cost of any other land use). A contributing factor in the evaluation of this project is that the proposed mine and the product delivered will not generate new operational activities for the involved companies but only sustain current production as the current sand ore producing mines are running out of stock. It will generate new business activities in the Rietkol area, but this is only a replacement for the activities for the current producing mine where the silica sand stocks are running low. It is vital information when decision makers are to understand the trade-offs involved in projects. A key part of considering opportunity costs is commonly to highlight the impacts of doing nothing i.e., the “no-go alternative”, also referred to as the “economic baseline” or the “zero line”. The economic baseline is then established and is used to evaluate possible positive or negative impacts by the proposed mine on the

current activities. It must be emphasized that in effect the economic baseline includes macro- and socio-economic, social and environmental issues.

## **SCOPE OF WORK**

The scope of work includes the possible negative Socio-Economic Impact of the mine on the local activities as well as the positive impacts of the mine on the provincial and national economies. The economic feasibility of the mine is also determined.

The proposed mine will be established in an area with a large number of smallholdings as well as a number of very active agricultural and business activities that is not welcoming the proposed mine.

## **PROPOSED RIETKOL MINE ECONOMIC ASSESSMENT**

The objective of this part of the study is to determine the macro-economic impacts of both the construction and operation of the silica mining processes to be conducted. The study reflects the total direct and indirect macro-economic impacts in quantified terms for the investment that will be generated through the inputs from all of the economic entities that are required to supply goods and services to the construction and operational segments of the project. In addition, quantification is made of the induced effects that the infrastructural investments will have on economic entities such as households, in terms of their income and expenditure activities.

The economic and socio-economic aggregates covered in the study are the following:

- Employment levels (jobs).
- Value added to the economy (or gross regional [Mpumalanga Province] product).
- Aggregate wages and salaries.
- Fiscal impacts.

Each of these measures reflects a dimension of improvement or impact in the economic well-being of the area's households.

### **Employment Creation**

It is envisaged that the Rietkol Project will employ 100 people at full production (year 3) and that approximately 40 - 50 workers be employed by support consultants (MWP, 2019). The nature of the mining operations requires employees that are skilled to operate in a safe and effective manner.

### **Development**

Human Resource Development Programme (HRDP), complying with the Mining Charter targets, will be implemented once in operation.

## **POTENTIAL ECONOMIC IMPACT OF THE RIETKOL PROJECT**

Any new capital investment always has a positive impact on the economy, national and provincial. In the case of the proposed silica mine and the location of the mine it was decided to only calculate the impact on the National Economy as most of the capital expenditure will be spend in Gauteng with also the impact in Gauteng.

## OPERATIONAL IMPACT

In evaluating the results of the operational phase, it is important to take into consideration that although this is a new mine it is actually only replacing another mine running out of silica stock. This is therefore not a set of completely new socio-economic results, but the operational maintenance of the users of the product. The following table presents the results of an operational year at maximum production of the production period of the proposed mine as calculated by applying the 2018 updated Mpumalanga Provincial Social Accounting Matrix (SAM) to 2020 prices.

	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Impact on Gross Domestic Product (GDP) [R million]	R 35.8	R 28.5	R 10.3	R 74.6
Impact on capital formation [R million]	R 68.8	R 48.8	R 36.5	R 154.1
Impact on employment [number of job opportunities]	100	54	51	205
- Skilled number of job opportunities	36	10	18	64
- Semi-skilled number of job opportunities	37	21	17	75
- Unskilled number of job opportunities]	27	23	16	66
Impact on Households [R million]				R 46.4
- Low Income Households [R million]				R 13.4
- Medium Income Households [R million]				R 8.2
- High Income Households [R million]				R 24.9
Fiscal Impact (R Million)				R 26.4
<i>National Government (R Million)</i>				R 24.5
<i>Provincial Government (R Million)</i>				R 0.3
<i>Local Government (R Million)</i>				R 1.6

### GDP Impact

The direct impact generated during the Year is estimated at R 35.8 million with the total GDP at R 74.5 million in 2017 prices.

### Operational Capital Formation

According to the results table the direct operational capital will be around R 68.8 million supplemented by the indirect component of R 48.8 million and the induced element of R 36.5 million providing a total of R 154.0 million.

### Employment Created

The direct employment of the mining company and service providers is 100, 54 are indirect and 51 induced opportunities providing a total of 205 opportunities. This is a 2.1 growth factor in terms of the direct jobs to the total opportunities created.

### Impact on Households

The total annual payments to households, including management fees and the indirect and induced labour, is estimated at R 46.4 million per annum with R 13.4 million (28.8%) to low-income households.

## Fiscal Impact

The total taxes paid are estimated at R 26.4 million with R 24.5 to the central Fiscus.

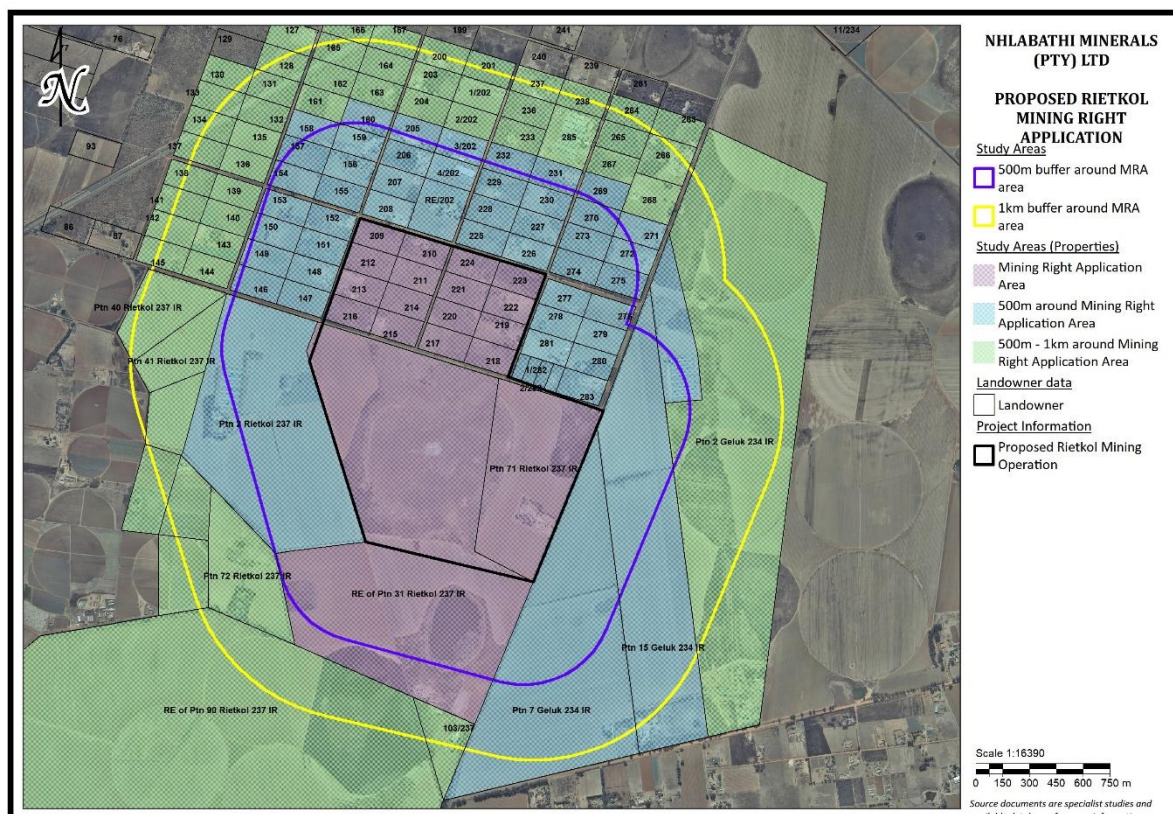
## CURRENT LAND USE MEASURED IN ECONOMIC TERMS

### STUDY ZONES

The current agricultural land use, the social economic data and the environmental data were sourced from the field research and site visits undertaken by Mosaka Economic Consultants cc, Diphororo Development (Pty) Ltd. and the various other specialist teams who visited the study area.

In order to define the area to be included in the economic study, Mosaka Economists used the area as divided into three sub-areas (see Figure below) in which to focus the study:

- **MRA Area Zone 1.** The MRA area of the Rietkol Mining Project comprising of 16 AHs and Rietkol 237 IR (northern part of portion RE/31/237). It is noted that the mining and infrastructure for the first 20-year LOM is confined to the AHs and that the farm Rietkol will not be directly affected. Some of the area will be purchased from the landowners by Consol Glass and the current farming activities on some of the land will cease. The existing rural residences will either be used by the mine for office or staff ablution facilities or be demolished.
- **Zone 2 Area.** A 500m demarcated area surrounding the MRA area of the Rietkol Project that may be impacted upon. In this area primary data collection was undertaken to calculate the economic impact of the proposed project.
- **Zone 3 Area:** A 500m to 1km demarcated area surrounding the MRA area of the Rietkol Project excluding Zone 2 that may be impacted upon. In this area primary data collection was undertaken to calculate the economic impact of the proposed project.



## **DATA COLLECTION**

The area subjected to and immediately adjacent to the mining development in the Rietkol Project MRA area that might be directly impacted upon was visited or contacted. Selected landowners or their representatives within the MRA area were visited. The information obtained by the different specialist teams that visited the area was also made available to Mosaka.

Additional information gathering of other areas and activities which impacted on the proposed Rietkol project was collected by means of secondary collection methods. The Social and Labour Plan (SLP), together with the necessary capital and operational income and expenditure (business plan) data for the mining operation on a timeline, was sourced from the Rietkol Mining Work Programme (MWP, 2019).

## **ECONOMIC BASELINE ASSESSMENT**

The current activities were identified, and the monetary value of the different activities estimated in the project area in 2020 prices. This is then converted to three macro-economic indicators which is used to estimate the projected possible impact of the proposed mine.

A Macro-Economic Impact Model (MEIM) is used to convert the monetary values of the different activities to macro-economic indicators. The MEIM is based on the Mpumalanga SAM, which has been converted to an econometric model to be used in the project area. The MEIM was adapted to accommodate each of the identified project areas and was then populated with the baseline data.

## **CONSIDERATION OF SPECIALIST STUDIES**

The specialist impact assessments that have a potential direct impact on the health, well-being and economic livelihoods of the sensitive receptors in the area were considered during the sensitivity mapping exercise, namely the air quality, ambient noise, blasting and groundwater impact assessments.

The criteria used for the sensitivity mapping were determined in conjunction with the various specialists and are based on the following:

- Legal requirements and applicable standards and/or guidelines;
- Impact modelling results as presented in the specialist reports;
- Recommendations made by the specialists in respect of mitigation; and
- Experience of the specialists involved.

In respect of air quality and noise the worst case was assumed, i.e., without the implementation of any mitigation measures. For blasting it was assumed that the revised blasting design recommended in the specialist report will be implemented and refined as monitoring data becomes available.

## **ECONOMIC RISK ASSESSMENT**

In statistics, relative risk or risk ratio (RR) is the ratio of the probability of an event occurring (for example, developing a disease, being injured) in an exposed group to the probability of the event occurring in a comparative non-exposed group. In economics it is interpreted as the deviation from the current baseline of activities. Therefore in the interpretation of a risk value it is important to remember that the event might not occur at all. An x percent risk value only means that a possibility exists that an activity might be impacted. It might happen in the first year, or in year 20 or not at all.

A risk profile was developed for each of the zones making provision for a weight allocated to a specific intrusion caused by the mining activity. A percentage impact is then allocated to each economic

activity, which is then multiplied with the weight; the answer is converted to a percentage impact. The percentage impact is then applied to the estimated annual turnover to arrive at the negative impact to be caused by the mining activity as shown in the next table presenting “hypothetical” data (example data).

Zone	Annual Turnover Rand million	Weighted Risk Rate	Annual Risk Rand Million	Annual Occurrence Once per Year
Zone 1	R1.15	1.7%	R0.02	1 in 59 years
Zone 2	R193.52	4.3%	R8.22	1 in 24 years
Zone 3	R43.82	1.8%	R0.79	1 in 56 years
<b>Total</b>	<b>R238.49</b>	<b>3.79%</b>	<b>R9.03</b>	

## REGIONAL OVERVIEW

The Modder East AHs on the farm Olifantsfontein cover a substantial area with plots varying from 4 to 28 ha. The land use on these AHs is very disparate, covering intensive horticultural enterprises (rose and cut flower cultivation), dry land crop production, commercial businesses (such as panel beaters, construction contractors and a guest house), residential, horse training (equestrian centre), etc. The surrounding area includes irrigation and dry land farming, horticulture and large poultry enterprises. Groundwater pivot irrigation is common.

## AGRICULTURE

The rural area(s) of the Victor Khanye Local Municipality predominantly consists of extensive commercial farming. The municipal area is a major maize producing area, with an annual maize production calculated at between 230 000 and 250 000 metric tons. These areas are primarily extensive residential with non-conforming land uses. As the Delmas area is a “high potential” agricultural area, it is important that agricultural land must be protected against urban sprawl and mining activity, etc.

### Poultry

Poultry enterprises are present in the area. Egg producers market their products in the eMalahleni and East Rand, Gauteng area. Here too good quality water for the layers is a pre-requisite for poultry health.

### Cultivated Agriculture

In the wider area extensive maize and soya bean fields (both dry land and irrigated) are present. Vegetable production (dry land, irrigated and tunnel) was also observed together with feedlots.

The next table presents the current agricultural and other activities in the area around the proposed mine divided into three zones:

- Zone 1 – MRA;
- Zone 2 – < 500m from the MRA;
- Zone 3 - < 1km from the MRA.

If a section of a production area falls outside the specific zone the total area is included in the zone.

Activity	Zone 1 (ha)	Zone 2 (ha)	Zone 3 (ha)	Total (ha)
Maize	33,04	154,65	619,75	807,44
Soya	16,52	77,33	309,87	403,72
Floriculture - Roses		7,97	-	7,97
Beef (Grazing)	98,5	107,647	164,85	370,997
Teff/Hay/Russian Grass		15,61	27,92	43,53
Cactus Pears		6,88	7,24	14,12
Pecan Nuts	3,5		-	3,5
Egg Packhouse	4,04			4,04
Poultry - Broilers		-	6,34	6,34
Floriculture - Cut Flowers			4,24	4,24
Combined Private Investigations (CPI)		12,14		12,14
Dr Greeff – House Rental		0,44		0,44
Dr Greeff – Pig Feed Experimental Unit		3,6		3,6
MBFi		8,09	12,14	20,23
Other natural areas (wetlands)	45,64	27,89	36,9	110,43
<b>Total</b>	<b>201,24</b>	<b>422,25</b>	<b>1189,25</b>	<b>1 812,74</b>

The project area consists of close to 69% allocated to cultivation and crop production (Maize, Soya and Dry Beans, Teff and Russian Grass, Cactus Pears, Floriculture and Pecan Nuts) and 21% to grazing.

### Horticulture

Hydroponics is well established in the area. The area is well situated for the local markets in Johannesburg, East Rand and Pretoria and for export by air via OR Tambo International Airport.

### MINING

Mining activities are concentrated mainly on coal and about 3 million metric tons of coal are mined annually in the municipal area. The main mining areas are around Delmas in the centre of the municipal area, and also in the far north-eastern corner of the municipal area.

### BUSINESS ACTIVITIES

The developed urban areas (and business concentrations) are Delmas, Botleng and Eloff, of which Delmas functions as the primary node. The urban areas are mainly residential with supportive services such as business, social facilities, etc.

### AGRICULTURE AND BUSINESS ACTIVITIES IN THE DIFFERENT ZONES

The MRA area has very little agricultural activity, only a relatively small dry land maize and soya bean fields and a young pecan nut orchard. Some of the AHs are residential with very little agricultural activities while on others the owners make a living from the proceeds of the land.

A large egg packhouse is also operational in the MRA employing a large number of staff and are packing around 60 000 dozen of eggs daily.

The general land use in the Zone 2 areas differs substantially from that in the MRA area. The land use in this zone is more extensive and includes horticulture, houses, commercial activities, informal



settlements and livestock. The commercial activities are Combined Private Investigations (CPI) and the four rental houses and a pig experimental unit.

The land use in Zone 3 is more extensive and includes pivot irrigation, horticulture, poultry broiler units, animal feed mill, houses and livestock. The area is generally rich in groundwater and subsequently boasts several irrigation fields producing maize, soya and vegetables. In Zone 3 MBFi is also operational and is a research and business group which are aimed at the enhancing of research and development of biological technology to help productivity of crops in South Africa and around the world.

With the good rainfall in the area dry land farming, mainly maize and soya beans, are successful crops.

The following table presents the activities in the three zones as macro-economic parameters. As a confidentiality assurance was given to all the business activities no detail is provided.

Zone	Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household Income	High & Middle Income	Low Income
	Rand million	Rand million	Rand million	Number	Number	Number	Rand million	Rand million	Rand million
Zone 1-MRA	20,488	19,7851	40,2731	79	66	145	19,689	11,8711	7,8179
Zone 2	64,045	51,634	115,679	201	142	343	33,627	24,864	8,763
Zone 3	36,855	51,594	88,449	145	142	287	30,445	22,177	8,268
<b>Total</b>	<b>121,388</b>	<b>123,0131</b>	<b>244,4011</b>	<b>425</b>	<b>350</b>	<b>775</b>	<b>83,761</b>	<b>58,9121</b>	<b>24,8489</b>

The direct annual GDP is estimated at R 121.388 million with a total of R 244.4011 million if the ripple impact is taken into consideration. The total employment number is estimated 775 jobs of which 425 is direct employment and 350 indirect and induced. The main labour-intensive activities are poultry, egg packhouse, roses and cut flower production.

Total salaries and management fees paid to households, not only those working on the farms but also the indirect and induced labour, are estimated at R 83.761 million with R 24.8489 million to low-income households.

From the above tables it is obvious that current agricultural and other activities provide a large number of direct jobs as well as a healthy income to households.

## RISK ANALYSIS

A detailed Risk Analysis was performed on each Zone and the projected negative impact per annum were estimated, but in the evaluation process it was decided to perform the **worst-case scenario**. The total estimated income of the current agriculture production and business activities are presented in the next table.

Zone	Annual Turnover	Estimated Risk	Estimated Risk
	Rand million	Percentage	Rand million
Zone 1-MRA	R 41,76	-1,74%	R -0,725
Zone 2	R 105,575	-8,31%	R -8,773
Zone 3	R 88,993	-1,03%	R -0,917
<b>Total</b>	<b>R 236,328</b>		<b>R 10,415</b>

The Risk in the MRA appears very large but it because of the very high possibility that the pecan nut production will be terminated and the beef grazing area will be reduced by around 40 hectares. In Zone 2 the activities identified which could be exposed to a risk are Unex Roses, Combined Private Investigations (CPI) and Dr Jacobus Greeff with the rental houses and pig feed experimental unit. The monetary amount of R10.415 million is used in the Economic Cost Benefit Analysis (ECBA) as a “cost” item, it is not a financial value but an economic value and also the worst-case scenario. The following table presents the estimated negative impact on socio-economic parameters.

Zone	Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household Income	High & Middle Income	Low Income
	Rand million	Rand million	Rand million	Number	Number	Number	Rand million	Rand million	Rand million
Zone 1-MRA	-0,385	-0,369	-0,754	-1	-2	-3	-0,404	-0,284	-0,120
Zone 2	-4,908	-3,824	-8,733	-19	-13	-32	-2,713	-2,002	-0,710
Zone 3	-0,415	-0,381	-0,796	-0	-2	-2	-0,441	-0,310	-0,132
<b>Total</b>	<b>-5,708</b>	<b>-4,574</b>	<b>-10,282</b>	<b>-20</b>	<b>-17</b>	<b>-37</b>	<b>-3,558</b>	<b>-2,596</b>	<b>-0,962</b>

Based on a worst-case scenario, where impacts cannot be mitigated, there is a potential risk that as many as 20 direct jobs could be lost with a further 17 indirect and induced providing a total of 37. A negative R 5.708 million reduction in direct GDP with a total R 10.28 million. The possible loss income to low-income households is estimated at R 0.962 million per annum with a possible annual total loss of R 3.558 million.

The following table show the results of the current activities, the possible negative impact and the positive impacts of the mine.

	Current Agriculture and Businesses	Mining	Net Benefit from the mining activity	Future Total Activities
	Current	Estimated Loss	Projected	
<b>Direct GDP</b>	R 121.388 mil.	R 5.708 mil.	R 35.8 mil.	R 30.092mil.
<b>Direct Employment</b>	425	20	100	80
<b>Low Household Income</b>	R 24.8489mil.	R 0.962mil.	R 13.40	R 12.438 mil.
				R 37.2869 mil.

The above table show that although the mine will have a possible limited negative impact on the economy in the area the overall impact will be positive. The total future direct GDP will increase from R 121.388 million to R 151.48 million.

The number of direct employment opportunities will increase from 425 to 505 and the wages paid to low-income households from R 24.8489 million annually to R 37.2869 million

## COST BENEFIT ANALYSIS (CBA)

A financial and economic price Cost Benefit Analysis was performed on the total financial and economic prices and costs. To accept a specific Cost Benefit Analysis (CBA) as positive the following parameters must all be above the minimum value:

- Net Present Value (NPV) must be positive;
- Financial CBA - Internal Rate of Return (IRR) > 11.28%, the discount rate;
- Economic CBA – Internal Rate of Return (IRR) > 8%, the discount rate.
- Benefit Cost Ratio (BCR) >1.

The following table shows the prices used in the CBA as well as the estimated volumes for year 1 at the different prices.

A three-price scenario were applied in the CBA model, the “Low Price” and “Median Price” and “High Price” to determine the feasibility of the mine.

Model Type	FCBA <sup>1</sup>	ECBA <sup>2</sup>	FCBA	ECBA	FCBA	ECBA
Price	Low	Low	Medium	Medium	High	High
Discount Rate	11.28%	8%	11.28%	8%	11.28%	8%
<b>Net Present Value (Rand mil.)</b>	<b>-R 86,84</b>	<b>-R 150,39</b>	R 73,93	R 17,85	R 154,90	R 71,03
<b>Benefit Cost Ratio</b>	<b>0,59</b>	<b>0,13</b>	1,69	1,13	2,25	1,53
<b>Internal Rate of Return</b>	<b>3,62%</b>	<b>-4,1%</b>	17,91%	9,4%	26,19%	13,76%

The table shows that for the “low prices” both models show negative answers, while the “medium” and “high” price structure indicate positive answers. It can therefore be stated that the mining proposal is financially and economically viable for the medium and high price structure.

In the MWP (2019) it was stated that Consol will be taking up between 90% and 95% of the silica ore used for glass production. In the risk analysis a situation was analysed where it is accepted that Consol could be in a position to add to the “low” price of the silica ore to ensure that the mine is viable.

The models were run again for the “low price” option with a 20% increase for the “glass sand”, R46 per ton extra. The results are presented in following table.

Model Type	FCBA	ECBA
Price	Low	Low
Discount Rate	11.28%	8%
<b>Net Present Value (Rand mil.)</b>	R 113.96	R 35.51
<b>Benefit Ration</b>	1.96	1.27
<b>Internal Rate of Return</b>	21.89%	10.8%

The table show that with R46 per ton added to the “Low Price”, the CBA results for both models turn positive.

The conclusion is that in terms of the CBA, the results indicate a feasible mine but will need detailed management to be a successful operation.

<sup>1</sup> FCBA – Financial Cost Benefit Analysis

<sup>2</sup> ECBA – Economic Cost Benefit Analysis

## SUMMARY and CONCLUSION

The area is an important agricultural producing area with intensive horticulture and poultry enterprises within the buffer area in which the concerns of the affected and interested parties are identified. Several other business activities are also active and contribute to economy. The area has several AHs, some of which are not commercially very productive. Furthermore, the area is rich with underground water and irrigation pivots are a common sight.

Although the proposed mine will impact negatively on the current land and business activities the net result is a positive improvement in benefits. Job opportunities will increase by 80 and an additional R 12.438 million will be paid annually to low-income households expressed in 2020 prices.

The current land users are not the only parties that have an interest in the final decision, but also the users of the glass sand. As already explained Consol Glass is currently receiving quantities of glass sand from an existing mine in the Delmas area where the available product will be in short supply in the next decade. As also explained about 30% of the output of the three processing units in Gauteng at Wadeville, Clayville and Nigel, depend on Glass Sand. Although Consol use about 70% recycled glass it is still a reasonable possibility exists that about 550 people currently employed at the three furnaces will probably have to be laid off if additional glass sand quantities are no longer available.

The analysis of the economic feasibility of the proposed silica mine shows that there are certain risks for the enterprises in close proximity to the proposed mine as an alternative land use. The issue in the Rietkol Project is which one of the two resource economic activities is the better land use option. Mining is the non-renewable resource user, while the current land-use activities, depending on the quality of environmental management, are renewable resource activities. Currently the economic activities within the MRA area are limited and the mine will be an economic improvement. However, for the intensive horticulture, poultry and equestrian activities in the Buffer Area, the mine will pose a certain financial and economic risk which is presented in the relevant tables.

In the case of pecan nut production and the cattle grazing area in the proposed mine operational area it is accepted that they will have to relocate. In the case of egg packhouse a different situation is observed as the current site for the mine operations will for the next 15 to 20 years not impact the activities and they should be able to carry on with the current business activities.

The CPI Security Business and Dr Jacobus Greeff are operating from buildings just outside the MRA will be exposed to a risk to the two business operations. The cost of the risk associated with the mining to the buildings has been accommodated in the Cost Benefit Analysis and the projection is that they will experience some risk but should be able to carry on with the business operations.

Unex Roses is the activity which would probably be exposed to highest risk, especially the two tunnels quite close to the mining site and the mine management should ensure that a good working relationship be established with Unex Roses management.

For Rossgro Broilers and Goudhoek Boerperde, noise from blasting could be a problem that can be addressed by agreement with the involved managers to detonate at specific time schedules. Blasting could have an effect on the safety of competitors during equestrian events held at the equestrian centre.

The situation around MBFi is problematic in the sense that they did not provide any data. Their main buildings are just over 1 km from the mine sight and a possibility do exist that they could be exposed to some risk in the case of blasting.

It therefore becomes a choice between “the positive socio-economic impact of the new capital investment” and “the economic feasibility of the project together with the possible negative impact on the current land users”.

Another issue that causes some concern is the possible impact on property values in the area. The municipal evaluation roll shows a value of R500 000.00 per holding. According to information received from some of the owners a more common sale value was R400 000.00 per unit. Property prices is as a rule very difficult to project, but experience has shown that in the short-term values decline but tend to recover in the medium to longer term.

If all the proposed mitigation factors, as defined in the specialist reports, are implemented and adhered to it can be stated that the proposed mining project is economically feasible and will only have a “low risk” on the current activities. The positive economic contribution to the Mpumalanga and Gauteng economies is an additional positive factor. It is therefore possible to recommend the construction of the mine.

## TABLE OF CONTENTS

<b>1</b>	<b>Background .....</b>	<b>1</b>
1.1	Structure of the Report.....	1
1.2	Locality .....	2
1.3	Overview of the Project .....	3
1.4	Development Alternatives .....	4
1.5	Scope of Work.....	6
1.6	Assumptions.....	7
<b>2</b>	<b>PROPOSED RIETKOL MINE ECONOMIC ASSESSMENT.....</b>	<b>8</b>
2.1	Introduction .....	8
2.2	Methodology and Approach .....	8
2.3	Project Description.....	10
2.3.1	Proposed Mine Infrastructure .....	10
2.3.2	Mining Operation.....	10
2.3.3	Power Supply to the Mine .....	12
2.3.4	Water Supply to the Mine.....	12
2.3.5	Access Roads .....	12
2.3.6	Closure Planning and Rehabilitation.....	13
2.3.7	Employment Creation .....	14
2.3.8	Development Programmes .....	14
2.4	Potential Economic Impact of Rietkol Project .....	15
2.4.1	Construction Impact.....	15
2.4.2	Operational Impact .....	17
<b>3</b>	<b>CURRENT LAND USE MEASURED IN ECONOMIC TERMS.....</b>	<b>21</b>
3.1	Approach and Methodology .....	21
3.1.1	Study Zones.....	21
3.1.2	Data Collection.....	23
3.1.3	Area Estimation.....	25
3.1.4	Economic Baseline Assessment .....	25
3.1.5	Public Participation and Stakeholder Concerns.....	27
3.1.6	Consideration of Specialist Studies and Sensitivity Mapping .....	28
3.2	Economic Risk Assessment .....	34
3.2.1	Possible Mining Impact on Current Agriculture and Business Activities .....	34
3.2.2	Macro-Economic Impact Assessment.....	39
3.3	Regional Overview .....	42

3.3.1	Agriculture.....	43
3.3.2	Mining .....	44
3.3.3	Industries .....	45
3.3.4	Business Activities.....	45
3.4	Economic Assessment on Current Activities.....	45
3.4.1	Activities in the MRA Area .....	45
3.4.2	Zone 2: Within 500m from the MRA Boundary .....	53
3.4.3	Zone 3: Between 500m and 1km from the MRA Boundary.....	66
3.5	Summary of Current Activities.....	81
3.5.1	Current Economic Assessment .....	81
3.5.2	Impact Assessment .....	82
3.5.3	Socio-Economic Impact of the proposed mine .....	82
3.5.4	Economic Impact used in the Economic CBA.....	83
<b>4</b>	<b>COST BENEFIT ANALYSIS .....</b>	<b>84</b>
4.1	Approach & Methodology .....	84
4.1.1	Purpose of the CBA .....	84
4.1.2	Objective of the Cost Benefit Analysis .....	85
4.1.3	Cost Benefit Analysis Methodology .....	85
4.1.4	Assumptions Underlying the Cost Benefit Analysis .....	86
4.2	Costs and Benefits.....	86
4.2.1	Estimated Capital Expenditure.....	86
4.2.2	Operational Costs.....	87
4.2.3	Mining Method’s Impact on Operating Cost .....	88
4.2.4	Salary and Wages .....	89
4.2.5	Other Costs .....	90
4.2.6	Externality Costs.....	92
4.2.7	Projected Revenue .....	92
4.2.8	Revenue Stream used in the CBA Model .....	94
4.2.9	CBA Results .....	94
<b>5</b>	<b>CONCLUSION .....</b>	<b>96</b>
<b>6</b>	<b>REFERENCES .....</b>	<b>98</b>

## TABLES

Table 2-1: Financial Provision for the Social and Labour Plan (2020 prices) .....	15
Table 2-2: Annual Socio- and Macro-Economic Impacts of the Construction Phase of the Rietkol Project .....	16
Table 2-3: Socio- and Macro-Economic Impact Assessment of the Operational Phase of the Rietkol Project.....	18
Table 3-1: Agricultural Production and Business Activities in the three Zones.....	21
Table 3-2: Built-up Area in the three Zones.....	22
Table 3-3: Multipliers and Turnover .....	26
Table 3-4: Criteria used for socio-economic risk classification of properties within impact zone .....	33
Table 3-5: Quantitative rating and equivalent descriptors for the impact assessment criteria.....	36
Table 3-6: Description of the significance rating scale .....	37
Table 3-7: Description of the significance spatial scale .....	38
Table 3-8 Description of the temporal rating scale .....	38
Table 3-9: Description of the degree of probability of an impact occurring.....	39
Table 3-10: Indication of Methodology Applied .....	40
Table 3-11: Impact Scale .....	40
Table 3-12: Hypothetical Weighted Risks per Zone and Estimated Value of Agricultural Value (2020 prices).....	41
Table 3-13: Pre-Mining Land Use in MRA Area.....	46
Table 3-14: The Estimated Built-up Area in the Zone 1 (MRA).....	46
Table 3-15: Annual Turnover in the MRA (2020 prices) .....	46
Table 3-16: Annual Turnover Macro-Economic Impact Parameters – (2020 prices) .....	47
Table 3-17: Risk Rating of individual Smallholdings in the MRA.....	48
Table 3-18: Estimated Impact in the MRA due to the construction of the Mine .....	53
Table 3-19: Pre-Mining Land Use in the Zone 2 Area .....	54
Table 3-20: The Estimated Built-up Area in Zone 2. ....	54
Table 3-21: Estimated Baseline Agricultural Production and Business Activity in Zone 2 (2020 prices) .....	58
Table 3-22: Annual Baseline GDP, Salaries and Wages paid to Households and Labour in Zone 2 – 500m .....	58
Table 3-23 - Property risk classification – 500m buffer around the MRA area .....	61
Table 3-24: Estimated Impact in Zone 2 (500m).....	66
Table 3-25: Pre-Mining Land Use in the Zone 3 Area .....	67
Table 3-26: The Estimated Built-up Area in the Different Zones.....	67
Table 3-27: Estimated Baseline Production in Zone 3 (1km) (2020 prices) .....	72
Table 3-28: Baseline GDP, Salaries and Wages paid to Households and Labour in Zone 3 – 1km .....	72
Table 3-29: Zone 3 Holdings in the 1km Radius.....	73
Table 3-30: Estimated Impact in Zone 3 (1km) .....	80
Table 3-31: The Socio-Economic Parameters for the Total Area (2020 Prices).....	81
Table 3-32: Possible Negative Impact of the Proposed Mine (2020 prices) .....	82
Table 3-33: Estimated Benefits associated with the operational phase of the proposed mine.....	82
Table 3-34: Annual Turnover and Risk Monetary Amount (2020 prices) .....	83
Table 4-1: Initial Capital Expenditure 9.....	86
Table 4-2: On-Going Expenditure (updated 2020 prices) .....	87
Table 4-3: Operating Cost Forecast (Excluding the Processing Plant and Labour) (updated 2020 prices) .....	87



Table 4-4: Processing Plant Operating Cost Forecast (updated 2020 prices).....	88
Table 4-5: Service Providers for the First Five Operational Years (Updated 2020 prices).....	89
Table 4-6: Salaries and Wages (2020 constant prices) .....	90
Table 4-7: Estimated Rehabilitation Costs .....	90
Table 4-8: Regulatory Costs – (Updated 2020 prices).....	91
Table 4-9: Social and Labour Plan Financial Assistance – (Updated 2020 prices) .....	91
Table 4-10: Projected Mining Products (tonnes) .....	93
Table 4-11: Product Price Forecast .....	94
Table 4-12: Annual Revenue estimated with the different product prices .....	94
Table 4-13:: CBA Results for the Financial and Economic Models.....	95
Table 4-14: CBA Results – Low Price 20% Increase.....	95
Table 5-1: Possible Negative Impact of the proposed mine on Agriculture Production and Business Activities.....	96
Table 5-2: Estimated Benefits Associated with the Operational Phase of the Proposed Mine .....	96
Table 6-1: Comparison of Financial and Economic Costs Benefit Analysis.....	103

## FIGURES

Figure 1-1: Regional Locality of the Project .....	2
Figure 1-2: Mining Right Application Area .....	3
Figure 1-3: Efficiency, Equity and Sustainability Trade-offs Based on Opportunity Costs .....	5
Figure 2-1: Proposed Mine Layout.....	11
Figure 2-2: Proposed Transport Route.....	13
Figure 2-3: Division of the GDP Generated.....	18
Figure 2-4: Division of Jobs Generated per Impact.....	19
Figure 2-5: Number of Jobs divided in the Relevant Skills.....	20
Figure 2-6: Distribution of Household Income.....	20
Figure 3-1: Rietkol Project Defined Zones .....	23
Figure 3-2: Groundwater sensitivity map .....	29
Figure 3-3: Air quality sensitivity map .....	30
Figure 3-4: Noise sensitivity map.....	31
Figure 3-5: Blasting sensitivity map .....	32
Figure 3-6: Cumulative (combined) sensitivity map .....	34
Figure 3-7: UNEX Roses - Source Google Earth Image 18 November 2017 .....	55
Figure 3-8: Pretorius Blomme South of the Proposed Mine .....	68
Figure 3-9: Broiler Production Unit East of the proposed Mine .....	69
Figure 3-10: Broiler Production Unit South West of the proposed Mine .....	70
Figure 3-11: Goudhoek SA Boerperd Stud .....	71

## ACRONYMS

AH	-	Agricultural Holding
CBA	-	Cost Benefit Analysis
DMRE	-	Department of Mineral Resources and Energy
EIA	-	Environmental Impact Assessment
EMPr	-	Environmental Management Programme
GDP	-	Gross Domestic Product
GVA	-	Gross Value Added
m.b.g.l.	-	Metres below ground level
MR	-	Mining Right
MRA	-	Mining Right Application
MWP	-	Mining Work Programme
RR	-	Risk Rating
RE	-	Risk Estimation
RoM	-	Run of Mine
SAM	-	Social Accounting Matrix
SEIA	-	Socio-Economic Impact Assessment
SLP	-	Social and Labour Plan

# 1 BACKGROUND

## 1.1 STRUCTURE OF THE REPORT

In the following subsections the structure of the report is presented with a short discussion.

### Chapter 1

Chapter 1 provides the background to the project, by presenting in the following sub-headings:

- Locality.
- Overview of the project.
- Explanation of the scope of work.

### Chapter 2 – Proposed Rietkol Mine Economic Assessment

The chapters consist of the following subsections:

- Introduction.
- Methodology and Approach. This section provides a detailed discussion.
- Project Description.
- Potential impact of the project.

### Chapter 3- Current Land Use Measured in Economic Terms

The following sub-sections in the chapter:

- Explanation of the approach and methodology used.
- Regional overview to provide the background to the approach.
- Economic Assessment of Current Activities and the possible risk to the current Activities.
- 

### Chapter 4 – Cost Benefit analysis

The theory of a CBA analysis is explained and the approach to the costs and revenue/benefits used in the analysis.

Three models are used:

- Constant Price Financial CBA – 8% discount rate;
- Current Price Financial CBA – 4.5% inflation and 11.28% discount rate.
- Economic CBA – 8% discount rate.

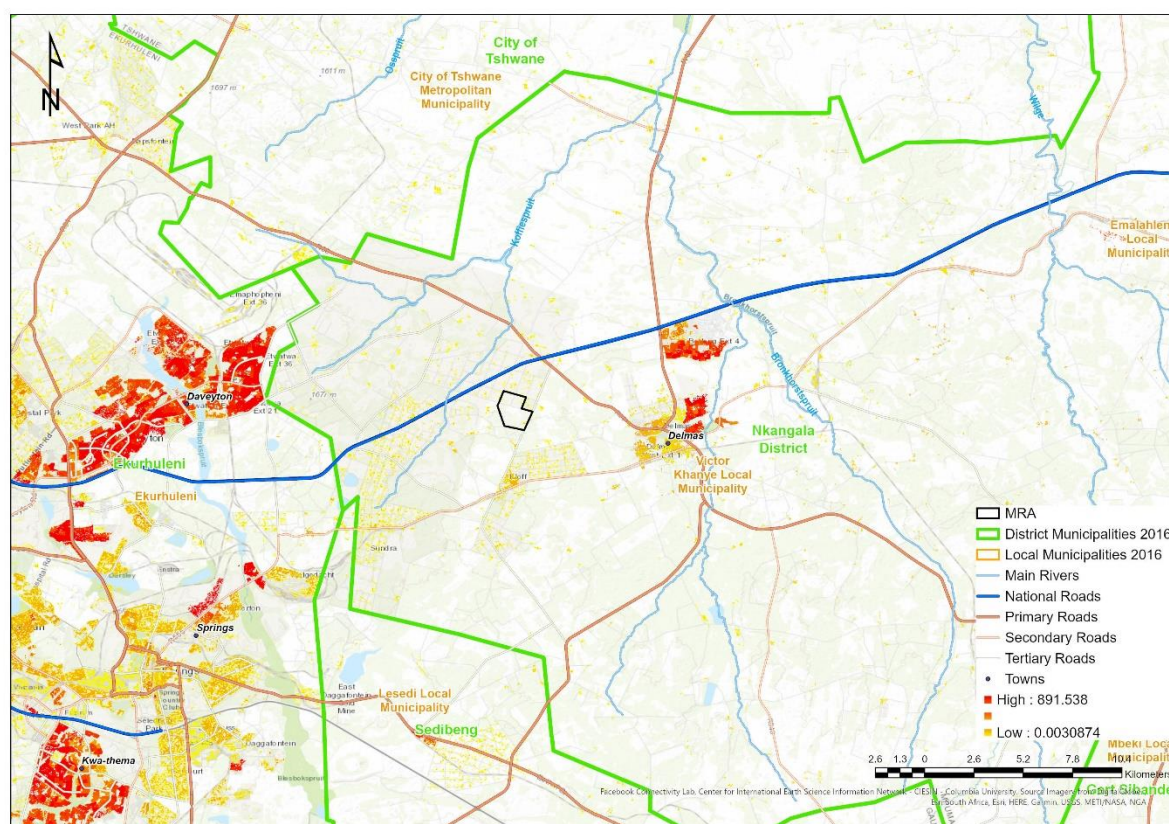
### Chapter 5 - Conclusion and Summary

A short summary and conclusions are discussed.

## 1.2 LOCALITY

Consol Glass (Pty) Limited (Consol) has recently reorganised its mining interests in terms of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act 28 of 2002). An application for a Mining Right to mine silica and associated minerals (clay, sand, etc.), at the Modder East Agricultural Holdings (AHs) and the farm Rietkol 237 IR, was submitted by Nhlabathi Minerals (Pty) Ltd to the Department of Mineral Resources and Energy (DMRE) in terms of section 22 of the MPRDA.

The Modder East AHs and the farm Rietkol 237 IR are located in Wards 8 and 9 of the Victor Khanye Local Municipality and Nkangala District Municipality, Mpumalanga Province. Major routes in the project area include the N12 (north-west), R50 (north-east) and R555 (south). See **Figure 1-1** below for locality.



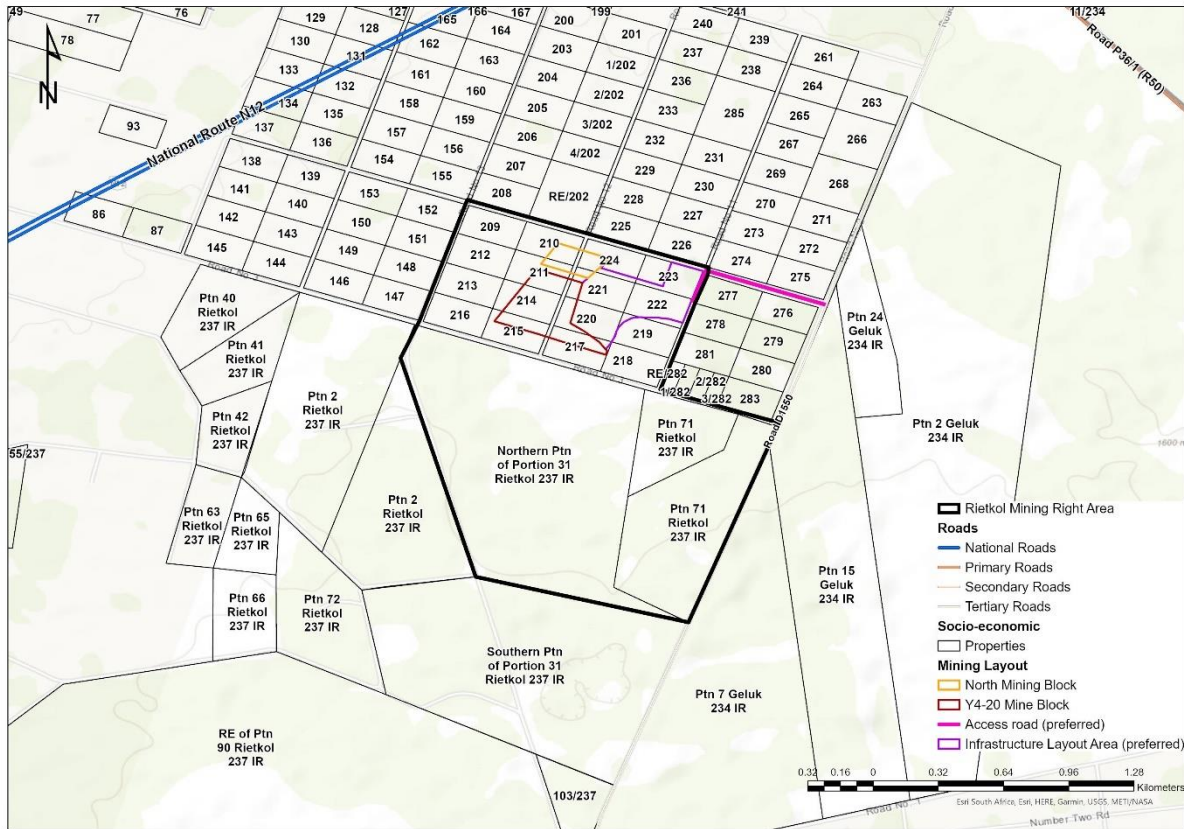
**Figure 1-1: Regional Locality of the Project<sup>3</sup>**

The Modder East AHs were originally regarded as rural residential areas with small-scale farming operations. This has changed with time with intensive agriculture production as well as other business activities taking place on some of the holdings.

The Mining Right Application (MRA) area is situated in a mixed land use area approximately 6 km west of the western boundary of the residential area of Delmas and Botleng and approximately 4 km north of the northern boundary of the residential area of the Eloff hamlet as indicated in **Figure 1-1** above.

<sup>3</sup> Map Source: Surveys and Land Information - 2628BA Delmas (Third Edition) 1995, 1:50 000.

The MRA area includes part of the Modder East Orchards AHs located on the farm Olifantsfontein 196 IR covering 16 AHs (each AH is approximately 4.0471 ha in extent) and portions of RE/31/237 and 71/237 on the farm Rietkol 237 IR covering an area of approximately 211 ha. See **Figure 1-2** below. It is noted that the mining and infrastructure for the first 20-year LOM is confined to the AHs and that the farm Rietkol will not be directly affected.



**Figure 1-2: Mining Right Application Area**

The Victor Khanye Local Municipality (LM) is currently characterised by an increase in coal mining and related activities, the mining of silica sand was also done at the Silica Quartz Mine but it closed its glass sand producing facilities due to quality and retrenched the employees. Other important sectors in this area are agriculture, agricultural product processing, industrial and manufacturing. Natural resources make a significant and direct contribution to the Municipality’s economy.

### 1.3 OVERVIEW OF THE PROJECT

It is planned that Silica be mined by means of conventional opencast methods to a depth of between 30 and 50 m.b.g.l. The estimated life of mine (LOM) for the proposed Rietkol Project is 20 years. Further exploration drilling will be conducted during the operational phase, which may increase the LOM and mining depth if the resource proves to be viable.

The main reason for this MRA is for the supply of silica sand to various markets, including the glass, foundry and filtration industries in the Gauteng and Mpumalanga regions. In conjunction with this many other local industries rely on various grades of silica sand to manufacture their products. The

main products that are envisaged to be sold are River Sand, Amber Sand, Flint Sand, Chemical Sand and Filter Sand

A brief summary on the strategic importance of the proposed Rietkol mining project is:

- Currently Consol, PFG Building Glass Company and Nampak all rely on TCM<sup>4</sup> as the only source of low iron flint grade silica sand, however the Thaba Chueu Mine is experiencing production issues and flint glass sand must currently be imported from the Western Cape. The remaining life of mine is estimated to be around 7 years at current offtake, and without allowing room for growth.
- Rietkol is the only known alternative low iron deposit that is situated within a radius to the Consol/PFG/Nampak which would make it an economically viable alternative to TCM.
- The three companies employ, according to the Annual Reports in excess of 5 000 people.

Roughly 95% of the Rietkol mining products will be distributed within the Gauteng and other northern regions while the remaining 5% is destined for the remainder of South Africa and surrounding African countries. Based on the current market structure approximately 70% of the mined material would be supplied to the glass industry.

The approach and contribution of this study to the Environmental Impact Assessment (EIA) study is to determine the current land use and economic activities and then to compare the current situation to the possible impact of the proposed mining of silica. In the process it is necessary to determine the possible negative economic impact of the proposed mine on the local agriculture, especially the AHs and farm portions within a 1 km area surrounding the MRA area and then to establish the feasibility of the proposed mine by means of a Cost Benefit Analysis (CBA).

## 1.4 DEVELOPMENT ALTERNATIVES

The approach was to utilise the collected site-specific data to determine the comparative feasibility of the project and the possible economic impact on local activities. A micro- and macro-economic study is aimed at determining the economic and socio-economic indicators to assist in identifying the best alternative land use option in a resource economic evaluation.

The basic function of this specialist study is to determine whether the Rietkol Project will enhance net societal welfare as it is using a non-renewable resource to stimulate economic growth.

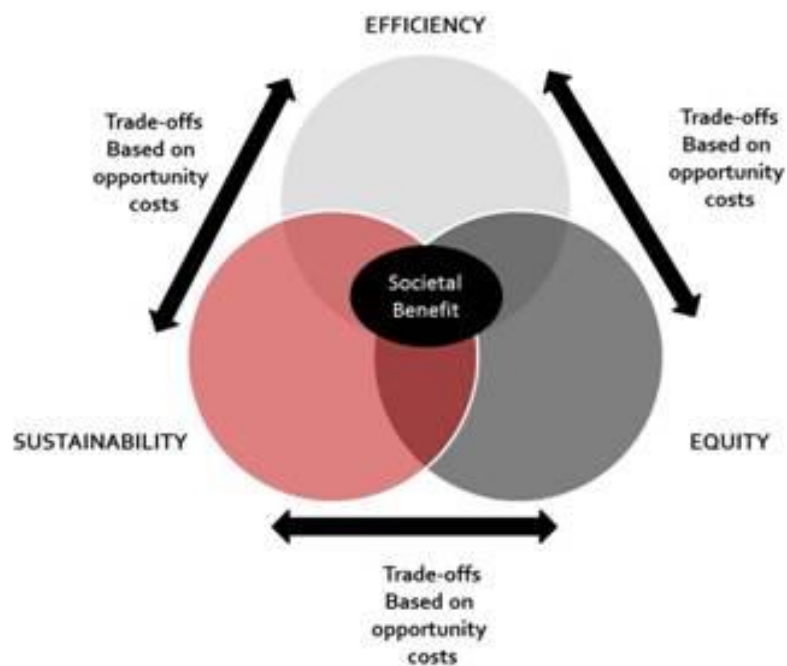
At a broad level, investigating impacts on overall welfare requires considering the efficiency, equity and sustainability of the project. Keeping these principles in mind, the core concept applied by the economist when considering trade-offs is “opportunity cost” - the net benefit that would have been yielded by the next best alternative. This is the net benefit that would have been yielded by the next best alternative (for example, whether farming is the next best alternative for a piece of land, then the foregone benefit associated with it will be the opportunity cost of any other land use). An additional factor in the evaluation of this project is that the proposed mine will not generate new operational activities for the involved companies but sustain current activities in the light of the problems experienced at TCM production and allow for some expansion as the market for glass-based

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<sup>4</sup> TCM - Thabo Chueu Mining

products are expecting to increase. It will generate new business activities in the Rietkol area, but this is only a replacement for the activities for the current producing mine that will eventually close down. It is vital information when decision makers are to understand the trade-offs involved in projects. A key part of considering opportunity costs is commonly to highlight the impacts of doing nothing i.e., the “no-go alternative”, also referred to as the “economic baseline” or the “zero line”. The economic baseline is then established and is used to evaluate possible positive or negative impacts by the proposed mine on the current activities. It must be emphasized that in effect the economic baseline includes macro- and socio-economic, social and environmental issues.

**Figure 1-3** below illustrates how efficiency, equity and sustainability combine to impact on societal welfare and how trade-offs need to be made between these issues, taking cognizance of opportunity costs.



**Figure 1-3: Efficiency, Equity and Sustainability Trade-offs Based on Opportunity Costs**

The principle of efficiency raises the issue of whether alternative forms of a project would constitute a more efficient use of resources.

The equity principle requires the consideration of whether the project results in outcomes that can be considered “fair”. Investigating the distribution of impacts is required to clearly indicate what is impacted on, in what way and for what period.

Sustainability related issues include a consideration of whether the project is likely to be economically viable over the long term and whether it will be ecologically sustainable. Risks to the long-term success of the project, including factors such as changing interest and exchange rates, become important here.

The economic study concentrates on the possible impact of the mining project on the MRA area and the associated infrastructure on the local community and economic activities, which includes the:

- Evaluation of economic trade-offs between agricultural (i.e., livestock and cultivated agriculture, where applicable) and mining land use activities.
- Evaluation of economic trade-offs between business and mining land use activities.
- Assessment of the influence of the planned development (i.e., resource use restrictions, and especially rights to use and benefit from resources) on the magnitude and adaptability of land use activities and livelihood systems.
- Assessment of the vulnerability of changed land use activities to the possible emergence of plant and animal diseases.

The key issues that are considered and addressed by the specialist can be summarised as follows:

- Environmental and social externalities that are not accounted for in financial costs and benefits but must be addressed in terms of economic costs and benefits.
- The economic sustainability of the project over the medium term.
- Degree of compatibility with economic development planning in the area.
- Linkage effects that allow a project to generate added benefits in the form of employment, incomes, increased production in local communities and small businesses.
- Macro-economic risks (i.e., whether the project has the potential to impact on exchange rates, balance of payments, interest rates or local factor and product prices).

An additional factor in this specific mining application is the dependency of Consol Glass on the supply of glass sand to carry on with production at the three production units in Gauteng. Consol was supplied by the one operating mine, also in the Delmas region, Silica Quartz Mine which recently closed its glass sand producing facilities due to quality and retrenched the employees.

A meeting was held with Mr. Bheki Khumalo, Chief Executive Officer of Silica Quartz (Pty) Ltd. and Mr. Thomas Shaw of Consol Glass (Pty) Ltd. on 30 May 2018 to clarify some aspects of the mining operation and the production and destination of the different minerals mined.

## 1.5 SCOPE OF WORK

The scope of work includes the possible positive and negative Socio-Economic Impact of the proposed mine on the local activities as well as the positive impacts of the mine on the provincial and national economies. The economic feasibility of the mine is also determined.

The Socio-Economic Impact Analysis includes:

- The possible impact on current economic activities, the population and the environment, by establishing the baseline of current activities to determine possible deviations from the baseline. This was performed in current monetary units and converted to economic parameters like Gross Domestic Product (GDP) and socio-economic parameters such as Employment and Payments to Households.
- The nature and magnitude of the possible economic impacts on the impacted current sector emanating from the proposed Rietkol Project was determined. As such a comparison of the impacts that the project will have on the agricultural sector were weighed against the positive economic development that the project will bring to the region, as is essential in projects of this nature.



The determination of whether the project is economically viable was determined by the uses of a Cost Benefit Analysis (CBA) econometric model.

- It was necessary to determine whether the benefits associated with the project actually outweigh the possible costs/negative impacts. This determination included the impact on the environment as well as on the social quality of life.
- If the project was found to be economically viable, the positive socio-economic parameters were estimated.

## 1.6 ASSUMPTIONS

A number of assumptions were applied during the study as shown in the following:

- The Mine Work Program April 2019 (MWP) as provided by the company was used in the analysis. The data was accepted as provided and used in the economic models.
- Results following from the analysis from other team member consultants were accepted and used in the analysis.
- The conclusions from the Jacana Rietkol Mine Poultry Report 5.8.21 was accepted and applied as such.

## 2 PROPOSED RIETKOL MINE ECONOMIC ASSESSMENT

### 2.1 INTRODUCTION

The focus of the economic impact analysis is micro and macro-economic, stressing linkages between the project and the remainder of the relevant economy. Environmental externalities may affect other economic sectors and are included in the tools of the macro-economic impact analysis. Also, the local, regional and national macro-economic impact is assessed.

### 2.2 METHODOLOGY AND APPROACH

The objective of this part of the study is to determine the socio-economic impacts of both the construction and operation of the silica mining processes to be conducted. The study reflects the total direct and indirect macro-economic impacts in quantified terms for the investment that will be generated through the inputs from all of the economic entities that are required to supply goods and services to the construction and operational segments of the project. In addition, quantification is made of the induced effects that the infrastructural investments will have on economic entities such as households, in terms of their income and expenditure activities.

According to the partial general economic equilibrium analysis, the impacts of the project's developments can only be evaluated meaningfully if such impacts are assessed against the background of its total effect (direct and indirect) on certain economic objectives. The updated and benchmarked 2020 Mpumalanga Provincial SAM tables were used as a modelling input to quantify the relevant economic impacts. Thus, both the investment and operational activities of the project were analysed in terms of its impacts.

The macro-economic impact analysis can be regarded as an extension of the more narrowly defined economic cost-benefit analysis, at the macro level and not at the project level, demonstrating the efficiency of utilising scarce capital and other economic resources. The macro-economic analysis is therefore used in conjunction with the micro project CBA to provide an indication of the project's use of scarce resources relative to the main economic objectives contained in the economic development plan.

The economic and socio-economic aggregates covered in the study are the following:

- Employment levels (jobs).
- Value added to the economy (or gross regional [Mpumalanga Province] product).
- Aggregate wages and salaries.
- Fiscal impacts.

Each of these measures reflects a dimension of improvement or impact in the economic well-being of the area's households.

There are different types of impacts that occur over time. In the initial construction phase, labour and materials will be used. After completion, on-going employment and other long-term impacts will result, as set out below:

- Total Employment Levels, reflecting the number of additional employment opportunities created by economic growth. This is the most popular measure of economic impact because

it is easy to comprehend. However, employment opportunity counts do not necessarily reflect the quality/nature of the employment opportunities, nor salary levels. Therefore, levels of employment, i.e., skilled/unskilled could also be assessed where necessary.

- Value Added, which is normally equivalent to Gross Domestic Product or Gross Regional Product, and a broader measure of the full income effect.
- Aggregate Wages and Salaries in the area increase as pay levels rise and/or additional employees are hired. Either or both conditions can occur as a result of growth in business revenues. If nearly all of those affected employees live in the study area, this is a reasonable measure of the personal income benefit impact of a project.

It is also important to note that economic impacts also lead to financial impacts, which are changes in government revenues and expenditures. Economic impacts on total business sales, wealth creation or personal income, can affect municipal and other government revenues by expanding or contracting the tax base. Impacts on employment and associated population levels can affect municipal and other government expenditures by changing demand for public services.

This on-going process of macro-economic impact analysis focuses on aspects stressing linkages between the project and the surrounding economy. Environmental externalities may affect other economic sectors and are, therefore, included in the techniques of macro-economic impact analysis. This is necessary to assist in determining whether the project will enhance net societal welfare.

This necessitates the analysis of impacts on different sectors or groups that make up society. At a broad level, investigating impacts on overall economic welfare requires considering the efficiency, equity and sustainability of the project. It is important that all three of these aspects are considered in order to provide adequate information to decision makers:

- The principle of efficiency raises the issue of whether the nature and form of the project would constitute the efficient use of resources.
- The equity principle requires the consideration of whether the project results in outcomes that can be considered fair/equitable in socio-economic terms. Investigating the distribution of impacts is required to clearly indicate who is impacted upon, in what way and for what period.
- Sustainability relates to the consideration of whether the project is likely to be financially viable over the medium to long term and whether it will be economically sustainable. Risks to the long-term success of the project, including factors such as changing interest and exchange rates, therefore, become important aspects for assessment.

A partial general macro-economic equilibrium model based on the SAM of the Gauteng and Mpumalanga Provinces are used to determine the nature and magnitude of the macro-economic impacts that emanate from the project in terms of its impacts on larger macro-economic aggregates such as:

- Impact on Gross Domestic Product (GDP).
- Capital utilisation.
- Employment impact.
- Impact on all households.
- Fiscal Impacts from tax revenues and royalties.
- Infrastructure development.
- Efficiency Criteria for Capital and Labour.
- Income generation for subcontractors in Mpumalanga.

The economic impacts associated with the project consist of a construction and operational (production) phases. For purposes of this assessment, the phases will be measured and it is envisaged that the macro-economic direct, indirect and induced emanating from the primary project as well as all the externalities will be addressed.

The construction and application of a SAM is discussed in Appendix B.

## 2.3 PROJECT DESCRIPTION

### 2.3.1 Proposed Mine Infrastructure

The proposed project includes the following mining and related infrastructure:

- Opencast pits;
- Processing plant (crushing, screening, washing and drying operations);
- Product stockpiles;
- Administration office facilities (security building, administration and staff offices, reception area, ablution facilities);
- Production facilities (locker rooms, laboratory, workshops, stores, ablution facilities);
- Bagging facility and warehouse;
- Weighbridge;
- Access roads; and
- Clean and dirty water management infrastructure.

### 2.3.2 Mining Operation<sup>5</sup>

The proposed Rietkol Mining Project is to mine Silica and associated minerals (clay, sand, etc.) on the 221 ha MRA area of the Modder East AHs which includes 16 agricultural holdings (Holdings 209 to 225) on the farm Olifantsfontein 196 IR, each of which is approximately 4.05 ha in extent and portions of the farm Rietkol 237 IR (RE/31/237 and Ptn 71/237).

Silica sand is extensively used in water purification, filtration, separation and the glass industry. Consol Glass uses the silica with low iron oxide to manufacture amber and flint glass, the balance of the product is sold to the industry i.e., chemical sand for use in foundries, river sand for the construction of roads and filter sand for water purification. The major advantage of the selected site at Rietkol is the presence of high-quality silica (low iron oxide) together with the close proximity of the site to the Consol Glass operations in Gauteng (Germiston, Nigel and Olifantsfontein).

The estimated life of mine (LOM) for the proposed Rietkol Project is 20 years. Further exploration drilling will be conducted during the operational phase, which may increase the LOM and mining depth if the resource proves viable. **It is important to note that the current Environmental Impact Assessment (EIA) deals with the first 20 years of mining only.**

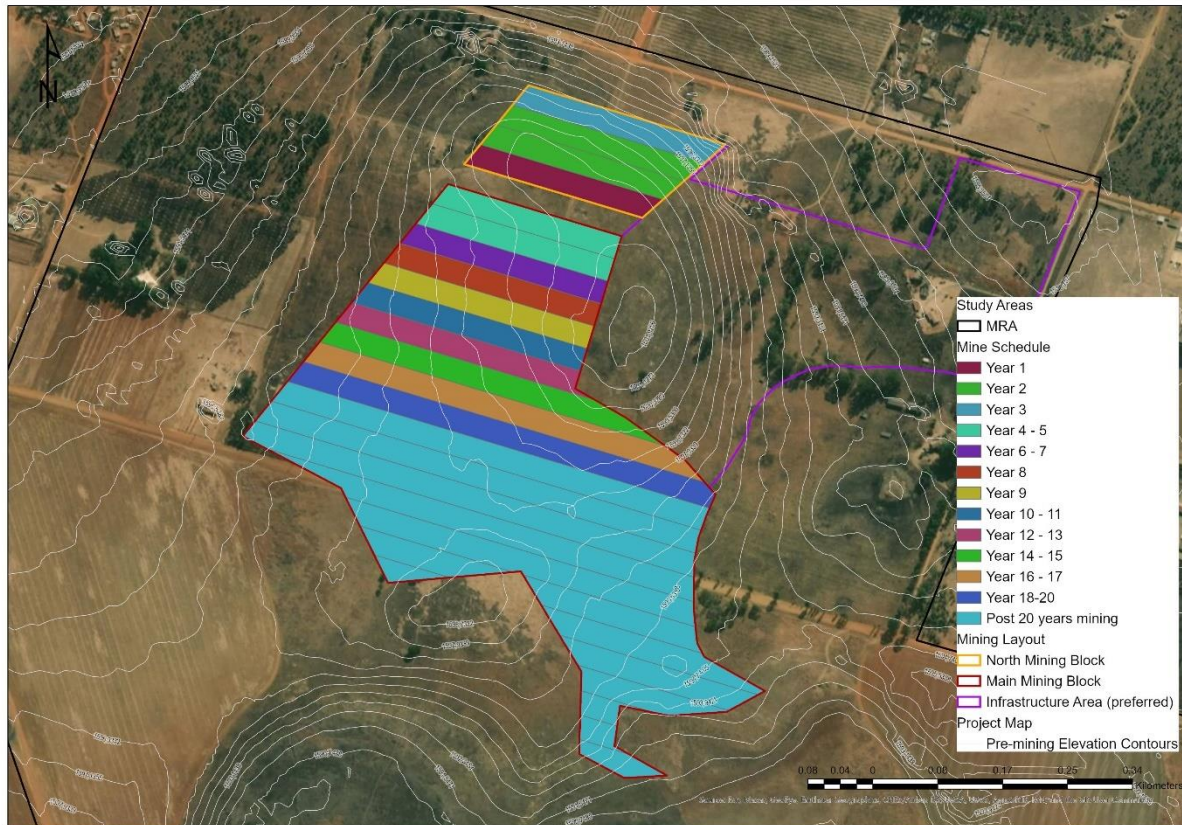
The MWP state that the Silica will be mined through an opencast bench mining method. The benches are mined at a width of 8 metres and a height of 10 metres. Final mining depth will initially be 30

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<sup>5</sup> Mining Work Programme (2019).

m.b.g.l with the possibility of increasing the depth to 50 m.b.g.l. Mining will commence in the northern portion of the MRA area and will progress in a south-easterly direction.

Mining will then commence in the blocks to the north of the MRA area that will be utilised as a tailing's facility after mining in this block has finished (North Block).



**Figure 2-1: Proposed Mine Layout**

The predominant minerals to be mined are:

- Glass Sand (Silica) QG Type Q.
- Silica sand (general) Q Type Q.
- Sand (general) QY Type I.
- Silica Sand QD Type Q.

Drilling and blasting of the rock face will be conducted on a predetermined schedule in accordance with projected volumes of production and will be undertaken by blast professionals and with the required safety procedures applied. It is anticipated that blasting will take place approximately once a week according to information provided by company. As part of the mitigation process the community would be informed in advance of when blasting will take place.

The mining method will include:

- Vegetation and topsoil will be stripped ahead of mining. At least one cut (8m) should already be stripped and available for drilling between the active topsoil stripping operation and the open void;

- The topsoil will be loaded onto dump trucks by excavators and hauled to areas that require rehabilitation;
- Drilling operations will commence in the front of the advancing pit after the topsoil has been removed;
- The blasted Run of Mine (RoM) will be stockpiled with excavators; and
- Thereafter RoM will be transported to the crushing plant by means of haul trucks with a loading capacity of approximately 40 tons.

Various machinery and vehicles will be used in the pit and to transport the RoM to the crushing plant. The equipment includes excavators, front-end loaders and ADTs.

The processing plant comprises of crushing, screening, washing and drying operations.

### 2.3.3 Power Supply to the Mine

Currently an 11kV electricity supply line is located on the northern boundary of the MRA area. Generators will be installed to supplement Eskom power where required.

### 2.3.4 Water Supply to the Mine

Limited water is consumed during processing and all processing water will be recycled. However, there will be a loss of approximately 20% through moisture in the product and evaporation.

Water for processing and dust suppression will be obtained from the open pit (groundwater influx) and the existing boreholes within the MRA area.

The maximum on-site water requirement at full production is expected to be 4 ℓ/s (i.e., 0.4 ℓ/s dust suppression, 0.2 ℓ/s potable water and 3.4 ℓ/s plant). The groundwater testing shows that the combined sustainable yield of the on-site tested boreholes is around 4 ℓ/s. The existing boreholes on site would therefore be sufficient to supply the Rietkol operations, not taking into account groundwater influx and direct rainfall.

Run-off water from the site will be managed to limit siltation of the surrounding water sources. The overall objective of storm water management at the MRA area will be to isolate contaminated areas from clean runoff thereby minimising contaminated run-off and preventing pollution of water resources.

### 2.3.5 Access Roads

Access to the site is gained via the R50 and the N12 as indicated in the **Figure 2-2** below. From the R50 access to site will be via Provincial Road D1550, a paved secondary provincial road. It is stated that this road will be upgraded to handle the additional traffic associated with the proposed mining project. From the D1550 the mine will be accessed via an existing gravel road turning off the D1550 just north of Holding 276 and then turn left pass Holding 277 and run at the back of Holdings 277 and 278 to the proposed administration buildings and the loading area. It is mentioned that this gravel road will be upgraded to carry the additional traffic load. Formal access will be constructed to the pit and the infrastructure as the development progresses.

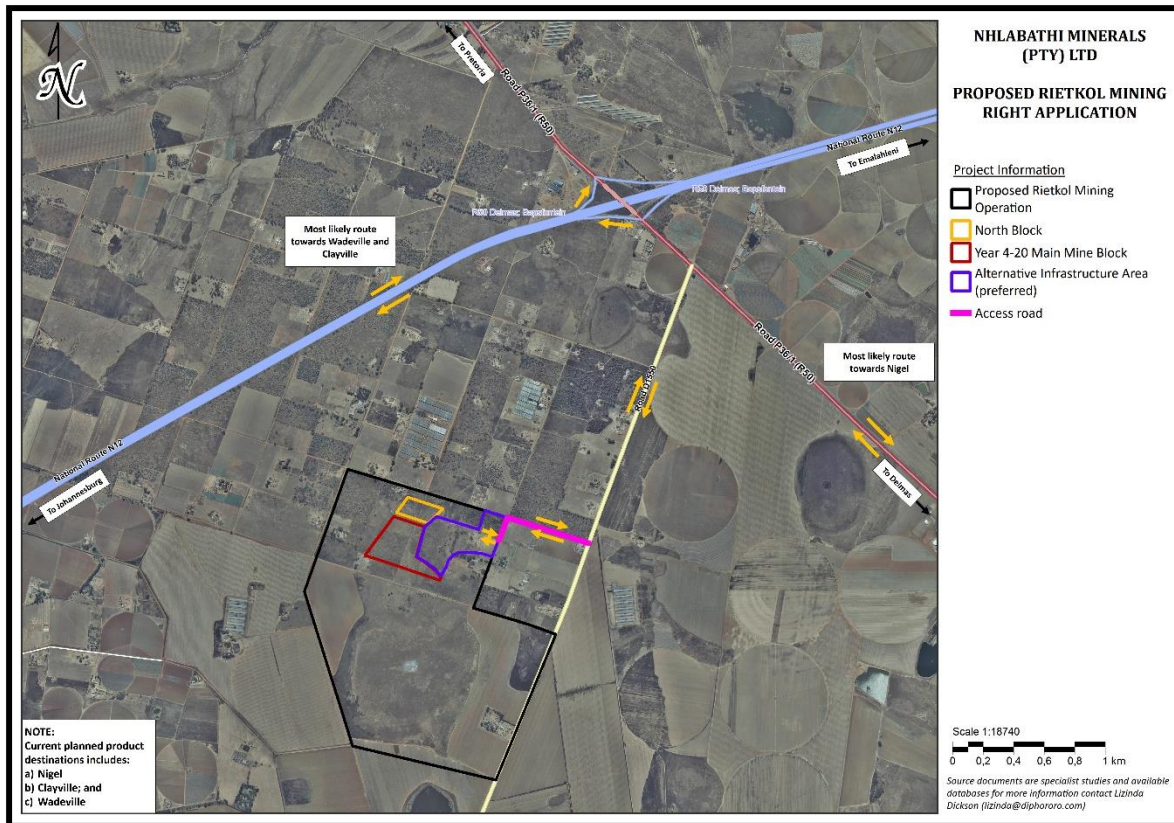


Figure 2-2: Proposed Transport Route<sup>6</sup>

The vehicle traffic related to the mine includes:

- Transport of staff to and from work working on a three (3) shift rotations per day;
- Routine maintenance of equipment, site vehicles and production equipment;
- Transport of fuel and on-site refuelling;
- Management and visitor transport and supervision activities; and
- Transport of final product to the markets estimated at 36 trucks (one way) per day at highest levels of production (worst case). The final product is transported to either Wadeville (Germiston), Nigel or Clayville (Olifantsfontein) factories.

The product will be transported from Monday through to Sunday during daylight hours.

### 2.3.6 Closure Planning and Rehabilitation

North Block will be backfilled with tailings to original pre-mining levels, topsoiled and revegetated. This will be completed prior to decommissioning. As most of the material mined is processed and removed from site as product, backfilling of the Main Block will not be possible as insufficient tailings will be produced. A final void of approximately 2 Mm<sup>3</sup> will be left after mining.

<sup>6</sup> Source: Specialist Traffic Impact Assessment Report

The sides of the pit will be sloped and vegetated to a stable environment. Safety/access control berms will be constructed around the Main Block to prevent unsafe access to the open void high-risk areas. Infrastructure with a beneficial re-use potential will be retained for transfer to a third party. This could include the water dams, provided that the water quality is acceptable for third party use. All non-beneficial infrastructure will be demolished/dismantled, and the area rehabilitated to facilitate the post-mining land use.

Demolition material will be recycled as far as possible. The Main Block will be backfilled with inert demolition material and building rubble, all other material will be disposed of at an appropriate landfill site. No remnant stockpiles would remain on site post-closure. All remaining stockpile material will be dumped into Main Block.

The proposed final post-mining land use in the infrastructure areas and at North Block will be grazing, with the Main Block area constituting a wilderness area.

### 2.3.7 Employment Creation

According to the MWP it is envisaged that the Rietkol Project will employ 100 people at full production (year 3) and that approximately 40 - 50 workers be employed by support consultants (MWP, 2019). The calculation in estimating the number of support workers was estimated by Mosaka using the average wage and salary per job description as provided to estimate the number of service provider employees. The nature of the mining operations requires employees that are all skilled to operate in a safe and effective manner.

### 2.3.8 Development Programmes

The Human Resource Development Programme and Local Economic Development Programme is discussed in the following sections.

#### 2.3.8.1 Human Resource Development Programme

Human Resource Development Programme (HRDP), complying with the Mining Charter targets, will be implemented once in operation. This includes:

- Skills Development Legislative compliance.
- Skills Development Plan.
- Career Progression Path.
- Mentorship.
- Talent management.
- The internship and bursary plan.
- Human Resourcing.
- Employment Equity.

Provision for the HRDP has been made as presented in **Table 2-1**.



### 2.3.8.2 Local Economic Development Programme

The Rietkol Project is committed to delivering improvements in the social and human capacities of the people who will surround this operation to create real opportunities for socio-economic advancement. The provision for the Local Economic Development Programme (LEDP) will be funded entirely by the mine from a budget as presented in **Table 2-1**. The table only presents the amounts for the first 10 years of mining, but the funds will be available for the full estimated 20 years of the mining operations.

**Table 2-1: Financial Provision for the Social and Labour Plan<sup>7</sup> (2020 prices)**

	2021	2022	2023	2024	2025
<b>HRD Budget</b>	R 1 300 591	R 1 544 976	R 1 564 571	R 1 701 764	R 1 786 852
<b>LED Budget</b>	R 300 000	R 350 000	R 300 000	R 300 000	R 467 400
<b>Management of Downscaling</b>	R 199 744	R 223 713	R 283 846	R 317 907	R 171 700
<b>Total</b>	R 1 800 335	R 2 118 689	R 2 148 417	R 2 319 671	R 2 425 952

	2026	2027	2028	2029	2030
<b>HRD Budget</b>	R 1 314 040	R 1 379 742	R 1 448 729	R 1 521 166	R 1 597 224
<b>LED Budget</b>	R 467 400	R 467 400	R 467 400	R 467 400	R 467 400
<b>Management of Downscaling</b>	R 171 700	R 171 700	R 171 700	R 171 700	R 171 700
<b>Total</b>	R 1 953 140	R 2 018 842	R 2 087 829	R 2 160 266	R 2 236 324

The above table provide the costs for the first 10 operational years, as the base CBA is done in constant prices only a 3% annual growth was added for the next 10 years in line with the projected increase in yield.

## 2.4 POTENTIAL ECONOMIC IMPACT OF RIETKOL PROJECT

Any new capital investment always has a positive impact on the economy, national and provincial. In the case of the proposed silica mine and the location of the mine it was decided to only calculate the impact on the National Economy as most of the capital expenditure will be spend in Gauteng with also the impact in Gauteng.

The following sections present the macro-economic results of the construction and the operational phases of the proposed Rietkol Project for which the National SAM<sup>8</sup> was adapted and applied.

### 2.4.1 Construction Impact

In the following table the detailed results of the construction phase of the mine, for the macro-economic analysis, is presented. It is important to keep in mind that the “real” construction period is

<sup>7</sup> MWP, 2019 (Constant 2018 Prices) - Table 25 page 41

<sup>8</sup> SAM – Social Accounting Matrix

only three years with the result that these impacts will only be for very short period. The results are presented for an average year during the three-year construction period.

**Table 2-2: Annual Socio- and Macro-Economic Impacts of the Construction Phase of the Rietkol Project**

<b>Construction Impact: National</b>				
<b>[R million, 2020 Prices or Numbers]</b>				
	<b>Direct impact</b>	<b>Indirect impact</b>	<b>Induced impact</b>	<b>Total impact</b>
<b>Impact on Gross Domestic Product (GDP)</b>	<b>R14.2</b>	<b>R6.2</b>	<b>R12.0</b>	<b>R32.4</b>
<b>Impact on capital formation</b>	<b>R27.0</b>	<b>R15.1</b>	<b>R32.1</b>	<b>R74.2</b>
<b>Impact on employment [person years]</b>	<b>24</b>	<b>14</b>	<b>28</b>	<b>66</b>
<i>Skilled impact on employment [person years]</i>	<i>8</i>	<i>3</i>	<i>6</i>	<i>17</i>
<i>Semi-skilled impact on employment [person years]</i>	<i>13</i>	<i>6</i>	<i>12</i>	<i>31</i>
<i>Unskilled impact on employment [person years]</i>	<i>3</i>	<i>5</i>	<i>10</i>	<i>18</i>
<b>Total Payments to Households</b>				<b>R23.3</b>
<i>Low Income Households</i>				<i>R3.8</i>
<i>Medium Income Households</i>				<i>R4.5</i>
<i>High Income Households</i>				<i>R15.0</i>
<b>Fiscal Impact</b>				<b>R9.8</b>
<i>National Government</i>				<i>R9.1</i>
<i>Provincial Government</i>				<i>R0.1</i>
<i>Local Government</i>				<i>R0.6</i>

*Note: All Rand values reflected are expressed in Rand Millions*

In the evaluation of the construction results it must be kept in mind that this is for a very limited period of time. The term “Person Years” are used, because very often during a construction period a person is not employed at the construction site for a full year, but at least a person is on site.

#### 2.4.1.1 GDP Impact

GDP is a good indicator of economic growth and welfare as it represents, among other, criteria, remuneration of employees and gross operating surplus (profits) as components of value added at all the levels of the economy.

The direct impact generated during the total programming period is estimated at R 14.2 million with the total GDP at R 32.4 million in 2020 prices.

#### 2.4.1.2 Capital Formation

Productive capital assets are required to support or generate any given amount of economic activity (i.e., GDP). These capital assets, together with labour and entrepreneurship, form the core productive factors needed for production. The effectiveness and efficiency with which these factors are combined will determine the overall level of productivity and profitability of such assets. The former will in turn depend on a whole array of factors, of which the appropriate technology and skills content of the labour force are important.

According to the results table the direct capital will be around R 27.0 million supplemented by the indirect component of R 15.1 million, the induced element of R 32.1 million providing a total of R 74.2 million.

#### 2.4.1.3 Employment Created

Labour input is a key element of the production process. It is one of the main production factors in any economy and employment levels are indicators of whether the extent of labour is effectively absorbed in the economy. This study determines the number of new employment opportunities that will be created through the impact of the construction and operation of the identified project on an average annual basis.

In the case of the construction these employment opportunities will only be for a three-year period and decreases during this period.

The direct employment of 24 is supplemented by 14 indirect and 28 induced opportunities providing a total of 66 opportunities. This is a 2.64 growth factor in terms of the direct jobs to the total opportunities created.

#### 2.4.1.4 Impact on Households

One of the crucial aspects of any macro-economic assessment is determining the personal income distribution characteristics thereof, especially how low-income households will be impacted. In this section the extent to which low-income households will be positively affected by the spin offs created by the total development project is under scrutiny.

The total payments to households are estimated at R 23.3 per annum with R 3.8 million (16.3%) to the low-income households in the first year of construction and then decline for years two and three.

#### 2.4.1.5 Fiscal Impact

The total taxes paid are estimated at R 9.8 million in year one with R 9.1 to the central Fiscus.

### 2.4.2 Operational Impact

In evaluating the results of the operational phase, it is important to take into consideration that although this is a new mine, it is replacing another mine where silica stock is running low. This is therefore not new macro-economic results, but the maintenance of the socio-economic results produced by another mine in the Delmas area. **Table 2-3** presents the results of operational **Year 7, as a representative year for full production**, of the production period of the proposed mine as calculated by applying the 2020 updated Mpumalanga Provincial Social Accounting Matrix (SAM).

**Table 2-3: Socio- and Macro-Economic Impact Assessment of the Operational Phase of the Rietkol Project**

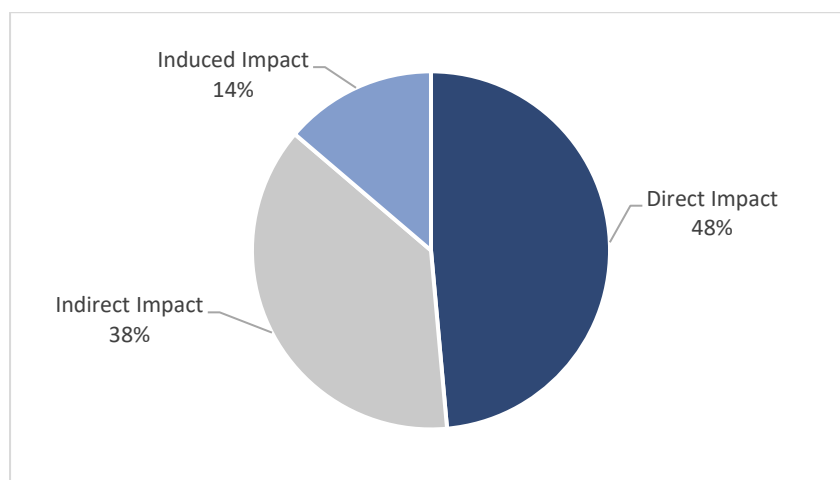
	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Impact on Gross Domestic Product (GDP) [R million]	R 35.8	R 28.5	R 10.3	R 74.6
Impact on capital formation [R million]	R 68.8	R 48.8	R 36.5	R 154.1
Impact on employment [number of job opportunities]	100	54	51	205
- Skilled number of job opportunities	36	10	18	64
- Semi-skilled number of job opportunities	37	21	17	75
- Unskilled number of job opportunities]	27	23	16	66
Impact on Households [R million]				R 46.4
- Low Income Households [R million]				R 13.4
- Medium Income Households [R million]				R 8.2
- High Income Households [R million]				R 24.9
Fiscal Impact (R Million)				R 26.4
<i>National Government (R Million)</i>				R 24.5
<i>Provincial Government (R Million)</i>				R 0.3
<i>Local Government (R Million)</i>				R 1.6

Note: All Rand values reflected are expressed in Rand Millions

#### 2.4.2.1 GDP Impact

The direct impact generated during Year 7 is estimated at R 35.8 million with the total GDP at R 74.6 million in 2020 prices.

Figure 2-3 present the percentage GDP division per Impact which show that 48% will be in the mining and surrounding area.



**Figure 2-3: Division of the GDP Generated**

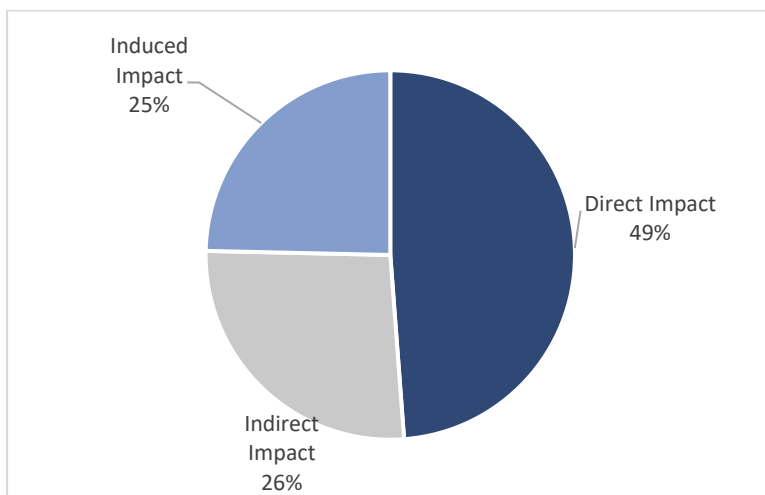
### 2.4.2.2 Operational Capital Formation

According to the results **Table 2-3** the direct operational capital in Year 7 will be around R 68.8 million supplemented by the indirect component of R 48.8 million and the induced element of R 36.5 million providing a total of R 154.1 million. New capital formation is an important element of any future economic growth and to keep in mind that the new capital is formed in a number of sectors, not only mining.

### 2.4.2.3 Employment Created

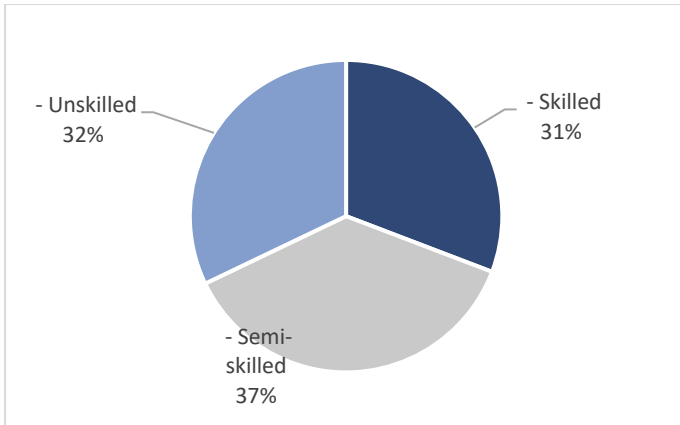
The direct employment of the mining company and service providers is 100, 54 are indirect and 51 induced opportunities providing a total of 205 opportunities. This is a 2.1 growth factor in terms of the direct jobs to the total opportunities created.

**Figure 2-4** show that 49% of the jobs created will be in area.



**Figure 2-4: Division of Jobs Generated per Impact**

**Figure 2-5** the skill levels of the jobs created, with 31% skilled, 37% semi-skilled and 32% unskilled.

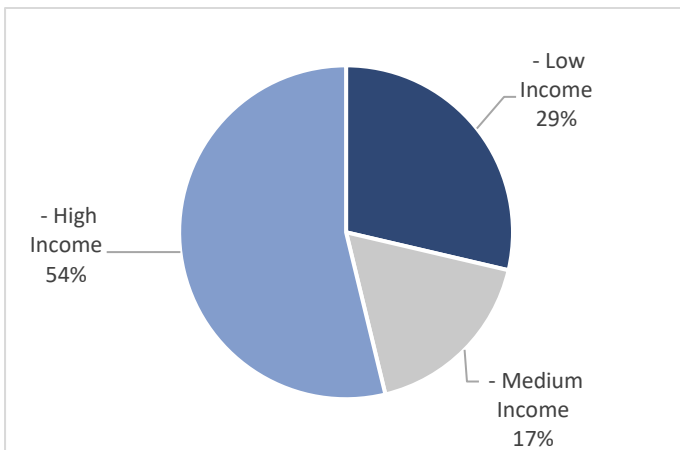


**Figure 2-5: Number of Jobs divided in the Relevant Skills**

#### 2.4.2.4 Impact on Households

The total annual payments to households, including management fees and the indirect and induced labour is estimated at R 46.4 million per annum with R 13.4 million (28.8%) to low-income households for Year 7.

**Figure 2-6** show the distribution of the Household Income with 29% to the Low-Income Households.



**Figure 2-6: Distribution of Household Income**

#### 2.4.2.5 Fiscal Impact

The total taxes paid are estimated at R 26.4 million with R 24.5 million to the central Fiscus for Year 7.

### 3 CURRENT LAND USE MEASURED IN ECONOMIC TERMS

#### 3.1 APPROACH AND METHODOLOGY

##### 3.1.1 Study Zones

The current agricultural land use, the social economic data and the environmental data were sourced from the field research and site visits undertaken by Mosaka, Diphororo Development (Pty) Ltd. and the various other specialist teams who visited the study area.

An evaluation of the impact of the mine in an area of approximately 1 km surrounding the MRA area was undertaken. The intention was to concentrate on three areas, namely the MRA agricultural producing area which covers an area of approximately 201.24 ha (as the southern portions of Rietkol 31/237 have been excluded), a 500m, buffer area of approximately 422.25 ha and a 500m to 1km buffer area of approximately 1189.25 ha.

The data collected is presented in **Table 3-1** with the estimated agricultural production and business activities. The list includes some of the Business Activities like CPI and the Egg Packhouse close to the proposed mine, but exclude data of the vehicle garages, panel beaters and trucking close to the Eloff tar road.

**Table 3-1: Agricultural Production and Business Activities in the three Zones**

Activity	Zone 1 (ha)	Zone 2 (ha)	Zone 3 (ha)	Total (ha)
Maize	33,04	154,65	619,75	807,44
Soya	16,52	77,33	309,87	403,72
Floriculture - Roses		7,97	-	7,97
Beef (Grazing)	98,5	107,647	164,85	370,997
Teff/Hay/Russian Grass		15,61	27,92	43,53
Cactus Pears		6,88	7,24	14,12
Vegetables			-	0
Pecan Nuts	3,5		-	3,5
Egg Packhouse/Feed Mill	4,04			4,04
Poultry - Broilers		-	6,34	6,34
Floriculture - Cut Flowers			4,24	4,24
Combined Private Investigations (CPI)		12,14		12,14
Dr Greeff – House Rental		0,44		0,44
Dr Greeff – Pig Feed Experimental Unit		3,60		3,60
MBFi		8,09	12,14	20,23
Other natural areas (wetlands)	45,64	27,89	36,9	110,43
<b>Total</b>	<b>201,24</b>	<b>422,25</b>	<b>1189,25</b>	<b>1812,74</b>

Source: Diphororo Development and Mosaka.

**Table 3-2** presents the build-up areas in the three identified zones.

**Table 3-2: Built-up Area in the three Zones**

Built-up	Zone 1 (ha)	Zone 2 (ha)	Zone 3 (ha)	Total (ha)
<b>Farm Homesteads and Out Buildings</b>	6,89	27,07	12,86	<b>46,82</b>
<b>Packhouse/Feed Mill</b>	2,38		5,55	<b>7,93</b>
<b>Informal Settlements (squatters)</b>		3,55		<b>3,55</b>
<b>Business Administration and Premises</b>		10,29	28,39	<b>38,68</b>
<b>Equestrian</b>			2,62	<b>2,62</b>
<b>Security Business</b>		1,26		<b>1,26</b>
<b>Roads</b>	1,48	9,59	11,66	<b>22,73</b>
<b>Total</b>	<b>10,75</b>	<b>51,76</b>	<b>61,08</b>	<b>123,59</b>

Source: Diphororo Development and Mosaka.

In order to define the area to be included in the economic study, Mosaka Economists used the area as divided into three sub-areas (see **Figure 3-13-1** below) in which to focus the study:

- **MRA Area Zone 1.** The MRA area of the Rietkol Mining Project comprising of 16 AHs and Rietkol 237 IR (northern part of portion RE/31/237). It is noted that the mining and infrastructure for the first 20 years LOM is confined to the AHs and that the farm Rietkol will not be directly affected. Some of the area will be purchased from the landowners by Consol Glass and the current farming activities on some of the land will cease. The existing rural residences will either be used by the mine for office or staff ablution facilities or be demolished.
- **Zone 2 Area.** A 500m demarcated area surrounding the MRA area of the Rietkol Project that may be impacted upon. In this area primary data collection was undertaken to calculate the economic impact of the proposed project.
- **Zone 3 Area:** A 500m to 1km demarcated area surrounding the MRA area of the Rietkol Project excluding Zone 2 that may be impacted upon. In this area primary data collection was undertaken to calculate the economic impact of the proposed project.



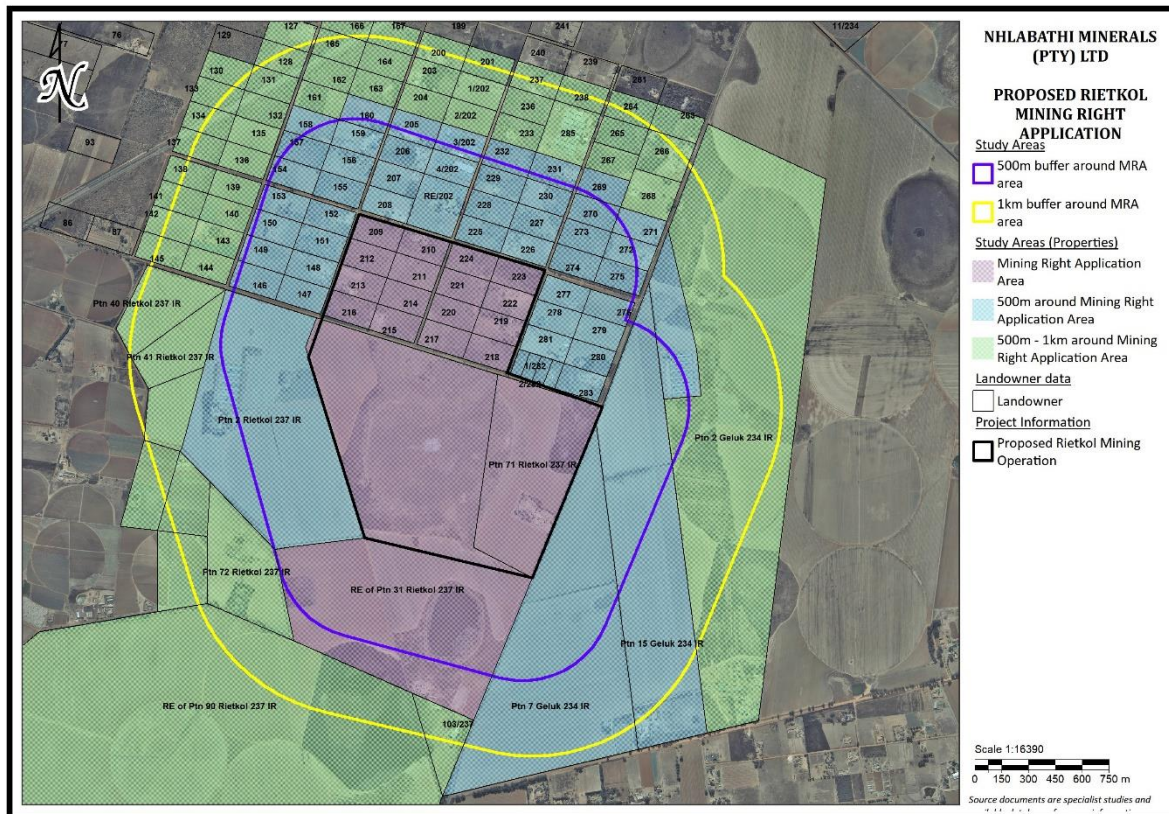


Figure 3-1: Rietkol Project Defined Zones<sup>9</sup>

### 3.1.2 Data Collection

The area subjected to and immediately adjacent to the mining development in the Rietkol Project MRA area, that might be impacted upon, was visited or contacted. Selected landowners or their representatives within the MRA area were visited. The information obtained by the different specialist teams that visited the area was also made available to Conningarth.

The following sources were used to obtain agricultural information pertaining to the study area:

- SA Poultry Association.
- SA Grain<sup>10</sup>.
- Department of Agriculture for the Enterprise Budgets<sup>11</sup>.
- Individual property owners and farmers.
- Agricultural Abstract of Agricultural Statistics – 2020.

Additional information gathering of other areas and activities which impacted on the proposed Rietkol project was collected by means of secondary collection methods. The Social and Labour Plan (SLP)

<sup>9</sup> Source: Diphororo Development (Pty) Ltd

<sup>10</sup> Published Maize and Soya Enterprise Budgets

<sup>11</sup> Enterprise Budgets, Department of Agriculture. Compiled by the Land Bank and Development Bank, 2012 and updated 2017 for the Land Bank.

together with the necessary capital and operational income and expenditure (business plan) data for the mining operation on a timeline was sourced from the Rietkol Mining Work Programme.

An analysis was done of some of the several studies made in the recent past on development projects that are anticipated for the area and of published and unpublished secondary information in the possession of Mosaka or other organisations.

The following agriculture and other business activities were identified after visiting the area:

- Unex Roses;
- Pretorius Blomme;
- Goudhoek SA Boerperd Stoetery;
- Rossgro;
- MBFi; and
- Combined Private Investigations (CPI).

At a later stage Dr Jacobus Greeff and Mr. Piet van der Walt was added to the list.

Individual meetings on 3 May 2018 originally took place with four of the six owners/managers of the larger businesses located within the 1km area, namely:

- Mr. S.J.N (Sarel) Kritzinger, owner of Goudhoek SA Boerperd Stoet/Ovomart (Pty) Ltd. SJN Kritzinger cc. Business location: Modder East Orchards AH 160, 161.
- Mr. W.G.M (Thinus) Stols, owner of Unex Roses. Business location: Modder East Orchards AH 201, 202.
- Mr. Martin van Zyl, manager of the prickly pear business of Unex Roses on Modder East Orchards AH 201, 202.
- Mr. Leon Pretorius of Pretorius Blomme. Business location: Modder East Orchards AH 285.

In 2018, the owners/representatives of the following large businesses in the area were not interviewed:

- Rossgro. A meeting with a representative of Rossgro, via Mr. Johann Minnaar, did not materialise.
- MBFi. Several attempts were made to meet with a representative of the company. Due to diary constraints, it was agreed that Mosaka submit a questionnaire. The questionnaire was submitted but no response was received.
- Combined Private Investigations (CPI).

The original meetings were followed up on the following dates and places:

- Modder East Orchards Holding 278, 279, 281 - 5 May 2021 – Combined Private Investigations cc – The following people were present: The owner Mr. Ray Robertson, Mr Leroy Robertson and Mr Jan du Plooy, Delmas Operational Manager and Mrs. Isabel du Plooy CPI Administration. The meeting took place on Holding 281.
- Modder East Orchards Holding 277 – 5 May 2021 - Dr Jacobus Greeff – The following people were present: Dr Greeff and his wife Munette Greeff. The meeting took place in Eloff at the private home of the owner.
- Modder East Orchards Holding 213 – 5 May 2021 – Johanna Elizabeth van der Walt – Mr P van der Walt was present at the meeting – The meeting took place on Holding 213.
- Rietkol 237 IR Portions 2, 3,24,31,40,41,4271,90 and 103. The portions are registered under different owner names but are all part of the Rossgro Group. A ‘virtual’ meeting took place

on the 6<sup>th</sup> of May 2021 with present Dr Naude Rossouw, Mr Johann Minnaar and other representatives from Rossgro.

- Modder East Orchards Holdings 144, 146, 147. 10 May 2021. MBfi – Microbial Biological Fertilizers International – The meeting took place with the legal representative and a written request for information was presented. To date no further information or a response on the request for information has been received.
- Modder East Orchards Holdings 201, 202, 225. – 11 May 2021. – Unex Roses – It is necessary to mention that the units are not all registered under the same name, it varies between Uniflo and Tinus Stolls. Mr Wally Lewis, manager and Mr Johann Minnaar was present at the meeting at the Unex facilities.
- Modder East Orchards Holding 285 – Petronella Jacoba Pretorius – 11 May 2021 – Present were Mrs. Pretorius, Willie Pretorius, Leon Pretorius and Johann Minnaar. The meeting took place on the premises of Pretorius Blomme cc.
- Mr. S.J.N (Sarel) Kritzinger, owner of Goudhoek SA Boerperd Stoet/Ovomart (Pty) Ltd. SJN Kritzinger cc. Business location: Modder East Orchards AH 160, 161. Presented data via e-mail.

### 3.1.3 Area Estimation

The actual registered hectares of the farm portions were used to determine the land extent of the properties. These were sourced from the landowners list, and where not listed, determined with the help of satellite images. Information gathered during site visits and meetings with landowners or representatives was also used to determine land use and production. In cases where the information was not available, the general norm was applied for the cultivated land identified on the farms that were measured on satellite images and for crops that were not specified by the owner during the site visits.

### 3.1.4 Economic Baseline Assessment

The current activities were identified, and the monetary value of the different activities estimated in the project area in 2020 prices. This is then converted to three macro-economic indicators which is used to estimate the projected possible impact of the proposed mine.

A Macro-Economic Impact Model (MEIM) is used to convert the monetary values of the different activities to macro-economic indicators. The MEIM is based on the Mpumalanga SAM, which has been converted to an econometric model to be used in the project area. The MEIM was adapted to accommodate each of the identified project areas and was then populated with the baseline data.

The magnitude of the current activities in the project area has been calculated according to the methods as explained. In later sections the current economic activities are expressed in terms of the following economic and socio-economic parameters as provided by the Socio-Economic Model:

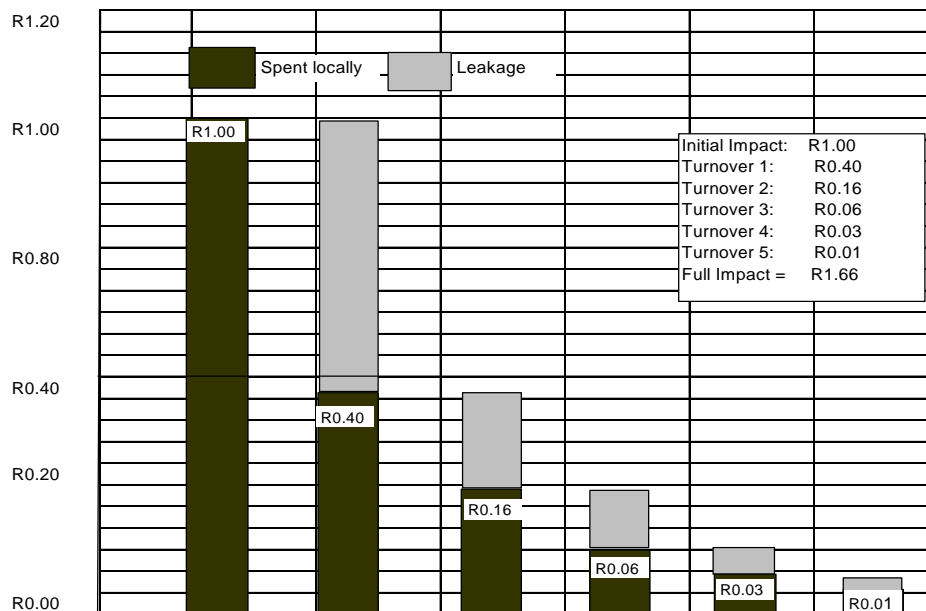
- Economic parameters
  - Gross Domestic Product (GDP) – Direct and Indirect/Induced Impacts;
  - Capital Utilisation;
- Socio-economic parameters
  - Employment – Direct and Indirect/Induced Impacts;
  - Payments to Households – Low Income and Medium/High Income.

The possible impacts of the proposed silica mine on the current economic activities was estimated and converted to the macro-economic parameters to reflect the impacts.

The SAM was used to synthesise appropriate multipliers to be used in the MEIM to calculate the macro-economic impact of the different activities.

All economic models incorporate a number of “multipliers” which form the nucleus of the modelling system. The nature and extent of the impact of a change in a specific economic quantity, e.g., exports, on that of another economic quantity or quantities, e.g., production output or employment, is determined by a “multiplier”. A multiplier summarises the total impact that can be expected from a change in a given economic activity. For illustrative purposes the figure below shows the multiplier concept used in assessing the change in economic activity.

**Table 3-3: Multipliers and Turnover**



In this example, R1 is received into the local economy of the area from sales beyond the local borders. Of this, 40 cents are spent for goods and services within the region. The economic sectors and individuals who receive the 40 cents spend 16 cents within the local area. Of the 16 cents, only six cents are spent locally, and so on. The total amount of money received by local firms and residents as a result of the initial R1 in added exported earnings is R1.66. Therefore, the multiplier is R1.66.

The change in economic activity resulting from the change in one factor of production, such as water resources, is measured by different multipliers. Four multipliers are commonly used to assess the impacts of an initial increase in production resulting from an increase in sales, usually called final demand in multiplier analysis. The four multipliers are: (1) output, (2) employment; (3) income; and (4) value added.

Sectorial multipliers are calculated using information contained in the applicable Provincial Social Accounting Matrix (SAM) and the National SAM as well as data obtained from the South African Reserve Bank and Statistics South Africa. These inverse matrices capture all the direct and indirect

relationships among the inputs and outputs of the various entities included in the applicable provincial SAM.

Direct GDP, labour and capital multipliers for each sector are calculated using the following formula:

$$\begin{aligned} \text{GDP multiplier} &= \frac{\text{Value Added}}{\text{Production}} \\ \text{Labour multiplier} &= \frac{\text{Employment}}{\text{Production}} \\ \text{Capital multiplier} &= \frac{\text{Capital stock}}{\text{Production}} \end{aligned}$$

These multipliers were incorporated into the MEIM and used to calculate the macro-economic impacts. By using a SAM for the applicable region, the above multipliers can be calculated. The multipliers that were used in this study to determine the economic impacts are as follows:

- Economic growth, i.e., the impact on GDP.
- Employment creation, i.e., the impact on labour requirements.
- Income distribution, i.e., the impact on low income, poor households and total households.

A breakdown of the different effects of the agricultural sector multipliers used in this study is as follows:

- Direct Impacts: the effects occurring directly in the agriculture or business sector.
- Indirect Impacts: those effects occurring in the different economic sectors that link backwards to agriculture due to the supply of intermediate inputs, e.g., fertiliser, seed, professional services, transport, etc.
- Induced Impacts: the chain reaction triggered by the salaries and profits (less retained earnings) that are ploughed back into the economy in the form of private consumption expenditure.
- Total Impacts: Represents the direct, indirect and induced summed effect.

### 3.1.5 Public Participation and Stakeholder Concerns

During the Public Participation process and the data collection process, the following common issues were expressed:

- Possible impact (water depletion and/or pollution) the mine could have on the quality and quantity of the groundwater source as all the businesses and agricultural activities fully rely on borehole water for their existence.
- The concern for air/dust pollution especially silica dust emanating from the mining activities and the accompanying impact on human and animal health and crops.
- The sense of place of the currently rural area will be negatively impacted upon by the mining activities.
- Noise as a result of blasting at the mine.
- The cumulative impact of the proposed mine together with the existing mining activities on the surrounding area.
- Sinkholes – dolomite area and aquifer.

- Negative impact on property values.

### 3.1.6 Consideration of Specialist Studies and Sensitivity Mapping

The specialist impact assessments that have a potential direct impact on the health, well-being and economic livelihoods of the sensitive receptors in the area were considered during the sensitivity mapping exercise, namely the air quality, ambient noise, blasting and groundwater impact assessments.

The criteria used for the sensitivity mapping were determined in conjunction with the various specialists and are based on the following:

- Legal requirements and applicable standards and/or guidelines;
- Impact modelling results as presented in the specialist reports;
- Recommendations made by the specialists in respect of mitigation; and
- Experience of the specialists involved.

In respect of air quality and noise the worst case was assumed, i.e., without the implementation of any mitigation measures. For blasting it was assumed that the revised blasting design recommended in the specialist report will be implemented and refined as monitoring data becomes available.

#### 3.1.6.1 Groundwater

All the involved economic activities have expressed concern about the quality and quantity of the available underground water.

The groundwater specialist study concluded that the water level impacts do extend beyond the MRA area, however no groundwater user boreholes are located within these affected areas. A medium risk was allocated on the quantity of the water. In the case of the quality of the water the different impacts vary between medium to low.

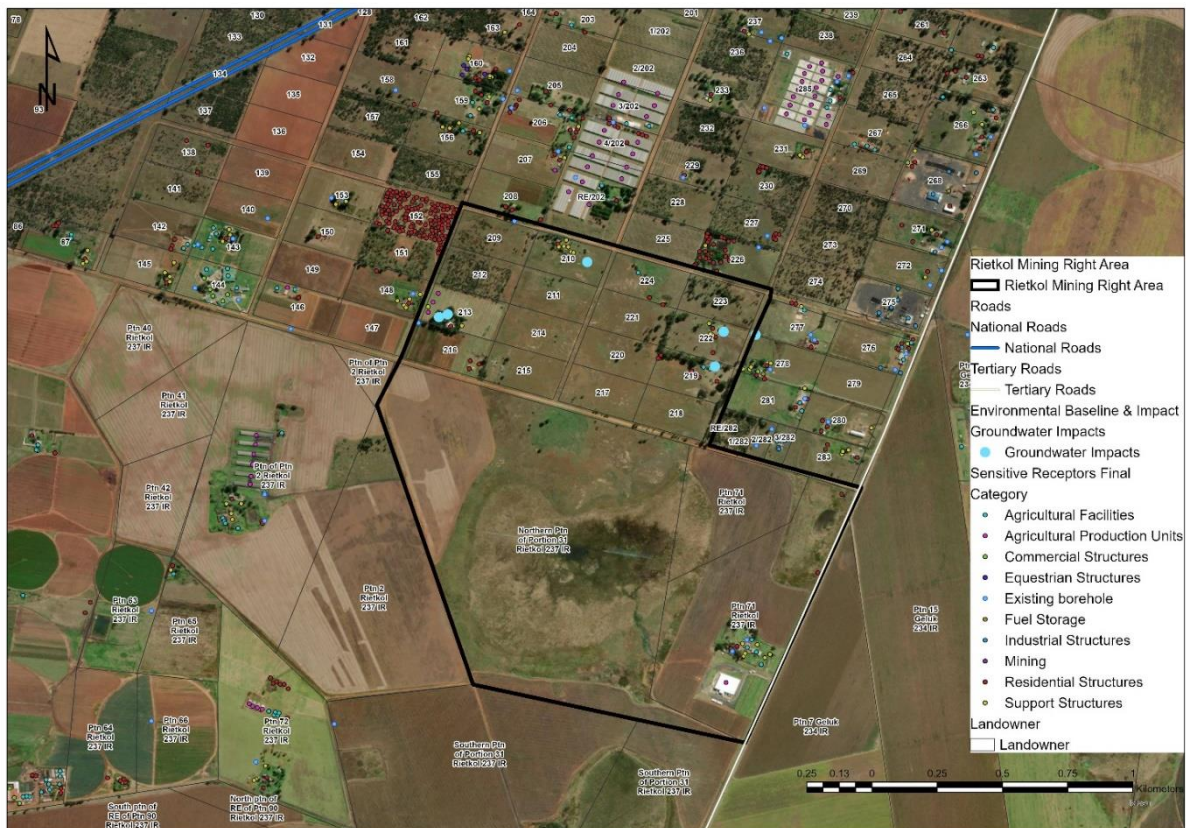
It is important to note that the sensitive dolomite aquifer will not be intersected by the proposed opencast pits. The sediment/sand (now quartzite after low grade metamorphism) was deposited into an ancient dolomite sinkhole. The proposed opencast pits are situated more or less in the centre of this deposit – meaning that at all time there will be a  $\pm 90$  to 300 meters buffer, or low transmissivity quartzite between the pit and surrounding dolomite. The quartzite deposit in its entirety is expected to act as a buffer between the proposed mining activities and the surrounding and underlying dolomite.

The boreholes that may potentially be impacted by the Rietkol Project, as identified by the groundwater specialist assessment, are indicated in **Figure 3-2**.

It is important to note that impacts on groundwater were not considered for the cumulative sensitivity mapping and property risk classification discussed in the following sections, for the following reasons:

- Boreholes that will be impacted during the operational phase all lie within the direct impact zone which must be purchased to facilitate mining.

- Impacts on the other boreholes will only manifest at mine closure and would therefore not have any impacts during the operational phase. Groundwater monitoring must be implemented to confirm the predictions of the groundwater model as mining progresses.



**Figure 3-2: Groundwater sensitivity map**

### 3.1.6.2 Traffic

The Traffic Impact Assessment concluded that the road network, surrounding the Rietkol Project, will be able to handle the traffic, with the identified road improvements, with no detrimental impact on the traffic on any of the relevant roads.

The Traffic Impact Assessment concluded that from a traffic perspective, there are no fatal flaws with the proposed identified required road works, including the new access onto Road D1550, on condition that all improvements (as recommended by the traffic specialist) be constructed to the applicable standards of the provincial authority.

### 3.1.6.3 Air Quality

The exposure to Particulate Matter with an aerodynamic diameter of less than 10 microns (PM<sub>10</sub>), and specifically silica dust, is regarded as the most critical social aspect associated with the Rietkol Project as this could lead to silicosis (lung disease) with a high risk of tuberculosis (TB) as a complication.

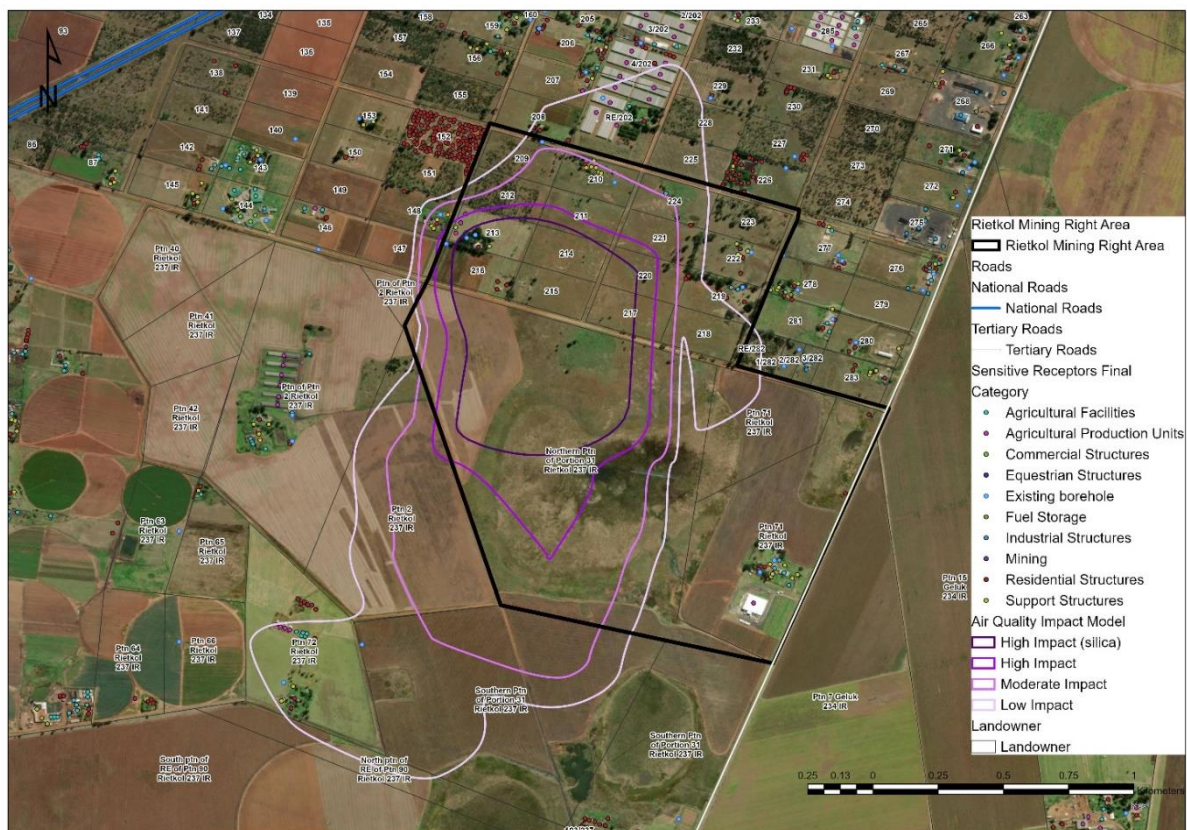
The US Occupational Safety and Health Administration has implemented as specific exposure limit of 0.1 mg/m<sup>3</sup> (100 µg/m<sup>3</sup>) for respirable silica, whilst South Africa published National Air Quality

standards in respect of PM<sub>10</sub> (SANS 1929:2011) which stipulates a daily (24-hour) average exposure limit of 75 µg/m<sup>3</sup> and an annual average exposure limit of 40 µg/m<sup>3</sup>.

The following limits were selected for air quality:

- High Impact (silica) – Respirable silica exposure above 100 µg/m<sup>3</sup>
- High Impact – PM<sub>10</sub> daily exposure above 75 µg/m<sup>3</sup>
- Moderate Impact – PM<sub>10</sub> daily exposure between 50 µg/m<sup>3</sup> and 75 µg/m<sup>3</sup>
- Low impact – PM<sub>10</sub> daily exposure of between 40 µg/m<sup>3</sup> and 50 µg/m<sup>3</sup>

The air quality sensitivity map is presented in **Figure 3-3**.



**Figure 3-3: Air quality sensitivity map**

### 3.1.6.4 Noise

The baseline monitoring conducted by EAR indicates that the ambient sound levels of the area are typical of an urban noise district and the acceptable zone rating level would be that of an urban area (45 dBA at night and 55 dBA during the day) as defined in SANS 10103:2008 (for residential use).

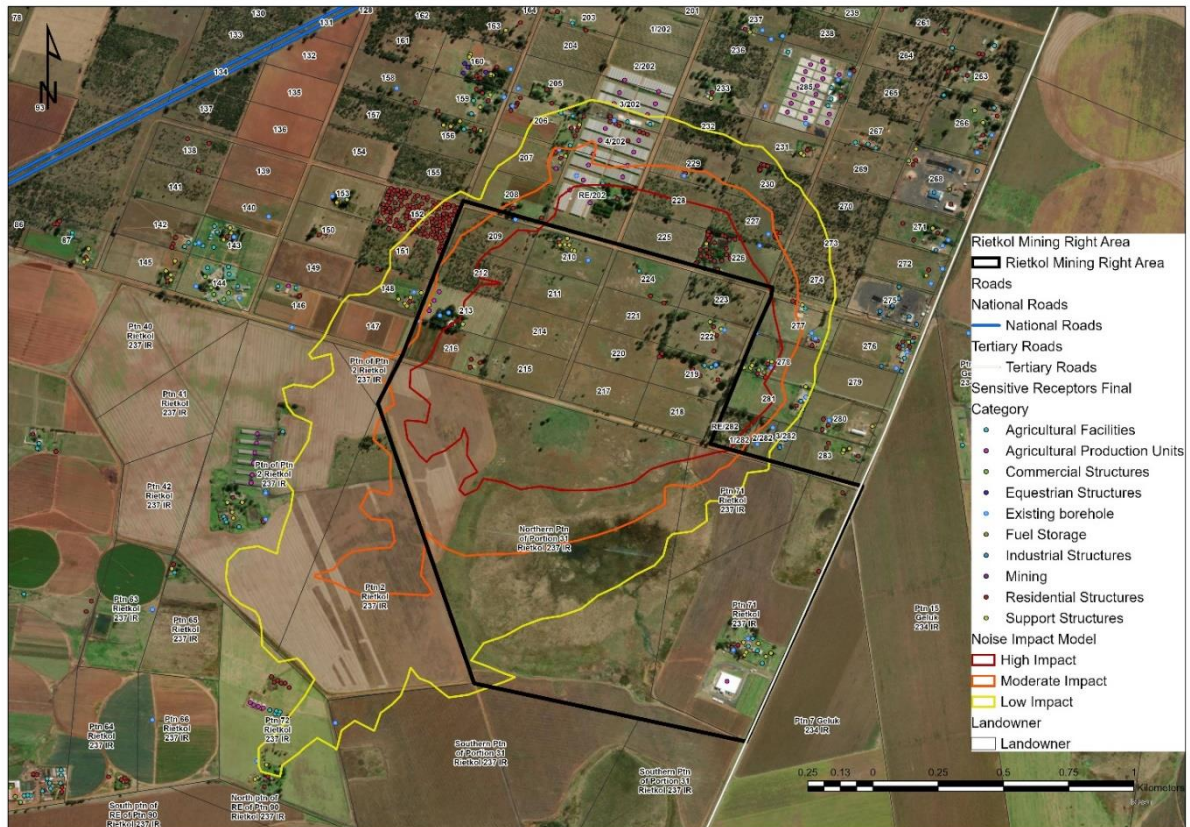
An increase (from the ambient sound level) of more than 7 dBA is defined as a disturbing noise and prohibited by National and Provincial Noise Control Regulations. Mining activities (calculated noise levels) should therefore not change the proposed acceptable rating levels with more than 7 dBA (disturbing noise) and ideally with no more than 3 dBA (World Bank guidelines). For the sensitivity mapping the night-time limit of 45 dBA was used which presents the worse-case scenario.



The following limits were therefore set for ambient noise:

- High Impact – Increase of 7 dBA or more
- Moderate impact – Increase of between 5 - 7 dBA
- Low impact – Increase of between 3 - 5 dBA

The noise sensitivity map is presented in **Figure 3-4**.



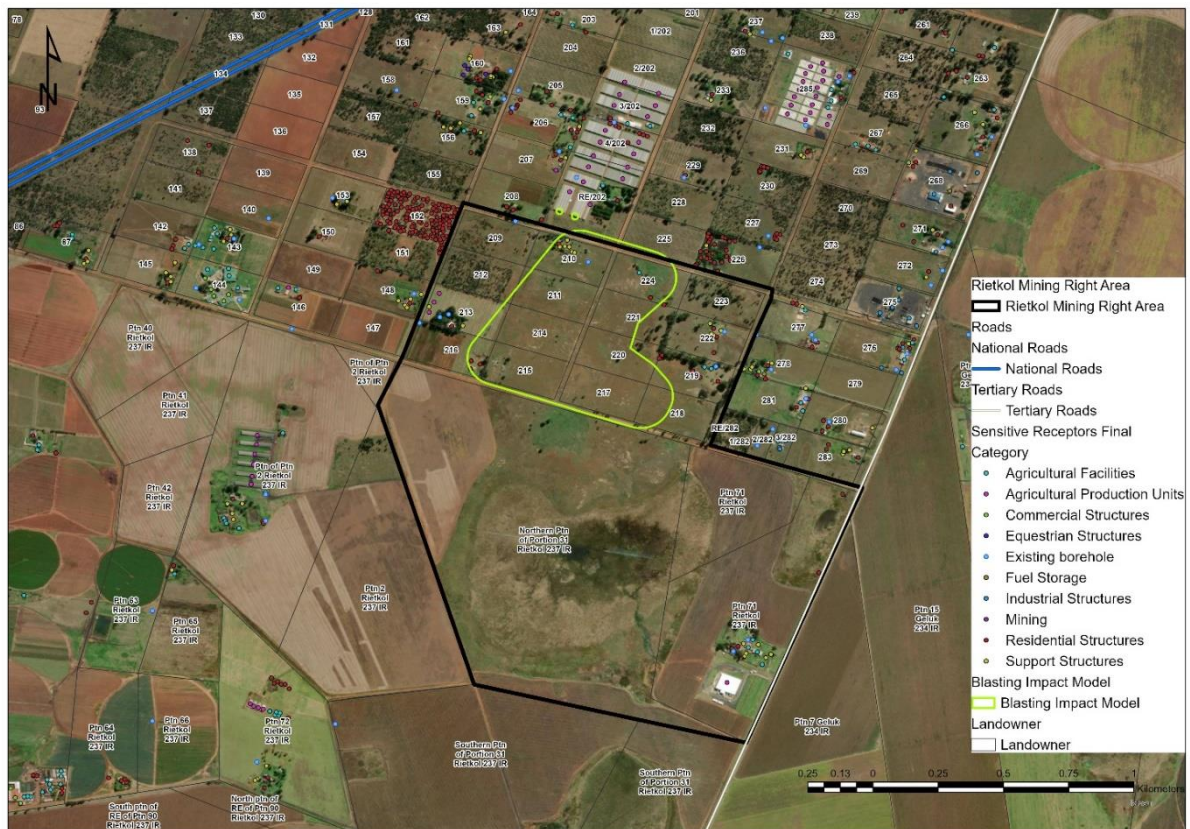
**Figure 3-4: Noise sensitivity map**

### 3.1.6.5 Blasting

The blasting impact assessment concluded that with the adoption of the revised blasting design as developed by BM&C, the following impacts are envisaged:

- Ground vibration impacts will be limited to sensitive receptors situated within the MRA and pit areas.
- Air blast impacts will also be limited to the MRA area except for the potential impact on the flower tunnels situated just to the north of the MRA area due to a lower limit set for such structures.
- The exclusion zone (evacuation zone) for fly rock was calculated as 105 m from any blasting event.

The blasting sensitivity map is presented in **Figure 3-5**.



**Figure 3-5: Blasting sensitivity map**

### 3.1.6.6 Property Risk Classification

To determine the potential socio-economic impact associated with the Rietkol Project, the properties within the overall impact zone were classified into five categories, namely:

- Direct (land take) impact zone: These properties are directly impacted by the proposed infrastructure and mining layouts and need to be purchased to facilitate mining. Existing land use on these properties will cease.
- Combined high impact zone: These properties will have a high impact during some stage of the proposed mining in respect of air quality, noise, and blasting. If appropriate mitigation measures cannot be implemented to reduce the impacts below the acceptable standards, these properties will probably have to be purchased and existing land use will cease. Monitoring must be implemented to determine the impacts over the LOM and the need for land take.
- Combined moderate to high impact zone: These properties will have a high to moderate impact in respect of air quality, noise, and blasting. No sensitive receptors occur within these zones and existing land use will be able to continue. Monitoring must be implemented to determine the impacts over the LOM.
- Combined moderate impact zone: These properties will have a moderate impact in respect of air quality and noise, with the potential for some structural damages due to uncontrolled air blast events. Land use will be able to continue. In the event of any damage, compensation should be negotiated with the mine, which may lead to a financial impact on the mine.

- Low impact zone: No detrimental social or economic impacts are expected on properties within this zone and existing land use will be able to continue. Some nuisance impacts may be experienced.

Any properties situated outside the overall impact zone should not have any risks to its health and well-being and/or livelihoods. It is important to note that this risk classification doesn't consider potential nuisance impacts/risks as these are considered subjective and depend on individual perceptions which cannot be scientifically substantiated at this moment. The predicted impacts should be confirmed with monitoring over the LOM and further impact modelling as appropriate.

The criteria used to determine the risk classification of individual properties are tabled below for individual aspects. If more than one aspect is applicable to a specific property, the higher risk classification was chosen.

**Table 3-4: Criteria used for socio-economic risk classification of properties within impact zone**

<b>Air quality / Noise</b>	<b>Blasting</b>	<b>Risk classification</b>
Property wholly or partially within <b>high zone</b> , with existing sensitive receptors within this zone	Property wholly or partially within <b>exclusion zone</b> , with existing sensitive receptors within this zone	High
Property wholly or partially within <b>high zone</b> , with no existing sensitive receptors within this zone	Property wholly or partially within <b>exclusion zone</b> , with no existing sensitive receptors within this zone	Moderate - High
Property wholly or partially within <b>moderate zone</b> , with existing residential sensitive receptors within this zone		Moderate
Property wholly or partially within <b>moderate zone</b> , with no existing residential sensitive receptors within this zone		Low
Property wholly or partially within <b>low (nuisance) zone</b> , with existing residential sensitive receptors within this zone		
Property wholly or partially within <b>low (nuisance) zone</b> , with no existing residential sensitive receptors within this zone		Insignificant

Figure 3-6 show the final impact of all the possible environmental issues and the possible areas impacted on.

The different environmental classification impacts will be applied in determining the economic impact on the current agricultural and other business activities.

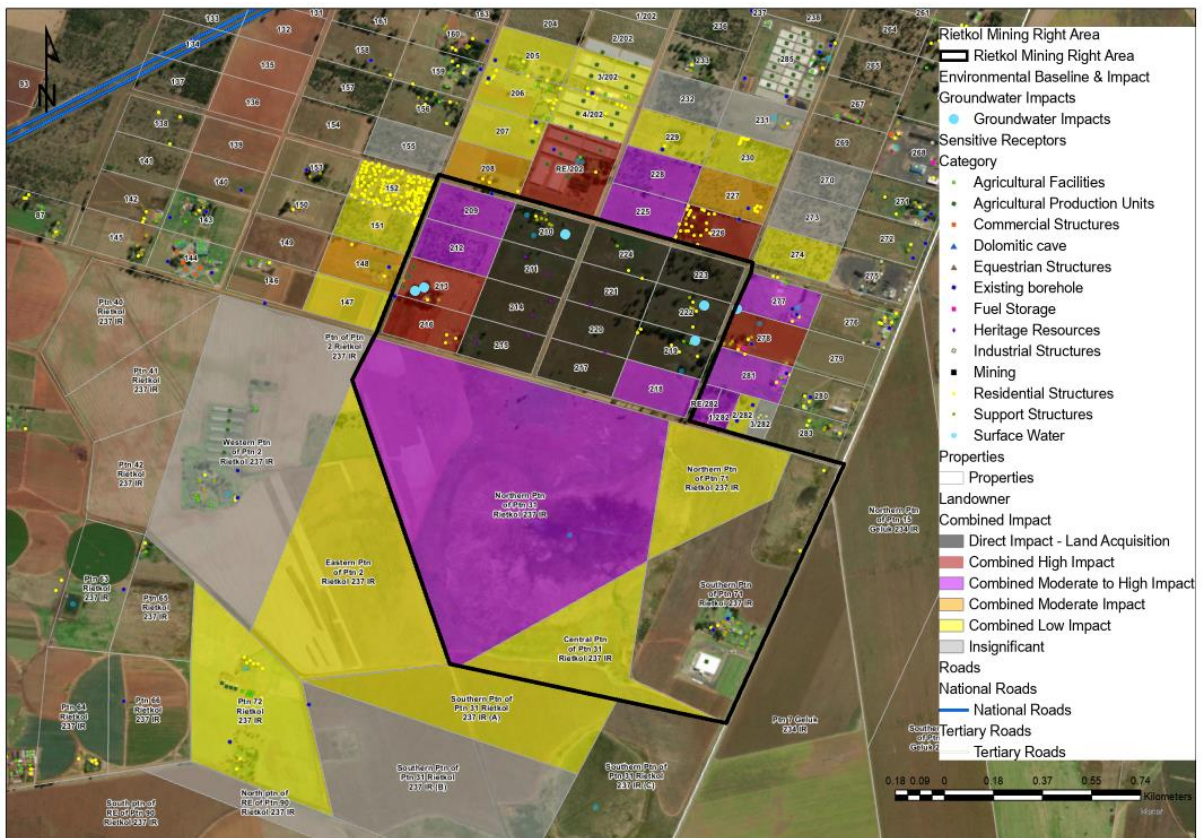


Figure 3-6: Cumulative (combined) sensitivity map

### 3.2 ECONOMIC RISK ASSESSMENT

In the following sections the possible impact of the proposed mining on the current agriculture and business activities is analysed explaining the approach and methodology.

#### 3.2.1 Possible Mining Impact on Current Agriculture and Business Activities

During the visits to the business, it emerged that there is general opinion that proposed mining activities will have a negative impact on the agricultural and business activities. Following up on the comments it is necessary that the approach be explained in detail that was followed to determine the economic possible impact

Therefore the following approach were followed to determine a possible negative impact on the activities. Eventually this is compared with the projected positive impact of the proposed mine.

In statistics, relative risk or risk ratio (RR) is the ratio of the probability of an event occurring (for example, developing a disease, being injured) in an exposed group to the probability of the event occurring in a comparative non-exposed group. In economics it is interpreted as the deviation from the current baseline of activities. Therefore in the interpretation of a risk value it is important to remember that the event might not occur at all. An x percent risk value only means that a possibility exists that an activity might be impacted. It might happen in the first year, or in year 20 or not at all.

It can also be explained by considering a 2% Risk Ratio which is often expressed as an impact once in 50 years, the baseline taken as 100% divided by the Risk Rate. Again, this is not to say that this event

will only take place once every 50 years, it could take place in any year and it might also be in a specific period even in 2 or 3 successive years.

Risk is there for a combination of the probability, or frequency of an occurrence or of a hazard and the magnitude of the consequence of the occurrence (Nel, 2002). Risk estimation is concerned with the outcome, or consequences of an intention, taking account of the probability of occurrence and which can be expressed as  $P$  (probability)  $\times$   $S$  (severity) = RE (Risk Evaluation). Risk evaluation is concerned with determining significance of the estimated risks and also includes the element of risk perception. Risk assessment combines risk estimation and risk evaluation (Nel, 2002).

Once the Risk Rate has been determined it must be converted to a monetary amount to provide an indication of possible damage to activities and structures. Again, it must be kept in mind that the possibility exists that the event will not occur. A low-risk rate means the chance that incident/event will occur is very low.

In developing a possible impact scenario for the construction and operation of the mine on the local economic activities, it was necessary to differentiate the activities and to again estimate it within the three identified sub-areas as the possible impacts differ for each of the three areas.

The aim of the Macro-Economic Impact Assessment (MEIA) is to identify the unintended consequences of the project on the receiving environment and to anticipate implementation risks to encourage measures to mitigate them.

A complicating factor in the specific area is that provision must be made for the difference in impact on structures, agricultural production and business activities. In the case of damage to structures it is much simpler to estimate the possible damage. In the case of crop and livestock production the uncertainty of the determination of the possible extent increases. For instance, two animals might differ in the reaction to a sudden noise.

It must also be kept in mind that any amount calculated is an economic value and not a financial value, this is specifically important in the case of a possible negative impact on crop and livestock production.

The identified crop and livestock activities per economic zone were subjected to the “Plump” Risk Matrix method to determine the impact of a specific activity in a specific area by applying a Delphi technique in which four members of the Mosaka staff participated per activity. Once an impact per activity, Risk Ratio, was determined a second Delphi was applied to weigh the different activities per zone to arrive at a mathematical weighted average providing an estimated economic impact per zone.

Once the possible impact was determined by applying the Risk classification as shown in **Table 3-3**, mitigation measures were considered and a final economic Risk Ratio per zone was determined for the crop and livestock activities.

### 3.2.1.1 Impact Assessment Methodology

The analysis provides the wider positive impact of the proposed mining activities, but it becomes necessary to also estimate the possible negative impact on current activities, such as quality of life and environment. The methodology, as discussed below, explains the concepts with specific reference to the economic impacts.

In order to ensure uniformity, a standard impact assessment methodology was utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology will be used to describe the impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 3-5**.

**Table 3-5: Quantitative rating and equivalent descriptors for the impact assessment criteria**

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	<i>Isolated corridor / proposed</i>	Incidental
2	LOW	<i>Study area</i>	Short-term
3	MODERATE	<i>Local</i>	Medium-term
4	HIGH	<i>Regional / Provincial</i>	Long-term
5	VERY HIGH	<i>Global / National</i>	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

As the possible economic impact will be expressed in monetary values it is necessary that the following explanation be provided.

### 3.2.1.2 Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e., the size) of area affected by atmospheric pollution may be extremely large (1000km<sup>2</sup>) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60ha of a grassland type are destroyed the impact would be VERY HIGH, if only 100ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 3-6** below as well as the possible impact of subsidence of productive land occurring.

**Table 3-6: Description of the significance rating scale**

<b>RATING</b>	<b>DESCRIPTION</b>	<b>Occurrence of Subsidence</b>
<b>5</b>	<b>VERY HIGH</b> Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.	Not Applicable
<b>4</b>	<b>HIGH</b> Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.	Not Applicable
<b>3</b>	<b>MODERATE</b> Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.	Not Applicable
<b>2</b>	<b>LOW</b> Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.	Not Applicable
<b>1</b>	<b>VERY LOW</b> Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.	Very low possibility that will impact dramatically on production, some possibility on crop production
<b>0</b>	<b>NO IMPACT</b> There is no impact at all - not even a very low impact on a party or system.	Not applicable

### 3.2.1.3 Spatial Scale

The spatial scale refers to the extent of the impact i.e., will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 3-7**.

**Table 3-7: Description of the significance spatial scale**

	RATING	DESCRIPTION	SIGNIFICANCE OF SUBSIDENCE
5	Global/National	The maximum extent of any impact.	Not applicable
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50km from the proposed site / corridor.	Not applicable
3	Local	The impact will affect an area up to 5km from the proposed route corridor / site.	Not applicable
2	Study Area	The impact will affect a route corridor not exceeding the boundary of the corridor / site.	Study area will small significance
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the corridor / site.	Not applicable

### 3.2.1.4 Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 3-8**.

**Table 3-8 Description of the temporal rating scale**

	RATING	DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5
3	Medium term	The environmental impact identified will operate for the
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

### 3.2.1.5 Degree of Probability

The probability or likelihood of an impact occurring is described as shown in **Table 3-9**.



**Table 3-9: Description of the degree of probability of an impact occurring**

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

### 3.2.2 Macro-Economic Impact Assessment

The aim of the Macro-Economic Impact Assessment (MEIA) is to identify the unintended consequences of the project on the receiving environment and to anticipate implementation risks to encourage measures to mitigate them.

A complicating factor in the specific area is that provision must be made for the difference in impact on structures and agricultural production. In the case of damage to structures it is much simpler to estimate the possible damage. In the case of crop and livestock production the uncertainty of the determination of the possible extent increases. For instance, two animals might differ in the reaction to a sudden noise.

**It must also be kept in mind that any amount calculated is an economic value and not a financial value, this is specifically important in the case of a possible negative impact on crop and livestock production. The intention is not to provide any possible financial impacts on buildings and repair costs.**

The identified crop and livestock activities per economic zone were subjected to the “Plump” Risk Matrix method to determine the impact of a specific activity in a specific area by applying a Delphi technique in which four members of the Mosaka staff participated per activity. Once an impact per activity, Risk Ratio, was determined a second Delphi was applied to weigh the different activities per zone to arrive at a mathematical weighted average providing an estimated economic impact per zone.

Once the possible impact was determined by applying the Risk classification as shown in **Table 3-9**, mitigation measures were considered and a final economic Risk Ratio per zone was determined for the crop and livestock activities.

The following **Table 3-10** provides an “**hypothetical**” indication of the methodology applied in the Risk Analysis Model for the agricultural activities as determined by Mosaka consultants involved in the project by applying the Delphi approach.

**Table 3-10: Indication of Methodology Applied**

Potential Impact	Duration		Scale		Magnitude/Severity		Probability		Significance	
	Description	Weight	Description	Weight	Description	Weight	Description	Weight	Description	Sum (Duration, Scale, Magnitude) x Probability
Sound	Long term	4	Site	1	Low	1	Improbable	1	Low	6
Underground Water	Long term	4	Site	1	High	8	Probable	2	Medium	26
Blasting	Long term	4	Site	1	Low	1	Improbable	1	Low	6
Dust - Mining	Long term	4	Site	1	High	8	Highly Probable	4	Moderate	52
Dust - Transport	Long term	4	Site	1	High	8	Highly Probable	4	Moderate	52
Employment effect	Long term	4	Site	1	Low	1	Improbable	1	Low	6
Sense of place	Long term	4	Site	1	Low	1	Improbable	1	Low	6
Financial loss	Long term	4	Site	1	Medium	4	Probable	2	Low	18
Socio-Economics	Long term	4	Site	1	Medium	4	Probable	2	Low	18
Security Concerns	Long term	4	Site	1	Low	1	Probable	2	Low	12
									Average - Low	20.2

The “Significance Value” is calculated by the sum of the Duration, Scale and Magnitude multiplied with the value of the “Probability”.

The “Significance Value” is then converted to an impact by using the following scale:

**Table 3-11: Impact Scale**

Negligible	≤20
Low	>20 ≤40
Moderate	>40 ≤60
High	>60

In **Table 3-11** the significance is estimated as 20.2 which converts to a **low** impact.

A risk profile is then developed for each of the zones making provision for a weight allocated to a specific intrusion caused by the mining activity. A percentage impact is then allocated to each economic activity, which is then multiplied with the weight; the answer is converted to a percentage impact. The percentage impact is then applied to the estimated annual turnover to arrive at the negative impact to be caused by the mining activity.

The following **Table 3-12** provides a “hypothetical” set of results as *an example* of a set of results and then followed by explaining the interpretation of the results.

**Table 3-12: Hypothetical Weighted Risks per Zone and Estimated Value of Agricultural Value (2020 prices)**

Zone	Hypothetical Annual Turnover Rand million	Hypothetical Risk Rate	Annual Risk Rand Million	Estimated Annual Occurrence Once per Year
<b>Zone 1 (MRA area)</b>	R1.15	1.7%	R0.02	1 in 59 years
<b>Zone 2</b>	R193.52	4.3%	R8.22	1 in 24 years
<b>Zone 3</b>	R43.82	1.8%	R0.79	1 in 56 years
<b>Total</b>	R238.49	3.79%	R9.03	

In the following sections the interpretation of the results in **Table 3-12** is explained.

In Zone 1 the speculative Risk Ratio of 1.7% is a very small chance that any damage will occur to *agricultural* production.

In Zone 2 the hypothetical Risk Ratio is 4.3% which is mostly caused by the high possibility that the two southern most tunnels of tunnel flower production unit could be damaged by the blasting operations and the rose production be disturbed.

In Zone 3 the hypothetical Risk Ratio value is 1.8% and again a very small chance that any damage can occur.

In the Economic Cost Benefit Analysis, the **hypothetical** amount of R 9.03 million as estimated in **Table 3-5** is allocated on a yearly basis in the model as already explained the possibility is always there that the damage can occur.

The actual damages to buildings and structures and the possible equestrian activities are estimated applying a different route. **However, it should be kept in mind that this is a not evaluation of the actual replacement or repairing cost but the determination of a risk amount to be used in an economic Cost Benefit Analysis.**

The applicable risk for homesteads and outbuildings is estimated in terms of the building material used and the use of the building. The following assumptions were used in the estimation of possible costs if damages are caused by blasting:

- Buildings in the MRA area are either a mining company building and two private homesteads still to be negotiated for sale if required and the Rossgro egg packhouse;
- Two of the Unex Rose tunnels could be impacted and a risk in terms of possible replacement was estimated. Possible operational losses are already included in the product risk analysis.
- Stone and brick buildings are estimated in terms of double the normal annual maintenance multiplied with the replacement costs.
- In the case of Goudhoek Saalperde and the equestrian centre it was accepted that some behaviour problems with the horses could be experienced when blasting at the mine occurs.

### 3.3 REGIONAL OVERVIEW<sup>12</sup>

The Delmas area is characterised by extensive agriculture with a mix of large and relatively small farms and mining activities such as coal and silica quartz in the area. Small scale farming practises at the Modder East Orchards AHs, Rietkol AHs, Rietfontein AHs and Eloff Small Holdings surround the project area. Farming is the most dominant economic activity in the Victor Khanye Local Municipality, occupying approximately 60% of the total physical area.

Victor Khanye LM boasts with a high potential of arable soils and a high rainfall. The proposed Rietkol Project falls within this area. Land use in the area is predominantly livestock, vegetable, floriculture (tunnels) and maize production, although the production of soybeans has significantly increased in the last number of years. The reduction in maize plantings can be assigned to the rotational cropping of soybeans.

The Municipality is currently characterised by an increase in coal mining and related activities, the mining of silica sand is also done and other important sectors in this area are agriculture, agricultural product processing, industrial and manufacturing. Natural resources make a significant and direct contribution to the Municipality's economy.

The two urban areas located in close proximity to the MRA area, namely Delmas (located approximately 5 km to the east of the mining area) and the Eloff hamlet (located approximately 1 km south of the mining area) with its neighbouring small holdings to the north and east of the hamlet, should not be impacted by the mining activities.

Cognisance is taken of the fact that only small areas of the involved farms will be subjected to mining. The mining footprint and infrastructure area of the MRA area will become the property of the mine and will probably not be available for any farming or other private activities.

The economic activities taking place in the specific areas was identified and quantified applying accepted methodologies and then converted to economic and socio-economic parameters.

The Modder East AHs on the farm Olifantsfontein cover a substantial area with plots varying from 4 to 28 ha. The land use on these AHs is very disparate, covering intensive horticultural enterprises (rose and cut flower cultivation), dry land crop production, commercial businesses (such as panel beaters, construction contractors and a guest house), residential, horse training (equestrian centre), etc. The surrounding area includes irrigation and dry land farming, horticulture and large poultry enterprises. Ground water pivot irrigation is common.

Of the current property owners within the specific zones own or farm more than one portion of land, either adjoining or separated from the land within another zone.

The areas surrounding the Modder East Orchards AHs host a number of wetlands and dams and are located on the south-eastern end of the Botleng Dolomite Aquifer. A great demand for groundwater arises from the agricultural sector with large scale irrigation practices occurring extensively in the Delmas area mainly for the production of maize, soya beans and vegetables (summer and winter). Meat and poultry abattoirs also make use of large volumes of water for their manufacturing processes.

The general farming activities in the wider area is commercial farming, which includes grazing, poultry, tunnel vegetable production and feedlots together with dryland and irrigation crop production.

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<sup>12</sup> Victor Khanye 2017-2021 Final Integrated Development Plan (IDP).

### 3.3.1 Agriculture

The rural area(s) of the Victor Khanye Local Municipality predominantly consists of extensive commercial farming. The municipal area is a major maize producing area, with an annual maize production calculated at between 230 000 and 250 000 metric tons. Commercial farming occurs primarily in the following areas: Union Forest Plantation Eloff, Rietkol, Springs, and Sundra AHs. These areas are primarily extensive residential with non-conforming land uses. As the Delmas area is a “high potential” agricultural area, it is important that agricultural land must be protected against urban sprawl and mining activity, etc.

#### 3.3.1.1 Poultry

Poultry enterprises are present in the area. Poultry producers market their products in the eMalahleni and East Rand, Gauteng area. Here too good quality water for the layers is a pre-requisite for poultry health.

The poultry industry consists of three main sectors, namely:

- Egg production;
- Broiler production; and
- Egg sorting, packing and dispatch.

In addition to the direct production of eggs, the poultry industry has a large impact through secondary activities, suppliers and outputs. The poultry industry is one of the largest consumers of maize in South Africa, consuming around 2.68 million tons of maize per annum; 25% of the country’s total maize consumption. In addition to this, feed is the biggest determinant of the cost of egg and broiler production. By-products of the industry include chicken manure and spent hens.

A large egg layer packhouse and two broiler units are present within the study zones.

#### 3.3.1.2 Cultivated Agriculture

The commercial agricultural activities reflected below were determined by day visits originally made to the area by members of Mosaka on the 9<sup>th</sup> of March 2016, 29<sup>th</sup> of December 2016, 20<sup>th</sup> of April 2018 and 3<sup>rd</sup> of May 2018 to either familiarise members with the situation, confirm some of the observations or deductions made from satellite images or to meet with affected parties. All the visits took place during the summer months. The summer crops are Maize and Soya, winter crops are Cabbage, Teff and Russian grass and flower and rose production all year round. The cultivated dry land and irrigation areas were identified by means of satellite images and the hectares determined.

Follow up visits and meetings took place on the 5<sup>th</sup> and 11<sup>th</sup> of May 2021 during Autumn. It was observed that the pecan nut trees has grown considerably and started with production and that prickly pear areas is also producing. The original egg layer unit has been changed to a broiler production unit. Also, a pig feed testing unit has been established.

In the wider area extensive maize and soya bean fields (both dry land and irrigated) are present. Vegetable production (dry land, irrigated and tunnel) was also observed.

Initial observations showed that the area of the AHs, within the MRA Area has several rocky outcrops and very limited dry land maize fields with a small Pecan Nut orchard. In the area south of the MRA area dry land maize and soya cultivation are present with a large wetland area. The major commercial agricultural production is all located within the Buffer Area.

The general 2012 norm for field crop production in the Delmas, Ogies and Leandra Districts is estimated at Maize 66%, Soybeans 29%, Sorghum 3% and Sunflower 2%<sup>13</sup>. The 2017/2018 production numbers show that the area under Maize production has declined to 60% and soya beans increased to 37% in Mpumalanga. It therefore appears as if soybean production is increasing at a cost to maize<sup>14</sup>. The rotational cropping of maize with soybeans was taken into consideration. This general norm was applied for the cultivated land identified on the farms that were measured on satellite images and for which the crops were not specified by the owner during the site visits.

The project area consists of close to 59% allocated to cultivation and crop production (Maize, Soya and Dry Beans, Teff and Russian Grass, Cactus Pears, Floriculture and Pecan Nuts) and 41% to grazing. The cultivation/crop production was estimated to consist of 54.59% Maize, Soya and Dry Beans, 1.81% Teff/Russian Grass, 1.55% Cactus Pears, 0.88% Floriculture and 0.24% Pecan Nuts.

The rotational cropping of maize with soybeans was taken into consideration. The following production yields were used in the calculations:

- The output of dryland maize is assumed at 6 tons per hectare.
- The output of dryland soya and dry beans is assumed at 2.5 tons per hectare.
- The output of cactus pears is assumed at 15 to 25 tons per hectare.
- The output of Teff grass is assumed at 9.3 tons per hectare.
- The output of pecan nuts is assumed at 2.2 tons per hectare.

MBFi also has their Head Office and Fungal Department on Holding 144 with experimental crops on surrounding holdings, such as on Holdings 146, 147 and 216.

### 3.3.1.3 Horticulture

Hydroponics is well established in the area. The area is well situated for the local markets in Johannesburg, East Rand and Pretoria and for export by air via OR Tambo International Airport.

### 3.3.2 Mining

Mining activities are concentrated mainly on coal and silica. About 3 million metric tons of coal<sup>15</sup> are mined annually in the municipal area. The main mining areas are around Delmas in the centre of the municipal area, and also in the far north-eastern corner of the municipal area. Importantly, there is a growing urgency to establish an equitable and realistic trade-off that maximises the provincial benefits from mining and energy sectors while mitigating any environmental impacts.

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<sup>13</sup> Evaluating the Impact of Coal Mining on Agriculture in the Delmas, Ogies and Leandra Districts. A Focus on Maize Production. Report by Bureau for Food and Agricultural Policy (BFAP).

<sup>14</sup> Crop Estimates Committee – 29 May 2018

<sup>15</sup> Integrated Development Plan – 2017-2018

There are no major active mining activities within a 5 km radius of the Rietkol Project MRA area. The existing coal mines are located mainly to the east and south-east of the project area.

### 3.3.3 Industries

Industries are concentrated in the following areas: Botleng Ext 14, Union Forests Plantation, Eloff surrounds, Rietkol AHs, Rietkol 2371R, Sundale, portions of the towns of Springs and Sunda. Victor Khanye forms an extension of the industrial core of Ekurhuleni to the west, which forms an extension of Tshwane and Johannesburg metros which is the economic hart land of Gauteng and South Africa. The industrial potential of Delmas (agri-processing) should particularly be promoted to capitalise on the town's strategic location regarding the major transport network.

No large industrial economic businesses were identified during any of the visits.

### 3.3.4 Business Activities

The developed urban areas (and business concentrations) are Delmas, Botleng and Eloff, of which Delmas functions as the primary node. The urban areas are mainly residential with supportive services such as business, social facilities, etc.

## 3.4 ECONOMIC ASSESSMENT ON CURRENT ACTIVITIES

### 3.4.1 Activities in the MRA Area

#### 3.4.1.1 Main Land Use Activities

The MRA area has very little agricultural activity, only a relatively small dry land maize and soya bean fields and a young pecan nut orchard. Some of the AHs are residential with very little agricultural activates while on others the owners make a living from the proceeds of the land.

Research and analysis of available data from the Agricultural Research Council convinced the team that the activities as identified in **Table 3.13** will not be impacted on by the "sand" mining.

**Table 3-13: Pre-Mining Land Use in MRA Area**

Agriculture	Pre-mining ha	After Mining ha	Possible Impact
Maize	33.04	33.04	Not impacted
Soya	16.52	16.52	Not impacted
Beef (Grazing)	98.50	54.16	Lose 44.34 ha
Pecan Nuts	3.5	3.5	Not impacted. Future of the small holding discussed separately
Egg Packhouse	4.04	4.04	This activity is discussed separately.
Other Natural areas (wetlands)	45.64	45.64	Not impacted
<b>Total<sup>16</sup></b>	<b>201.24</b>	<b>156.90</b>	

Table 3-14 presents the estimated built-up area in Zone 1.

**Table 3-14: The Estimated Built-up Area in the Zone 1 (MRA).**

Category	MRA (ha)
Farm Homesteads and Out Buildings	6.54
Egg Packhouse	1.50
Roads	7.35
<b>Total</b>	<b>15.39</b>

Table 3-15 presents an estimation of the annual turnover of the agricultural product in the MRA with the total area available for cattle grazing before the mining and if the pecan nut production remains in place or are removed.

**Table 3-15: Annual Turnover in the MRA (2020 prices)**

	Before	Pecan in Place	Pecan Removed
	Rand Mil.	Rand Mil.	Rand Mil.
<b>Total</b>	<b>R41,755</b>	<b>R41,689</b>	<b>R41,071</b>

Table 3-16 present the annual turnover in macro-economic units.

<sup>16</sup> Areas utilised for roads have been excluded in amount to approximately



**Table 3-16: Annual Turnover Macro-Economic Impact Parameters – (2020 prices)**

Activity or Crop	Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household	High & Middle Income	Low Income
	Rand Mil.	Rand Mil.	Rand Mil.	Number	Number	Number	Rand Mil.	Rand Mil.	Rand Mil.
<b>Total</b>	<b>R 20.4880</b>	<b>R 19.7851</b>	<b>R 40.2731</b>	<b>79</b>	<b>66</b>	<b>145</b>	<b>R 19.6890</b>	<b>R 11.8711</b>	<b>R 7.8179</b>

The direct GDP is estimated at R 20.4880 million with a total GDP of R 40.2731 million. The direct jobs, depending on the activities, are 79 with 66 indirect and induced providing a total of 145.

The annual wages paid to low-income households are estimated at R 7.8179 million with a total of R 19.6890 million.

### 3.4.1.2 Risk Rating and Impact Assessment

**Table 3-17** presents the Risk Rating of the individual holdings according to discussed mining activities on possible impact on the current activities.

**Table 3-17: Risk Rating of individual Smallholdings in the MRA**

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
MODDER EAST ORCHARDS AH	Holding 210	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing, Residential	Direct Impact - Land Acquisition	High Impact	Land purchased	Moderate Impact	SR in zone	High Impact	SR in zone	High Impact	Exclusion Zone with SR	High Impact	1 borehole within direct impacted area
MODDER EAST ORCHARDS AH	Holding 211	Mining Right Application Area	Willem Christoffel Meyer	Grazing	Direct Impact - Land Acquisition	High Impact	Land purchased	High impact	No SR in zone	High Impact	No SR in zone	High Impact	Exclusion Zone with no SR	No Impact	
MODDER EAST ORCHARDS AH	Holding 214	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Direct Impact - Land Acquisition	High Impact	Land purchased	High impact	No SR in zone	High Impact	No SR in zone	High Impact	Exclusion Zone with no SR	No impact	
MODDER EAST ORCHARDS AH	Holding 215	Mining Right Application Area	Veizaj Sokol	Grazing	Direct Impact - Land Acquisition	High Impact	Land to be purchased	High impact	No SR in zone	High Impact	No SR in zone	High Impact	Exclusion Zone with no SR	No impact	
MODDER EAST ORCHARDS AH	Holding 217	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Direct Impact - Land Acquisition	High Impact	Land purchased	High impact	No SR in zone	High Impact	No SR in zone	High Impact	Exclusion Zone with no SR	No impact	
MODDER EAST ORCHARDS AH	Holding 219	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing, Residential	Direct Impact - Land Acquisition	High Impact	Land purchased	Low impact	SR in zone	High Impact	SR in zone	High Impact	Exclusion Zone with no SR	High Impact	1 borehole within direct impacted area
MODDER EAST ORCHARDS AH	Holding 220	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Direct Impact - Land Acquisition	High Impact	Land purchased	High impact	No SR in zone	High Impact	No SR in zone	High Impact	Exclusion Zone with no SR	No impact	
MODDER EAST ORCHARDS AH	Holding 221	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Direct Impact - Land Acquisition	High Impact	Land purchased	High impact	No SR in zone	High Impact	No SR in zone	High Impact	Exclusion Zone with no SR	No Impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
MODDER EAST ORCHARDS AH	Holding 222	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing, Residential	Direct Impact - Land Acquisition	High Impact	Land purchased	Low impact	SR in zone	High Impact	SR in zone	No impact		High Impact	1 borehole within direct impacted area
MODDER EAST ORCHARDS AH	Holding 223	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Direct Impact - Land Acquisition	High Impact	Land purchased	No impact	No SR in zone	High Impact	No SR in zone	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 224	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing, Residential	Direct Impact - Land Acquisition	High Impact	Land purchased	Moderate Impact	SR in zone	High Impact	SR in zone	High Impact	Exclusion Zone with SR	No impact	
MODDER EAST ORCHARDS AH	Holding 213	Mining Right Application Area	Johanna Elizabeth van der Walt	Pecan nut farming, Grazing, Residential	Combined High Impact	No impact	No mining or infrastructure on property	High impact	SR in zone	High Impact	SR in zone	High Impact	Exclusion Zone with no SR	High Impact	2 boreholes affected at mine closure
MODDER EAST ORCHARDS AH	Holding 216	Mining Right Application Area	Bheki Mthethwa / Lorraine Mthethwa	Crops, Grazing, Residential	Combined High Impact	No impact	No mining or infrastructure on property	High impact	SR in zone	High Impact	SR in zone	High Impact	Exclusion Zone with SR	No impact	
MODDER EAST ORCHARDS AH	Holding 209	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Combined Moderate to High Impact	No impact	Land purchased	Moderate Impact	No SR in zone	High Impact	No SR in zone	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 212	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Combined Moderate to High Impact	No impact	Land purchased	High impact	No SR in zone	High Impact	No SR in zone	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 218	Mining Right Application Area	Consol Glass (Pty) Ltd	Grazing	Combined Moderate to High Impact	No impact	Land purchased	Moderate Impact	No SR in zone	High Impact	No SR in zone	High Impact	Exclusion Zone with no SR	No impact	
RIETKOL 237 IR	Northern Ptn of Portion 31	Mining Right Application Area	Rossouw Christiaan Le Cordeur	Crops, Grazing	Combined Moderate to High Impact	No impact	No mining or infrastructure on property	High impact	No SR in zone	High Impact	No SR in zone	No impact		No impact	
RIETKOL 237 IR	Central Ptn of Portion 31	Mining Right Application Area	Rossouw Christiaan Le Cordeur	Crops, Grazing	Combined Low Impact	No impact	No mining or infrastructure on property	Moderate Impact	No SR in zone	Low impact	No SR in zone	No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
RIETKOL 237 IR	Northern Portion of Portion 71	Mining Right Application Area	Rossouw Chris	Crops, Grazing	Combined Low Impact	No impact	No mining or infrastructure on property	Low impact	No SR in zone	Moderate impact	No SR in zone	No impact		No impact	
RIETKOL 237 IR	Southern Portion of Portion 71	Mining Right Application Area	Rossouw Chris	Feed, Poultry	No Impact	No impact		No impact	SR	No impact	SR	No impact		No impact	

Two of the businesses visited or conducted a virtual meeting is situated in the MRA area and was allocated a “Combined High Impact” and “Combined Moderate to High Impact” (Ptn 31) and “Combined Low Impact” (Ptn 71). It is there for necessary to discuss the two separately. Holding 215 is also listed as “Combined High Impact”, but it is only a homestead with few grazing cattle and a small maize production area.

#### [Mr. P van der Walt – Holding 213](#)

The property of Mrs. van der Walt, Small Holding 213, is located within the MRA area.

A meeting took place on the 5<sup>th</sup> of May 2021 on “Holding 213” with Mr. P van der Walt and also inspected the pecan nut trees. Mr. van der Walt has planted 709 pecan nut trees that has started to produce. The tree density converts to about 400 trees per hectare. He employs one worker permanently and in harvesting time a few on a part time contract.

Yields of pecan trees differ from region to region, with Mpumalanga achieving the lowest yields of around 1,5t/ha to 2,5t/ha. The drier areas in the Northern Cape achieve around 3t/ha to 5t/ha. The estimated yield per tree is per annum in the Rietkol area is at 8 kg, which is currently sold at between R60 and R80 per kg, which converts to between R480 - R640 per tree expressed in 2020 prices. That provides an estimated gross income of between R 340 320 and R 453 000.00 per annum once they are full grown on the holding.

#### [Mr. Bheki Mtethwa – Holding 215](#)

There is house on the property.

#### [Mr. Boy Mabona – Holding 220](#)

The holding has been bought by Consol Glass (Pty) Ltd. Mr. Mabona use the holding a number of other neighbouring holdings for cattle grazing. Some of the other areas falls in the MRA and about 40 hectares of grazing will be lost by Mr. Mabona.

#### [Rossgro](#)

The following land within Zone 1 is owned and used by the Rossgro Group:

- Portion 71 and RE of Portion 31 of the farm Rietkol 273 IR owned by Rossgro Pluimvee – Eiers (Edms) Beperk

The Highveld Packing Station is situated on Portion 71.

A virtual meeting was arranged with Rossgro, Dr Rossouw and Mr. Johann Minnaar part of the meeting on Thursday the 6<sup>th</sup> of May 2021.

The Highveld Packing Station is a centralized packhouse facility for the Highveld region for eggs produced by the Rossgro Group. According to data provided by Rossgro about 76 permanent staff are working in the facility, excluding the drivers that deliver the eggs from the different layer facilities and from time-to-time part time workers. According to data provided about 60 000 dozen of eggs are packed per day.

Issues raised are the following:

- Air Pollution;
- Environmental degradation;
- Impact of Silica on humans;
- Possible impact on dust in the packing facility and the quality of the eggs packed.
- Blasting and ground vibration.

The possibility was also mentioned regarding the possible relocation of the packhouse facility.

### 3.4.1.3 Risk Rating and Economic Impact Assessment

In terms of the MRA area the following activities will be affected or terminated:

- Maize production will not be terminated;
- Soya production will not be terminated;
- Beef production will lose about 40 hectares of grazing;
- Pecan nut production will be terminated if Holding 213 is bought by Consol.

The situation around the Rossgro egg packhouse is more complicated and is therefore discussed separately. The packhouse are situated in the MRA area, but according to the environmental risk assessment by the different consultants the southern portion of Rietkol 273 IR Ptn 71 is situated outside the overall impact zone of the proposed mining activities and should not have any risks to its health and well-being and/or livelihoods. It is important to note that this risk classification doesn't consider potential nuisance impacts/risks as these are considered subjective and depend on individual perceptions which cannot be scientifically substantiated at this moment. The predicted impacts should be confirmed with monitoring over the LOM and further impact modelling as appropriate.

In the estimation of the possible economic and financial risk the following impacts are added:

- Employment - Negligible;
- Business Atmosphere – Moderate;
- Socio-economics – Moderate;
- Security – Moderate.

If this is all combined an impact on the border between “Negligible and Low” is obtained and if judged against the proposed “Mining Plan” and again the reality that the packhouse is over 1.2 km from where the mining operations will start, then for at least a 15-year period the packhouse will not be impacted.

The impact above is expressed in economic terms in the **Table 3-18** with the pecan nuts stay in place or being removed.

**Table 3-18: Estimated Impact in the MRA due to the construction of the Mine**

	Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Househ old	High & Middle Income	Low Income
	Rand Mil.	Rand Mil.	Rand Mil.	Number	Number	Number	Rand Mil.	Rand Mil.	Rand Mil.
<b>Pecan Nuts Maintained</b>	-R0,026	-R0,040	-R0,066	-0	-0	-0	-R0,022	-R0,016	-R0,006
<b>Pecan Nuts Removed</b>	-R0,385	-R0,369	-R0,754	-1	-2	-3	-R0,403	-R0,284	-R0,119

The table show that the impact is minimal for the remaining activities in the MRA area. The Pecan nut orchard is included in the table but the possibility is high that Consol will buy the holding therefor the future negative impact will in any case take place due to the withdrawal of the production of the pecan nuts. The situation around the beef production is also that about 40 hectares of the grazing holdings will be lost.

The main projected loss could be the 1 direct and 2 indirect and induced jobs that could be lost if the pecan nut production is stopped and the grazing area is reduced.

### 3.4.2 Zone 2: Within 500m from the MRA Boundary

#### 3.4.2.1 Main Land Use Activities

The general land use in the Zone 2 areas differs substantially from that in the MRA area. The land use in this zone is more extensive and includes irrigation, horticulture, and livestock.

Zone 2 includes the rest of the Modder East Orchards AHs which, except for Unex Roses and the area under Microbial Biological Fertilizers International (MBFi) and Rossgro, is not agriculturally a very active area. Some of the AHs are residential with very little agricultural activities while on others the owners make a living from the proceeds of the land. On the adjacent properties of the Zone 2 commercial farming are more prominent.

Extensive dry and irrigated maize fields are present; Unex Roses shares a border with the MRA area to the north, CPI and Dr J Greeff are also active in the zone to the east.

The present land use in the project area, as reflected in **Table 3-19** and **Table 3-20**, was based on data sourced from initial orientation visits and satellite images.

**Table 3-19: Pre-Mining Land Use in the Zone 2 Area**

Agriculture	Zone 2 (ha)
Maize	154.65
Soya	77.33
Floriculture - Roses	7.97
Beef (Grazing)	106,67
Teff/Hay	15.61
Cactus Pears	6,88
Combined Private Investigations (CPI)	12.14
Dr Greeff – House Rental	4.52
Dr Greeff – Pig Feed Experimental Unit	
MBFi	8.09
Wetlands	27.89
<b>Total</b>	<b>422.25</b>

**Table 3-19** presents the total area occupied by the different activities and because of the confidentiality factor it was decided not to present an estimation of each of the business separate but only provides a total number as an indication of the total annual turnover in Zone 2.

The estimated annual average turnover expressed in 2020 prices is set at a value between **R 100 million and R 115 million**.

The **Table 3-20** presents the estimated built-up area in Zone 2.

**Table 3-20: The Estimated Built-up Area in Zone 2.**

Built-up	Zone 2 (ha)
Farm Homesteads and Out Buildings	27,07
Informal Settlements (squatters)	3,55
Business Administration and Premises	10,29
Security Business	1,26
Roads	9,59
<b>Total</b>	<b>51,76</b>

In the following sections a short discussion is provided of the different activities that could be impacted by the mining activities.



## Unex Roses

Unex Roses are the trading name for Uniflo Extension Eleven (PTY) Ltd situated on AH 202, Modder East Orchards, Delmas.

Unex Roses, located in Zone 2 and Zone 3, cultivates a variety of roses on 7.97 hectares of which 0.87 hectares in Zone 3 under cover and deliver the roses to Uniflo which in turn repacks and distribute them. During a meeting with Mr. Thinus Stols, Mr. Martin van Zyl and Mr. Johann Minnaar at the site on the 3<sup>rd</sup> of May 2018 we were informed of the business and their objections to the proposed mine. The meeting was followed up with a second meeting with the General Manager Mr. Wally Lewis and Mr. Johann Minnaar on the 11<sup>th</sup> of May 2021 to discuss outstanding issues and objections to the establishment of the mine.

Uniflo is currently receiving roses and flowers from 7 producers. The current labour force of Unex Roses is around 145 with 3 terrain managers.



**Figure 3-7: UNEX Roses - Source Google Earth Image 18 November 2017**

**The Webpage of Uniflo states the following:** *“Uniflo Roses is the largest rose supplier in South Africa. We export our roses worldwide and more than 70% of all roses originating from South Africa come from our farms. Roses have the ability to express love and genuine care, and at Uniflo we supply the most elegant and beautiful roses South Africa has to offer.*

*Welcome to Uniflo where you will always find the rose you are looking for. Uniflo consists of seven rose farms situated throughout the northern regions of South Africa. The 35 combined hectares produces an odd 50 million stems of quality fresh-cut roses every year which contribute to nearly 70% of all South African produced roses. The company was established in 1996, by combining our strengths as rose growers, we are able to take advantage of economies of scale offered in the industry.*

*The above highlights the size of Unex Roses in the South African rose production set up, 7.5 hectares out of the 35 hectares supplied to Uniflo, this represents 22% of the Uniflo supply and then adds up to 15% of the total South African Rose supply”.*

Unex Roses highlighted the following concerns and anticipated impacts:

- Possible problem with water quality and quantity when the mine is operational and blasting takes place.
- The possible impact of silica dust on the tunnels and the additional cost of cleaning the tunnels is a concern. Currently they clean the tunnels roughly every 6 to 8 weeks in winter by spraying them with water and they expressed the concern that this might increase if the mine is operational and the extra heavy vehicles create additional dust. According to the management of Unex Roses dust will have an impact on the growth of the roses. According to them the tunnels are designed to let the maximum sunlight in during the day. The dust will land on the roofs and will have an impact on the let through of the sunlight.
- The rose flowers must be 24 hours in cold storage before sending it to relevant customers. They anticipate that the dust will impact on the operation of the cold storage compressors and motors and prevent the roses to cool down as per the rules and regulations.
- Dust could also have an impact on the prickly pears that will reduce the projected fruit yield.
- Possible vibration impact on the tunnels that could be caused by the blasting if the mine is operational.
- Possible impact of the explosive blasting on the underground water situation as they are dependent on very deep boreholes for their water supply.
- The possibility of financial losses by Unex Roses were also mentioned with the possibility of staff then being reduced.

#### Combined Private Investigations (CPI)

**The Web page stated the following:** *“Combined Private Investigations (CPI), is a corporate investigation firm, specializing in the investigation of non-ferrous metal theft, specifically focusing on syndicates targeting electrical networks for most of the electricity supply companies as well the railway networks.*

*In addition, CPI secures and tracks high value cargo, with its unique robust locking mechanisms and its top of the range tracking device, for both road and rail transportation and logistics agents.*

*CPI also conducts investigations pertaining to the hi-jacking or theft of any non-ferrous metal or high valued cargo and prides itself in its excellent recovery levels”.*

The holdings, 278, 279 and 281, belongs to Robertson Trust from where Combined Private Investigation (CPI) operates with the management offices also on the site, but the head office is in Midrand where they have also established a laboratory for certain tests.

The property is also used for training purposes where they have accommodation facilities as well as lecture rooms and a shooting range for training purpose. The insured value of the different buildings is R 9.5 million. The total built up area is 2 032 m<sup>2</sup> with a replacement value of R11.2 million according to the calculations by Mosaka. There is also Vodacom tower as well helicopter landing facility on the property.

Also on site is a 15 000-liter fuel tank for the refueling of the vehicles, there are regularly 18 vehicles on the site.

A meeting was arranged on the 5<sup>th</sup> of May with CPI where the Robinson trustees, Mr. Roy Robinson and Leroy Robinson were present as well Mr. Jan du Plooy the administration manager. On site is an average of 12 permanent staff members and regularly increased in numbers by staff on courses who is also then accommodated on site.

As the CPI setup is adjacent to Mine Right Area and also close to one of the roads that will be used to take away the truck loads of silica sand.

CPI highlighted the following concerns and anticipated impacts:

- Possibility of an impact of dust on their activities from the operations and road transport.
- Possible impact of the explosive blasting on the underground water situation as they are dependent on boreholes for their water supply.
- Possibility that the sound levels from the mining activities would impact on their staff training activities. Regular staff training take place with varying groups of between 10 and 20 attendees.

#### Dr Jacobus Greeff

Holding 277 in Zone 2 is the property of Dr Greeff where four houses are situated as well as the pig feed experimental unit.

Dr Greeff has four houses for rental next to CPI and also have a pig feed testing unit with 250 pig sows who produces piglets. Dr Greeff also have pig feed producing unit in Sundra, about 15 km from the proposed mine.

A meeting took place with Dr Greeff on the 5<sup>th</sup> of May 2021 in Eloff where he and his wife was present and the following concerns and anticipated impacts were raised:

- The total denigration of the environment of the area will impact on the possibility to rent out the four units. Two of the houses have four bedrooms each and two is identified as flats. It is mentioned that the sound generated by the mining activities, the blasting and the dust will make it difficult to rent out the units.
- The underground water that might be impacted and a possible worsening of the security in the area.
- As far as the pig unit, concern was expressed about the possible impact of the dust on the pigs and their feed and the blasting from time to time.

In **Table 3-13** an estimation of the total agricultural and Business Activity in Zone 2 is presented. As the assurance was provided to the individual business that no private data would be provided only an estimation of the total is provided.

**Table 3-21: Estimated Baseline Agricultural Production and Business Activity in Zone 2 (2020 prices)**

Product	Zone 2 Estimated Income Rand Million
<b>Total</b>	R100 -115

The above figure is a conservative figure as the estimated prices used were on the lower end of the price range.

The baseline activities when converted by an econometric model expressed in Socio-Economic Parameters are reflected in the table below.

**Table 3-22** the results of Zone 2 are presented.

**Table 3-22: Annual Baseline GDP, Salaries and Wages paid to Households and Labour in Zone 2 – 500m**

Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household	High & Middle Income	Low Income
Rand Mil.	Rand Mil.	Rand Mil.	Number	Number	Number	Rand Mil.	Rand Mil.	Rand Mil.
R64,05	51,634	R115,68	201	142	343	R33,63	R24,86	R8,76

The direct GDP is estimated at R 64.05 million with a total of R 115.68 million if the ripple impact is taken into consideration. The total employment number is estimated 343 jobs of which 201 is direct employment and 142 indirect and induced. The main labour-intensive activities are rose production and CPI.

Total salaries and management fees paid to households, not only those working on the Holdings, but also the indirect and induced labour, are estimated at R 33.63 million with R 8.76 million, 26.05% to low-income households annually.

### 3.4.2.2 Risk Rating and Economic Impact Assessment

No evidence could be obtained that a silica mine will impact on the production of the following agricultural products:

- Maize Production;
- Soya Production;
- Vegetable Production;
- Feed Dry Hay Production;
- Prickly Pear Production;
- Animal Grazing.

The impact on the above list of products were therefor classified as “Negligent” and no impact were calculated.

In **Table 3-15** the following small holdings are where economic activities are taking place and where environmental issues that could be affected by the proposed mining activities:

- Holding 278 – Cumulative Rating - Combined High Impact - CPI;
- Extent of Holding 202 – Cumulative Rating – Combined High Impact – Uniflo (roses);
- Holding 277 - Cumulative Rating - Combined Moderate to High – Dr Greeff (House Rental and Pig Unit)
- Holding 281 - Cumulative Rating - Combined Moderate to High – CPI
- Holding 226 – Cumulative Rating – Combined High Impact – Mr Boy Mabona

#### Risk Rating – Unex Roses

The cumulative environmental rating is a “Combined High Rating” and is it necessary to rate the more commercial orientated possible impacts.

The following risks were allocated:

- Air Quality – Low Impact;
- Noise - High Impact;
- Blasting – High Impact – two tunnels can be impacted by air blast;
- Ground Water – No Impact.

In the estimation of the possible economic and financial risk the following impacts are added:

- Employment - Negligible;
- Business Atmosphere – Moderate;
- Socio-economics – High;
- Security – Moderate.

Combining the two sets of impacts and applying the “Plump” model a Low Economic Risk Rating is allocated. It appears as only the two top tunnels can be very negatively impacted by the possibility of air blast caused by mine explosion. Converting the possible damage to the two rose production tunnels as well as the rose production, a 11% chance of risk is allocated using the Plump methodology.

#### Risk Rating - Combined Private Investigation

The cumulative environmental rating is a “Combined High Rating” and is it necessary to rate the more commercial orientated possible impacts.

The following risks were allocated:

- Air Quality – No Impact;
- Noise- High Impact;
- Blasting – No Impact;
- Ground Water – High Impact – one of two boreholes can be affected at mine closure.

In the estimation of the possible economic and financial risk the following impacts are added:

- Employment - Negligible;
- Business Atmosphere – Moderate;
- Socio-economics – Negligible;
- Security – Moderate.

Combining the two sets of impacts and applying the “Plump” model a Low Economic Risk Rating is allocated. It appears as only the underground water supply can be very negatively impacted by the mining and blasting operations. Converting the possible damage to the borehole as well as the possible impact on the business and operational atmosphere a 9% risk rating is allocated.

#### Risk Rating Dr J Greeff

The cumulative environmental rating is a “Combined Moderate to High Rating” and is it necessary to rate the more commercial orientated possible impacts.

The following risks were allocated:

- Air Quality – No Impact;
- Noise - High Impact;
- Blasting – No Impact;
- Ground Water – No Impact.

It is noted that the rental houses are in the low impact zone, the pig unit in the moderate zone. Only a very small portion of the property (open space) is situated in the high impact zone.

In the estimation of the possible economic and financial risk the following impacts are added:

- Employment - Negligible;
- Business Atmosphere – Moderate;
- Socio-economics – Low;
- Security – Moderate.

Combining the two sets of impacts and applying the “Plump” model a Low Economic Risk Rating is allocated. It appears as only the noise impact on the rental houses and pig unit will have a “High” impact and possibility of a negative impact on the rental issue is moderate. The possibility of a negative impact on the pig feed experimental unit other noise impact could not be determined. Converting the possible negative economic impact, a 9% risk rating was allocated.

**Table 3-23 - Property risk classification – 500m buffer around the MRA area**

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
MODDER EAST ORCHARDS AH	Holding 226	500m around Mining Right Application Area	Mabona Boy Khetile and Sarah Maditshaba	Grazing, Residential	Combined High Impact	No impact		No impact	SR	High Impact	SR	No Impact		No impact	
MODDER EAST ORCHARDS AH	Remaining Extent of Holding 202	500m around Mining Right Application Area	Uniflo Extention Eleven Pty Ltd	Roses	Combined High Impact	No impact		Low impact	SR	High Impact	SR	High Impact	Two tunnels affected by air blast	No impact	
MODDER EAST ORCHARDS AH	Holding 278	500m around Mining Right Application Area	Combined Private Investigations CC	Commercial	Combined High Impact	No impact		No impact	SR	High Impact	SR	No impact		High Impact	1 of 2 boreholes affected at mine closure
MODDER EAST ORCHARDS AH	Holding 281	500m around Mining Right Application Area	Combined Private Investigations CC	Commercial	Combined Moderate to High Impact	No impact		No impact	SR	High Impact	SR in Low	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 225	500m around Mining Right Application Area	Tinus Stols	Prickley Pears	Combined Moderate to High Impact	No impact		Low impact	No SR	High Impact	No SR	High Impact	Exclusion Zone with no SR	No impact	
MODDER EAST ORCHARDS AH	Holding 228	500m around Mining Right Application Area	Bobbins Patricia Mary	Grazing	Combined Moderate to High Impact	No impact		Low impact	No SR	High Impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Portion 1 of Holding 282	500m around Mining Right Application Area	Naidoo Krishnaswami Adimoolam	Grazing	Combined Moderate to High Impact	No impact		Low impact	No SR	High Impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Remaining Extent of Holding 282	500m around Mining Right Application Area	Lam Ying Wan	Grazing	Combined Moderate to High Impact	No impact		Low impact	No SR	High Impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 277	500m around Mining Right Application Area	Greeff Jacobus, JO, Dr	Commercial - Agriculture & Property rental	Combined Moderate to High Impact	No impact		No impact	SR	High impact	SR in Low	No impact		No impact	No impact
MODDER EAST ORCHARDS AH	Holding 227	500m around Mining Right Application Area	Roux Jacobus J	Grazing	Combined Moderate Impact	No impact		No impact	SR	Moderate impact	SR	No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
MODDER EAST ORCHARDS AH	Holding 208	500m around Mining Right Application Area	Mthethwa Amos Bheki	Maize, Residential	Combined Moderate Impact	No impact		Low impact	SR	Moderate impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 148	500m around Mining Right Application Area	Booyen Koos	Pasture, Grazing	Combined Moderate Impact	No impact		Moderate Impact	SR	Low impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 147	500m around Mining Right Application Area	Etherington Jonathan	Commercial - Agriculture, Pasture	Combined Low Impact	No impact		Moderate Impact	No SR	Low impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 151	500m around Mining Right Application Area	Killat Siegward	Grazing, Residential	Combined Low Impact	No impact		Low impact	SR	Low Impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 152	500m around Mining Right Application Area	Hardchrome Plating Co Pty Ltd	Residential, Squatters	Combined Low Impact	No impact		No impact	SR	Low impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 205	500m around Mining Right Application Area	Van Zyl Martin	Prickley Pears	Combined Low Impact	No impact		No impact	SR	Low impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 206	500m around Mining Right Application Area	Van Staden JJ & EJ	Residential	Combined Low Impact	No impact		No impact	SR	Low impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 207	500m around Mining Right Application Area	Jerome Natasha	Maize, Residential	Combined Low Impact	No impact		Low impact	SR	Moderate impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 229	500m around Mining Right Application Area	Du Plessis Hendrik Nicholaas	Teff Grass	Combined Low Impact	No impact		Low impact	No SR in zone	Moderate impact	No SR in zone	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 230	500m around Mining Right Application Area	Mabona Boy Khetile and Sarah Madišhaba	Grazing	Combined Low Impact	No impact		No impact	SR	Low impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 274	500m around Mining Right Application Area	Heusinkveld Walter Karl Friedrich	Grazing	Combined Low Impact	No impact		No impact	No SR	Moderate impact	No SR	No impact		No impact	
MODDER EAST	Portion 2 of Holding 282	500m around Mining Right	Su Chung-Chien and	Grazing	Combined Low Impact	No impact		Low impact	No SR	Moderate impact	No SR	No impact		No impact	



Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
ORCHARDS AH		Application Area	Lam Ying Wan												
MODDER EAST ORCHARDS AH	Portion 3 of Holding 202	500m around Mining Right Application Area	Uniflo Extention Eleven Pty Ltd	Roses	Combined Low Impact	No impact		No impact	SR	Low impact	SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Portion 4 of Holding 202	500m around Mining Right Application Area	Uniflo Extention Eleven Pty Ltd	Roses	Combined Low Impact	No impact		Low impact	SR	Low impact	SR	No impact		No impact	
RIETKOL 237 IR	Southern Ptn of Portion 31 (A)	500m around Mining Right Application Area	Rossouw Christiaan Le Cordeur		Combined Low Impact	No impact	No mining or infrastructure on property	Moderate Impact	No SR in zone	Low Impact	No SR in zone	No impact		No impact	
RIETKOL 237 IR	Eastern Portion of Portion 2	500m around Mining Right Application Area	Rossouw Christiaan Le Cordeur	Crops, Feed, Grazing	Combined Low Impact	No impact		Moderate Impact	No SR	Moderate impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 155	500m around Mining Right Application Area	Pickering William Edward	Grazing	Insignificant	No impact		No impact		Low impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 231	500m around Mining Right Application Area	Wentzel Annamarie Regina and Christiaan Johannes Hubertus	Maize, Grazing	Insignificant	No impact		No impact	No SR	Low impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 232	500m around Mining Right Application Area	Murray Sheilah	Grazing	Insignificant	No impact		No impact	No SR	Low impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 270	500m around Mining Right Application Area	Dawid Joubert Trust	Grazing	Insignificant	No impact		No impact	No SR	Low impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 273	500m around Mining Right Application Area	Pollard Michael John Field	Grazing	Insignificant	No impact		No impact	No SR	Low impact	No SR	No impact		No impact	
MODDER EAST ORCHARDS AH	Portion 3 of Holding 282	500m around Mining Right Application Area	Fisher Riaan Henry	Commercial	Insignificant	No impact		No impact	No SR	Low impact	No SR	No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
RIETKOL 237 IR	Eastern Ptn of Portion 31 (B)	500m around Mining Right Application Area	Rossouw Christiaan Le Cordeur	Crops, Grazing	Insignificant	No impact	No mining or infrastructure on property	Low impact	No SR in zone	Low Impact	No SR in zone	No impact		No impact	
RIETKOL 237 IR	Western Portion of Portion 2	500m around Mining Right Application Area	Rossouw Christiaan Le Cordeur	Poultry, Feed, Residential/Office	Insignificant	No impact		No impact		Low impact		No impact		No impact	
GELUK 234 IR	Northern Portion of Portion 15	500m around Mining Right Application Area	Martinuzzi Nicolina	Crops, Feed	No Impact	No impact		No impact		No impact		No impact		No impact	
GELUK 234 IR	Portion 7	500m around Mining Right Application Area	Martinuzzi Nicolina	Crops, Feed, Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 146	500m around Mining Right Application Area	Etherington Jonathan	Commercial - Agriculture, MBFI	No Impact	No impact		No impact	SR	No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 149	500m around Mining Right Application Area	Middleditch David Garth	Pasture	No Impact	No impact		No impact	No SR	No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 150	500m around Mining Right Application Area	Thom Mike	Grazing	No Impact	No impact		No impact	SR	No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 153	500m around Mining Right Application Area	Thom Mike	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 154	500m around Mining Right Application Area	Mthetwha Amos Bheki	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 156	500m around Mining Right Application Area	Botha Daniel Erich	Grazing	No Impact	No impact		No impact	SR	No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 157	500m around Mining Right Application Area	Van Coller Hermanus Stephanus	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST	Holding 158	500m around Mining Right	Serepo Masie Lucas	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
ORCHARDS AH		Application Area													
MODDER EAST ORCHARDS AH	Holding 159	500m around Mining Right Application Area	Buckle Annemarie	Grazing	No Impact	No impact		No impact	SR	No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 269	500m around Mining Right Application Area	Webster Maria Elizabeth Cornelia	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 271	500m around Mining Right Application Area	Cremer Louis Frederik Jacobus	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 272	500m around Mining Right Application Area	Rudolph Johan	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 275	500m around Mining Right Application Area	Bredenkamp Pieter Dawid	Commercial	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 276	500m around Mining Right Application Area	Fourie Pieter Johannes and Fourie Johanna Hendrina	Commercial	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 279	500m around Mining Right Application Area	Combined Private Investigations CC	Commercial	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 280	500m around Mining Right Application Area	Greyling Jacobus Johannes	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 283	500m around Mining Right Application Area	Grobbelaar Alex Libion	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Southern Ptn of Portion 31 (C)	500m around Mining Right Application Area	Rossouw Christiaan Le Cordeur	Feed, Poultry	No Impact	No impact	No mining or infrastructure on property	No impact	SR	No impact	SR	No impact		No impact	

**Table 3-24: Estimated Impact in Zone 2 (500m)**

Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household	High & Middle Income	Low Income
Rand Mil.	Rand Mil.	Rand Mil.	Number	Number	Number	Rand Mil.	Rand Mil.	Rand Mil.
-R4,908	-R3,824	-R8,732	-19	-13	-32	-R2,713	-R2,003	-R0,710
-7,7%	-7,4%	-7,5%	-9,6%	-9,0%	-9,3%	-8,1%	-8,1%	-8,1%

The possible average loss in Macro-Economic parameters is estimated at 8.31% which, if correctly interpolated presents a possible loss of 1 in 12 years. This could happen in year 1 or 2 or 12 or not at all. The economic value used in the Economic Cost Benefit Analysis are then calculated as R 105.575 million x 8.31% = R8.77 million.

**Table 3-24** show that the maximum Direct GDP loss is R 4.908 million and with the Indirect and Induced losses the total is R 8.732 million.

An estimated 19 Direct Employment Opportunities can be lost in the worst-case scenario with a total of 32 if the Indirect and Induced are added.

The total Salaries and Wages that can be lost is R2.713 million with R0.710 million in the case of the Low-Income Households annually.

The applicable risk for homesteads and outbuildings is estimated in terms of the building material used and use of the building. The following assumptions were used in the estimation of possible costs if damages are caused by blasting:

- Two of Unex Rose Blomme tunnels could be impacted and a risk in terms of possible replacement was estimated. Possible operational losses are already included in the product risk analysis. Refer to discussion on p 36.

### 3.4.3 Zone 3: Between 500m and 1km from the MRA Boundary

#### 3.4.3.1 Main Land Use Activities

The land use in this zone is more extensive and includes pivot irrigation, horticulture, broiler houses and livestock. The area is generally rich in groundwater and subsequently boasts several irrigation fields producing maize, soya and vegetables.

With the good rainfall in the area dry land farming, mainly maize and soya beans, are successful crops. The potential for dry land production is high.

This zone includes all properties between 500m and 1km surrounding the MRA area also Pretorius Blomme and Rossgro broiler units. MBFi research and production facility lies within this zone and Equestrian facility.

The Agricultural Holdings or farms that straddle the 1km study area are considered as a farming unit and thus the property as a whole was included in this zone. The present land use in the project area, as reflected in the tables below, was based on data sourced from initial orientation visits and satellite images.

**Table 3-25: Pre-Mining Land Use in the Zone 3 Area**

Activity	Zone 3 (ha)
Maize	619.75
Soya	309.87
Floriculture - Roses	-
Beef (Grazing)	164.85
Teff/Hay/Russian Grass	27.92
Cactus Pears	7.24
Pecan Nuts	-
Poultry - Broilers	6,34
Floriculture - Cut Flowers	4,24
MBFi	12.14
Wetlands	36.9
<b>Total</b>	<b>1 189.25</b>

Table 3-26 below presents the estimated built-up area in the three identified zones.

**Table 3-26: The Estimated Built-up Area in the Different Zones**

Built-up	Zone 3 (ha)
Farm Homesteads and Out Buildings	12,86
Packhouse/Feed Mill	5,55
Business Administration and Premises	28,39
Equestrian	2,62
Roads	11,66
<b>Total</b>	<b>61,08</b>

From **Table 3-25** it appears that although a number of identified activities do occur in Zone 3, but not one of them has been identified with any risk. The following Holdings is part of the identified activities listed under different names but still part of the larger business:

- Unex Roses – Holdings 201, 202;
- Rossgro – Broilers – Rietkol Portion 90 and Portion 2;
- Pretorius Blomme – Holding 285;
- Rossgro – Feed – Rietkol Portion103.

#### Pretorius Blomme

Pretorius Blomme, located in Zone 3, produces fresh flowers (Chrysanthemums) for the local market in an area under cover, roughly 3.5 hectares. A group of family members live in a house on the

property. The company was established in 1987 and has steadily expanded over a period of 30 plus years.

During a meeting with Mr. Leon Pretorius and Mr. Johann Minnaar at the site on the 3rd of May 2018 we were informed of the business and concern with the proposed mine. A follow up meeting was arranged with the Pretorius Family and Mr. Johann Minnaar on the 11<sup>th</sup> of May 2021 and the situation were discussed.

The business consists of three business managers and employs 65 workers, 4 office staff and 2 terrain managers.

About 99% of their production is different colors of Chrysanthemums and the rest is foliage to be used with flower bouquets. The small plants are imported from Tanzania and then grown and marketed in South Africa. The flowers are packed on site, stored in coolers and then dispatched to the market by road. About 50% is flown from Oliver Tambo airport to flower wholesalers in the Western Cape. The entire management and marketing are done on site.



**Figure 3-8: Pretorius Blomme South of the Proposed Mine**

Pretorius Blomme highlighted the following concerns and anticipated impacts:

- Problems that will be associated with the possibility of the mining dust and problems that it might cause the tunnel roofs and the increased washing of the roofs and the increased cost associated with the process.

- The possible environmental degradation of the environment that will take together with increased security problems were mentioned in the discussion.
- Possible impact of the explosive blasting on the underground water situation as they are dependent on very deep boreholes for their water supply.
- The possible effect of silicosis on human beings was also brought forward by the management.
- The possibility of financial losses by Pretorius Blomme were also mentioned with the possibility of staff then being reduced.

### Rossgro Poultry

Rossgro (Geluk 234 IR Portion 24 and Rietkol 237 IR Portion 2) are commercial broiler production units located within the Zone 3 area. The closest, Rossgro enterprise (Rietkol 237 IR Portion 2) is located approximately 764 m southwest from the proposed mine operations and Rossgro (Geluk 234 IR Portion 24), approximately 1082 m east from the proposed mining operations. The distances depend on from where exactly you measure, but it would not impact on the zone classification.



**Figure 3-9: Broiler Production Unit East of the proposed Mine**



**Figure 3-10: Broiler Production Unit South West of the proposed Mine**

### Horse Stud and Equestrian Centre

The Goudhoek SA Boerperd Stud with an Equestrian Centre is located in the Zone 3 Area on Plots 158, 160, 161, 162.

The Boerperd Stud receives the horses from the stud at Wakkerstroom at a young age and are then trained at the Equestrian Centre and eventually sold between the 6<sup>th</sup> and 10<sup>th</sup> year.

The following additional issues applicable to the Goudhoek SA Boerperd Stud were raised by Mr. Sarel Kritzinger during a meeting at the centre on the 20<sup>th</sup> of April 2018. Additional information was also provided by Mr Kritzinger in May 2021:

- Ms. Kritzinger, together with her husband and Mr. Zietsman the stud breeder has a well-established SA Boerperd stud business with registered thorough bred horses. The horses are bred in Wakkerstroom and then at the age of approximately two years transferred to Modder East Orchards for training. The schooling of the horses commences at the age of four years and after five years the breeding traits can be assessed. The schooling constitutes the value added and determines the sale price of the horse from the age of approximately six years.
- The equestrian centre hosts four to eight equestrian events annually with approximately 30 to 40 competitors and their participating horses, which equates to an average of 100 visiting horses per event. Events are primarily held over weekends. Of the visitors are children and the visiting horses are not accustomed to noise and earth tremors which may originate from blasting at the mine during competitions. Sudden noise frightens horses which can result in injuries to the riders and/or the horses.
- The additional traffic from the mining activities will also have a negative effect on visiting competitors with their horse trailers.





**Figure 3-11: Goudhoek SA Boerperd Stud**

Mr DG and Mrs SS Middleditch

Holdings 135, 126, 139, 140, 141 and 143 is owned by the Middleditch couple and they are listed as grazing and pasture units, except 143 which is listed as “equestrian”. No contact was made with family as they are quite a distance from the MRA area.

MBFi

**The Web page state the following:** *“As the MBFi Group we are dedicated to enhancing research and development of biological technology to help productivity of crops around the world. The three main pillars of our products are Bio-Stimulants, Biologicals and Adjuvants. We aim to assist in growing the agricultural industry sustainably, by being leaders within the biological and bio-stimulant marketplace where the agricultural industry is coming to expect nothing but extraordinary.”*

The company specializes in manufacturing Bio-Stimulants and Biological products and has developed Crop Programs which will successfully support users in achieving optimum results from their crops.

Parts of experimental land is in Zone 2 while the administrative building, which is also their headquarters where their experiments and the manufacturing and distribution of the products takes place is situated in Zone 3.

No meeting could be arranged with the owners and or managers, but a meeting with their legal representative took place on the 11<sup>th</sup> of May 2021 in Pretoria North where certain information requests was put to him.

No answer has yet been received.

During the meeting the lawyer stated that the company is against the construction of the mine based on the possible impact of the silica dust on the experiments and the possible negative impact that blasting vibrations can have on the instruments that they use, which are very sensitive. Mention was

made of studies they have conducted on these sensitivities, but these have not been shared with the specialists.

The economic assessment on the baseline land use in the project area, as reflected in the tables below, was based on data sourced from agricultural databases, initial orientation visits and satellite images. The baseline calculation for agricultural production in the area is shown in the table below. By qualitative and quantitative inputs of the involved producers, producer organisations and other sources, Mosaka were able to present an economic picture of the current situation of the affected parties.

In an agreement with Unex Roses, Pretorius Blomme, Rossgro and Goudhoek Saalperde it was decided that no detailed estimation of annual turnovers will be published. As no data was provided by MBFi there annual turnover is not represented in **Table 3-27**.

**Table 3-27: Estimated Baseline Production in Zone 3 (1km) (2020 prices)**

Product	Zone 3 Estimated Income Rand Million
<b>Total</b>	R88.93

The above figure is a conservative figure as the estimated prices used were on the lower end of the price range. It also excludes the MBFi product sale numbers.

The baseline agriculture activities when converted by an econometric model expressed in Socio-Economic Parameters are reflected in the table below.

**Table 3-28** the results of Zone 3 are presented.

**Table 3-28: Baseline GDP, Salaries and Wages paid to Households and Labour in Zone 3 – 1km**

Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household	High & Middle Income	Low Income
<i>Rand Mil.</i>	<i>Rand Mil.</i>	<i>Rand Mil.</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Rand Mil.</i>	<i>Rand Mil.</i>	<i>Rand Mil.</i>
R36.855	R51.594	R88.449	145	142	287	R30.445	R22.177	R8.268

The direct GDP is estimated at R 36.855 million with a total of R 88.449 million if the ripple (secondary) impact is taken into consideration. The total employment number is estimated 287 jobs of which 145 is direct employment and 142 indirect and induced.

Total salaries and management fees paid to households, not only those working on the farms but also the indirect and induced labour, are estimated at R 30.445 million with R 8.268 million to low-income households.

**Table 3-29: Zone 3 Holdings in the 1km Radius**

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
RIETKOL 237 IR	Portion 72	500m - 1km around Mining Right Application Area	Du Plessis Maria Johanna / Ds Fanie	Vegetables	Combined Low Impact	No impact		Low impact	SR	Low impact	SR	No impact		No impact	
RIETKOL 237 IR	Northern Portion of Portion 90	500m - 1km around Mining Right Application Area	Chris Rossouw Familie Beleggings Pty	Crops, feed	Insignificant	No impact		Low impact		No impact		No impact		No impact	
GELUK 234 IR	Portion 2	500m - 1km around Mining Right Application Area	Rossouw Christiaan Le Cordeur	Crops, Feed	No Impact	No impact		No impact		No impact		No impact		No impact	
GELUK 234 IR	Portion 24	500m - 1km around Mining Right Application Area	Rossouw Christiaan Le Cordeur	Poultry	No Impact	No impact		No impact		No impact		No impact		No impact	
GELUK 234 IR	Southern Portion of Portion 15	500m - 1km around Mining Right Application Area	Martinuzzi Nicolina	Crops, Residential, Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 127	500m - 1km around Mining Right Application Area	De Jager Jacoba Alletta and De Jager Petrus Hendrik	Grazing, Residential	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 128	500m - 1km around Mining Right Application Area	De Jager Petrus Hendrik and De Jager Jacoba Alletta	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 130	500m - 1km around Mining Right Application Area	Shein Meyer	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 131	500m - 1km around Mining Right	Suid Afrikaanse Padraad	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
		Application Area													
MODDER EAST ORCHARDS AH	Holding 132	500m - 1km around Mining Right Application Area	Voogt Dwayne	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 133	500m - 1km around Mining Right Application Area	South African National Road Agency Ltd	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 134	500m - 1km around Mining Right Application Area	South African National Road Agency Ltd	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 135	500m - 1km around Mining Right Application Area	Middleditch David Garth	Pasture, Equestrian, Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 136	500m - 1km around Mining Right Application Area	Middleditch David Garth	Pasture, Equestrian, Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 137	500m - 1km around Mining Right Application Area	South African National Road Agency Ltd	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 138	500m - 1km around Mining Right Application Area	Marais Edwin	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 139	500m - 1km around Mining Right Application Area	Middleditch David Garth	Pasture, Equestrian, Horses	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST	Holding 140	500m - 1km around Mining Right	Middleditch David Garth	Pasture, Equestrian, Horses	No Impact	No impact		No impact		No impact		No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
ORCHARDS AH		Application Area													
MODDER EAST ORCHARDS AH	Holding 141	500m - 1km around Mining Right Application Area	Middleditch Sheryl Sandra	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 142	500m - 1km around Mining Right Application Area	Middleditch Sheryl Sandra	Pasture, Equestrian	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 143	500m - 1km around Mining Right Application Area	Middleditch Sheryl Sandra	Equestrian, Pasture	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 144	500m - 1km around Mining Right Application Area	Etherington Jonathan	Commercial - Agriculture, MBFI	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 145	500m - 1km around Mining Right Application Area	AW De Jager	Grazing, Residential	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 160	500m - 1km around Mining Right Application Area	Kritzinger Sarel Jacob Norval	Equestrian, Grazing	No Impact	No impact		No impact	SR	No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 161	500m - 1km around Mining Right Application Area	Kritzinger Sarel Jacob Norval	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 162	500m - 1km around Mining Right Application Area	Lions Club of Durban	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST	Holding 163	500m - 1km around Mining Right	Marais Hester H	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
ORCHARDS AH		Application Area													
MODDER EAST ORCHARDS AH	Holding 164	500m - 1km around Mining Right Application Area	Pioneer Carpet Wholesalers Pty Ltd	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 165	500m - 1km around Mining Right Application Area	Mc Donald Ronald	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 166	500m - 1km around Mining Right Application Area	Mountifield John Robert	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 167	500m - 1km around Mining Right Application Area	Binder Aron and Epstein Joseph and Plein Aaron	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 200	500m - 1km around Mining Right Application Area	Swart M	Maize/Veg	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 201	500m - 1km around Mining Right Application Area	Uniflo Exention Eleven Pty Ltd	Roses	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 203	500m - 1km around Mining Right Application Area	Jansen van Niewenhuizen	Teff grass	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 204	500m - 1km around Mining Right Application Area	Stols Tinus	Prickley Pears	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST	Holding 233	500m - 1km around Mining Right	Van Dyk Dawid Schalk	Grazing, Residential	No Impact	No impact		No impact		No impact		No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
ORCHARDS AH		Application Area	and Johanna Susanna												
MODDER EAST ORCHARDS AH	Holding 236	500m - 1km around Mining Right Application Area	Reitmann Cornelia Huibrecht and Le Roux Hester Anette	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 237	500m - 1km around Mining Right Application Area	Viljoen Carel Johannes	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 238	500m - 1km around Mining Right Application Area	Bouwer Jacobus Christoffel	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 263	500m - 1km around Mining Right Application Area	Webster Dennis Ian Webster Maria Elizabeth	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 264	500m - 1km around Mining Right Application Area	Engelbrecht David Cornelius	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 265	500m - 1km around Mining Right Application Area	Thembeni Geluza Selby and Thembeni Christina	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 266	500m - 1km around Mining Right Application Area	African BEE Farming Pty Lyd	Bee farming	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Holding 267	500m - 1km around Mining Right Application Area	Webster Maria Elizabeth Cornelia	Grazing	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST	Holding 268	500m - 1km around Mining Right	Webster Dennis Ian	Commercial	No Impact	No impact		No impact		No impact		No impact		No impact	

Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
ORCHARDS AH		Application Area													
MODDER EAST ORCHARDS AH	Holding 285	500m - 1km around Mining Right Application Area	Pretorius Petronelle Jacoba	Flowers	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Portion 1 of Holding 202	500m - 1km around Mining Right Application Area	Uniflo Extention Eleven Pty Ltd	Roses	No Impact	No impact		No impact		No impact		No impact		No impact	
MODDER EAST ORCHARDS AH	Portion 2 of Holding 202	500m - 1km around Mining Right Application Area	Uniflo Extention Eleven Pty Ltd	Prickley Pears	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Portion 103	500m - 1km around Mining Right Application Area	Rossgro Voere Pty Ltd	Feed Production	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Portion 40	500m - 1km around Mining Right Application Area	Rustig Landgoed Pty Ltd	Feed, Poultry	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Portion 41	500m - 1km around Mining Right Application Area	Rustig Landgoed Pty Ltd	Feed, Poultry	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Portion 42	500m - 1km around Mining Right Application Area	Rustig Landgoed Pty Ltd	Feed, Poultry	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Portion 63	500m - 1km around Mining Right Application Area	Louman Farm Property cc	Vegetables	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Portion 65	500m - 1km around Mining Right	Scorpio Farming cc	Pasture, Residential	No Impact	No impact		No impact		No impact		No impact		No impact	



Property Name	Portion Description	Study Area	Registered Landowner	Existing Land use	Cumulative Impact	Direct (Land Take) Impact	Direct (Land Take) Impact comment	Air Quality Impact rating	Air Quality Impact comment	Noise Impact rating	Noise Impact comment	Blasting Impact rating	Blasting Impact comment	Groundwater Impact rating	Groundwater Impact comment
		Application Area													
RIETKOL 237 IR	Portion 66	500m - 1km around Mining Right Application Area	Louman Farm Property cc	Vegetables	No Impact	No impact		No impact		No impact		No impact		No impact	
RIETKOL 237 IR	Southern Portion of Portion 90	500m - 1km around Mining Right Application Area	Chris Rossouw Familie Beleggings Pty	Crops, feed	No Impact	No impact		No impact		No impact		No impact		No impact	

### 3.4.4.2 Risk Rating and Economic Impact Assessment

The specialist studies and the cumulative risk assessment indicate that there will be no direct impact within this zone, albeit that some nuisance impacts may result from the mining operations.

It is necessary that the risk to the Pretorius Blomme, Rossgro Broilers and Goudhoek Stud be discussed as the evaluation of the changed environment show no impact for the activities. Although part of Unex Roses holdings in in Zone 3 the projected impact was handled in Zone 2.

**Pretorius Blomme:** The environmental impact assessment show “no impact”. The economic impact assessment indicates a very low impact in terms of additional costs to wash the tunnel roofs.

**Rossgro Broilers:** The environmental impact assessment show “Negligible impact” for the Rustig Broiler Farm (Rietkol Ptn 2) and “No impact” for the Geluk Broiler Farm. The economic impact assessment indicates a very low impact in terms of negative reaction of the chickens with the blasts and possible changes to the housing facilities to ensure no dust enter the facilities.

**Goudhoek Saalperde Stud:** The environmental impact assessment show “no impact”. The economic impact assessment indicates a very low impact in terms of negative reaction of the horses during organised events if blasting take place.

**Middleditch Equestrian:** No impact on holding 143 could be identified.

**MBFi:** As no data was received from MBFi an estimate indicate very little impact could be identified.

**Table 3-30** the worst possible economic impacts are presented for the current activities in Zone 3.

**Table 3-30: Estimated Impact in Zone 3 (1km)**

Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household	High & Middle Income	Low Income
Rand Mil.	Rand Mil.	Rand Mil.	Number	Number	Number	Rand Mil.	Rand Mil.	Rand Mil.
-R0,4149	-R0,3806	-R0,7955	0	-2	-2	-R0,4414	-R0,3095	-R0,1319
-1,13%	-0,74%	-0,90%	-0,08%	-1,30%	-0,68%	-1,45%	-1,40%	-1,60%

A total GDP loss of R0.79 million per annum is estimated with R0.41 million direct. A possible number of employment opportunities are at risk with a total of 2.

The possible total loss in wages is estimated at R 0.441million with R 0.132 for low-income households. The average loss is estimated at 1.03% per annum, if presented in terms of probability it is a possibility that it will happens once in 100 years or the first year or any year.

Using the estimated annual turnover of R 88.93 million for Zone 3 and multiplying it with the estimated negative impact of 1.03% provides a maximum of R 0.917million per annum as an economic value as possible impacts and is as such used in the Economic CBA.

### 3.5 SUMMARY OF CURRENT ACTIVITIES

In the following paragraphs a summary of the total agricultural and other business activities is presented together with the possible impact of the proposed mine.

#### 3.5.1 Current Economic Assessment

The present level of economic activities in the three areas was determined in order to serve as a baseline from where the possible deviation of the different impacts will be calculated using a detailed Risk Model. The detail of the Risk Assessment Methodology is discussed in **paragraph 2.2.5**. The values allocated by the specialist reports will be converted in the Risk Model to monetary values, which will be expressed in terms of impacts on GDP, employment and payments to households.

Likewise, the possible accumulated impact on the wider area, due to the Rietkol mining activities, is also considered and where applicable incorporated in the study.

In **Table 3-31** the total agricultural and business results of the MRA area and Zones 2 and 3 are presented before any mining took place. As confidentiality is important as little as possible detail per activity is provided.

**Table 3-31: The Socio-Economic Parameters for the Total Area (2020 Prices)**

Zone	Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household Income	High & Middle Income	Low Income
	Rand million	Rand million	Rand million	Number	Number	Number	Rand million	Rand million	Rand million
Zone 1-MRA	20,488	19,7851	40,2731	79	66	145	19,689	11,8711	7,8179
Zone 2	64,045	51,634	115,679	201	142	343	33,627	24,864	8,763
Zone 3	36,855	51,594	88,449	145	142	287	30,445	22,177	8,268
<b>Total</b>	<b>121,388</b>	<b>123,0131</b>	<b>244,4011</b>	<b>425</b>	<b>350</b>	<b>775</b>	<b>83,761</b>	<b>58,9121</b>	<b>24,8489</b>

The direct GDP is estimated at R 121.388 million with a total of R 244.4011 million if the ripple impact is taken into consideration. The total employment number is estimated 775 jobs of which 425 is direct employment and 350 indirect and induced. The main labour-intensive activities are poultry, egg packhouse, roses and cut flower production.

Total salaries and management fees paid to households, not only those working on the farms but also the indirect and induced labour, are estimated at R 83.761 million with R 24.8489 million to low-income households.

From the above tables it is obvious that current agricultural and other activities provide a large number of direct jobs as well as a healthy income to households.

There are several small businesses operating on some of the AHs, such as a guest house facility, panel beaters, trucking, etc, which is not included in the tables.

No other mining activities were observed in the immediate area.

### 3.5.2 Impact Assessment

The area is an important agricultural producing area with intensive horticulture and poultry enterprises within the buffer area in which the concerns of the affected and interested parties are identified. A number of other business activities are also active and contribute to economy. The area has several AHs, some of which are not commercially very productive. Furthermore, the area is rich with underground water and irrigation pivots are a common sight.

In **Table 3-32** the possible negative impact of the proposed mining operation is presented in socio-economic parameters. The data presented in **Table 3-32** for the MRA-Zone 1 accepts that the pecan nut production will eventually be stopped and that the beef grazing area will be reduced.

**Table 3-32: Possible Negative Impact of the Proposed Mine (2020 prices)**

Zone	Direct GDP	Indirect and Induced GDP	Total GDP	Direct Jobs	Indirect and Induced Jobs	Total	Total Household Income	High & Middle Income	Low Income
	Rand million	Rand million	Rand million	Number	Number	Number	Rand million	Rand million	Rand million
Zone 1-MRA	-0,385	-0,369	-0,754	-1	-2	-3	-0,404	-0,284	-0,120
Zone 2	-4,908	-3,824	-8,733	-19	-13	-32	-2,713	-2,002	-0,710
Zone 3	-0,415	-0,381	-0,796	-0	-2	-2	-0,441	-0,310	-0,132
<b>Total</b>	<b>-5,708</b>	<b>-4,574</b>	<b>-10,282</b>	<b>-20</b>	<b>-17</b>	<b>-37</b>	<b>-3,558</b>	<b>-2,596</b>	<b>-0,962</b>

Based on a worst-case scenario, where impacts cannot be mitigated, there is a potential risk that as many as 20 direct jobs could be lost with a further 17 indirect and induced, with a total of 37. A reduction of R5.708 million in direct GDP is anticipated, with a total R 10.28 million. The possible loss of income to low-income households is estimated at R 0.962 million per annum with a possible annual total loss of R3.558 million.

### 3.5.3 Socio-Economic Impact of the proposed mine

In **Table 3-33** a comparison between the estimated negative impact of the mine on current activities and the projected positive impact of the proposed mine is presented.

**Table 3-33: Estimated Benefits associated with the operational phase of the proposed mine**

	Current Agriculture and Businesses		Mining	Net Benefit from the mining activity	Future Total Activities
	Current	Estimated Loss	Projected		
<b>Direct GDP</b>	R 121.388 mil.	R 5.708 mil.	R 35.8 mil.	R 30.092mil.	R 151.48 mil.
<b>Direct Employment</b>	425	20	100	80	505
<b>Low Household Income</b>	R 24.8489mil.	R 0.962mil.	R 13.40	R 12.438 mil.	R 37.2869 mil.

**Table 3-33** show that although the mine will have a possible limited negative impact on the economy in the area the overall impact will be positive. The total future direct GDP will increase from the current value of R 121.388 million to R 151.48 million.

The number of direct employment opportunities will increase from 425 to 505 and the wages paid to low-income households from R 24.8489 million annually to R 37.2869 million.

### 3.5.4 Economic Impact used in the Economic CBA

**Table 3-34** presents the estimated annual turnover in the three zones with the percentage risk used to calculate the economic monetary amount. The total amount of R10.415 million is added as a cost to the Economic CBA.

**Table 3-34: Annual Turnover and Risk Monetary Amount (2020 prices)**

Zone	Annual Turnover	Estimated Risk	Estimated Risk
	Rand million	Percentage	Rand million
Zone 1-MRA	41,76	-1,74%	-0,725
Zone 2	105,575	-8,31%	-8,773
Zone 3	88,993	-1,03%	-0,917
<b>Total</b>	<b>196,323</b>		<b>-10,415</b>

## 4 COST BENEFIT ANALYSIS

### 4.1 APPROACH & METHODOLOGY

The Cost Benefit Analysis (CBA) approach is used to determine the financial and economic feasibility of the proposed mine in the Rietkol area.

The Financial CBA is performed in two models: firstly, as a constant 2020 price model, and secondly as a current price model that incorporates a projection of the future inflation rate. Financial viability is measured in terms of the following parameters and decision criteria:

- Net Present Value (NPV)  $>0$ , with the relevant discount rates that differ for the two models.
- Internal Rate of Return (IRR)  $> 8\%$  Discount Rate for the constant price model; and
- Internal Rate of Return (IRR)  $> 11.28\%$  for the current price model;
- Benefit Cost Ratio (BCR)  $>1$ .

The Economic CBA is performed with constant prices using economic “prices” that eliminate market price distortions. These economic prices are often referred to as “shadow prices”. The same parameters and decision criteria are used as in the Financial CBA to determine economic feasibility.

By economic analysis is meant the project is re-evaluated at prices which reflect the relative scarcity of inputs and outputs. The economic analysis follows the analysis of the source and application of productive funds, which is done at market prices. In the economic analysis, prices represent opportunity costs and reflect the actual economic value of inputs and outputs. The opportunity cost is the value of the best alternative application of an input or an output of the project.

The market price of land, for example, does not necessarily reflect the opportunity cost of the land. Thus, when a price has to be determined for a piece of agricultural land used for maize farming but on which an airport is planned, the opportunity cost of the land is the discounted net output from the maize.

In some other cases the concept of shadow prices is used to estimate opportunity costs. The whole concept is discussed in Appendix A.

#### 4.1.1 Purpose of the CBA

The economic tools used for the economic assessments are the CBA and the Partial General Equilibrium Analysis, based on a regional SAM representing all involved economic units in the study.

In short, the CBA can be described as a system whereby the costs and benefits of a specific development project are compared to evaluate the economic viability of the project.

The CBA forms part of the micro-economic impact analysis and focuses on the positive and negative economic impacts in order to put all direct and secondary impacts of the project into perspective, for effective decision-making purposes.

#### 4.1.2 Objective of the Cost Benefit Analysis

The principles underlying the Standard CBA are applied to evaluate the economic viability of the Rietkol Project, taking into consideration all negative and positive costs (impacts) of the mining activities.

The CBA approach provides a logical framework by means of which development projects can be objectively evaluated and, as such serves as an aid in the decision-making process. (A more detailed explanation of the CBA can be found in Appendix A).

The theoretical foundations of a CBA are benefits that are defined as increases in human wellbeing (utility) and cost that are defined as reduction in human wellbeing. For a project or policy to qualify on cost-benefit grounds, its social benefits must exceed its social costs. "Society" is simply the sum of individuals. The geographical boundary for a CBA is usually the nation, but can be readily extended to wider limits. See Appendix A for more detail about the theoretical context of a CBA.

To determine the economic viability of the proposed project an economic CBA was done in accordance with the Water Research Commission's publication "*A Manual for Cost Benefit Analysis in South Africa with specific Reference to Water Resource Development*" Third Edition. In short, the CBA can be described as a system whereby the costs and benefits of a specific development project are compared to evaluate the financial and economic viability of the project. The CBA method provides a logical framework by means of which development programmes can be evaluated and serves as an aid in the decision-making process.

The CBA accommodates all the possible negative impacts on local economic activities, impacts on the environment and, if applicable, rehabilitation.

#### 4.1.3 Cost Benefit Analysis Methodology

A CBA comprises of two distinct portions, a financial CBA component and an economic CBA component. The financial CBA component is based on market and nominal prices, whilst the economic CBA component is based on shadow/economic and constant prices. It was decided to construct a constant price economic CBA as part of this assessment. The use of shadow/economic prices is necessary to reflect more realistic values of scarce economic resources. Market prices often do not give a true representation of the scarcity value of resources, owing to interference in market price setting such as government tax regulation and artificial adjustments to, for example fossil fuels prices, electricity tariffs and minimum wage levels.

The decision on the actual values used is discussed in a later section.

Within the CBA framework, various impacts have been calculated for each year of the project period.

- The impacts for each year of the project are discounted to present values, using an appropriate discount rate. The financial CBA conducted in current prices (with the assumption that the SA inflation rate over the longer period will be less than 6%) and a real yield on capital of 5% giving a discount rate of around 11% per annum, reflecting the cost of capital. It is calculated as follows  $((1+0.07) \times (1+0.04))^{-1} \times 100 = 11.28\%$ . Obviously, the rate will not always be constant as it depends on prime lending rate as well as associated risk of the specific project.

The economic CBA is done in constant prices and discounted by a social discount rate of 8% per annum.

The CBA methodology has been chosen to indicate whether the project in question is economically feasible or not. Within the framework, the estimated economic cost of the project is compared by means of a ratio (Benefit Cost Ratio) to the estimated economic benefits of the project. For a project to be considered economically viable, this ratio must have a value greater than 1 in order to indicate that benefits outweigh costs.

Additional viability indicators provided are Net Present Value (NPV) and Internal Rate of Return (IRR). A more detailed discussion on the interpretation of each indicator is included in the results section of the CBA component.

#### 4.1.4 Assumptions Underlying the Cost Benefit Analysis

The assumptions that were used in relation to the benefits and costs for the economic CBA are briefly discussed below.

## 4.2 COSTS AND BENEFITS

In the following sections the capital and other costs as well as the projected revenue presented in the MWP (2019) is presented and discussed as necessary.

It is important to take in consideration that the original prices were available in 2018 prices, but the mine will not be operational before 2021, therefore all prices were adapted to 2020 prices. A second assumption is that the main construction will take place during 2021, but the first ore production will take place in 2022, if the license is obtained.

### 4.2.1 Estimated Capital Expenditure

#### 4.2.1.1 Initial Capital Expenditure

The capital expenditure includes the cost of the land as well as the construction of the plant for the first 10 years. In **Table-4-1** the initial capital presented expressed in 2018 and 2020 prices.

**Table 4-1: Initial Capital Expenditure<sup>17</sup> 9**

Capital Expenditure	2021	2022	2023
2018 Prices (Rand million)	R 30.00	R 15.00	R 10.00
2020 Prices (Rand million)	R 34.05	R 17.70	R 12.25

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<sup>17</sup> Source: MWP, 2019 – page 44.



#### 4.2.1.2 On-going Capital Expenditure

On-going expenditure expected for the first ten years are listed below, the same amount per annum is used for the period 2022 to 2028, these were updated to 2020 prices:

**Table 4-2: On-Going Expenditure<sup>18</sup> (updated 2020 prices)**

Ongoing Expenditure	Capital	2021	2022	2023	2024	2025
<b>TOTAL</b>					<b>R 11.24 mil.</b>	<b>R.11.67 mil.</b>
Ongoing Expenditure	Capital	2026	2027	2026	2028	2029
<b>TOTAL</b>		<b>R 12.10 mil.</b>	<b>R 12.53 mil.</b>	<b>R 12.95 mil.</b>	<b>R 13.38 mil.</b>	<b>R 13.81 mil.</b>

#### 4.2.2 Operational Costs

The anticipated operational costs are reflected below for a ten-year period with the projected annual sand production growth rate of 3% per annum, as the mine is forecasting a 20-year lifetime whereby the CBA model accommodates it.

**Table 4-3: Operating Cost Forecast (Excluding the Processing Plant and Labour)<sup>19</sup> (updated 2020 prices)**

Cost of Mining	2022	2023	2024	2025	2026
<b>Fuel</b>	R 1 753 132	R 1 856 567	R 1 966 104	R 2 082 105	R 2 204 949
<b>Electricity</b>	R 114 600	R 124 914	R 136 156	R 148 410	R 161 767
<b>Stores and Maintenance material</b>	R 380 000	R 411 160	R 1 363 320	R 1 475 112	R 1 596 071
<b>Total</b>	<b>R 2 247 732</b>	<b>R 2 392 641</b>	<b>R 3 465 581</b>	<b>R 3 705 627</b>	<b>R 3 962 787</b>

Cost of Mining	2027	2028	2029	2030	2031
<b>Fuel</b>	R 2 335 041	R 2 472 808	R 2 618 704	R 2 773 207	R 2 936 827
<b>Electricity</b>	176 326	192 196	209 493	228 348	248 899
<b>Stores and Maintenance material</b>	R 1 726 949	R 1 868 559	R 2 021 781	R 2 187 567	R 2 366 948
<b>Total</b>	<b>R 4 238 316</b>	<b>R 4 533 563</b>	<b>R 4 849 978</b>	<b>R 5 189 122</b>	<b>R 5 552 673</b>

<sup>18</sup> Source: MWP, 2019 – page 45.

<sup>19</sup> Source: MWP, 2019 – page 26.

**Table 4-4: Processing Plant Operating Cost Forecast<sup>20</sup> (updated 2020 prices)**

Cost of Production	2022	2023	2024	2025	2026
Diesel	R 4 104 189,00	R 4 246 364,96	R 4 393 466,13	R 4 545 663,13	R 4 703 132,49
Fuel	R 3 830 576,00	R 3 963 273,55	R 4 100 567,96	R 4 242 618,48	R 4 389 589,86
Electricity cost	R 9 820 720,00	R 10 160 926,13	R 10 512 917,58	R 10 877 102,59	R 11 253 903,58
Stores and Maintenance material	R 12 907 829,00	R 13 354 977,74	R 13 817 616,47	R 14 296 281,77	R 14 791 528,83
<b>Total</b>	<b>R 30 663 314,00</b>	<b>R 31 725 542,38</b>	<b>R 32 824 568,13</b>	<b>R 33 961 665,97</b>	<b>R 35 138 154,77</b>

Cost of Production	2027	2028	2029	2030	2031
Diesel	R 4 866 056,85	R 5 034 625,18	R 5 209 033,00	R 5 389 482,60	R 5 576 183,28
Fuel	R 4 541 652,59	R 4 698 983,01	R 4 861 763,63	R 5 030 183,24	R 5 204 437,18
Electricity cost	R 11 643 757,59	R 12 047 116,79	R 12 464 449,03	R 12 896 238,35	R 13 342 985,57
Stores and Maintenance material	R 15 303 932,08	R 15 834 085,84	R 16 382 605,01	R 16 950 125,79	R 17 537 306,44
<b>Total</b>	<b>R 36 355 399,11</b>	<b>R 37 614 810,82</b>	<b>R 38 917 850,66</b>	<b>R 40 266 029,98</b>	<b>R 41 660 912,47</b>

The table indicate that the assumption is that all water will be from the available boreholes with no additional cost except pumping costs.

#### 4.2.3 Mining Method's Impact on Operating Cost

##### 4.2.3.1 Equipment and Activities Impacting Electricity Cost

According to the MWP no electricity will be consumed during the mining process.

##### 4.2.3.2 Equipment and Activities Impacting on Fuel Cost

Various machinery and vehicles are used in the pit and to transport the RoM to the crushing plant. The equipment includes excavators, front-end loaders and ADT's.

##### 4.2.3.3 Equipment and Activities Impacting on Cost of Stores and Material

It is anticipated that approximately a fifth of the total cost of stores and materials at Rietkol is related to the mining operations and will include spares for equipment and vehicles used during the mining process.

##### 4.2.3.4 Equipment and Activities Impacting on the Cost of Water

Water for processing and dust suppression will be obtained from the existing boreholes and excess water will be stored in water storage facilities for re-use in the plant.

<sup>20</sup> Source: MWP, 2019 – page 31.

#### 4.2.3.5 Activities impacting on other Cost not Included Above

The only other operational costs would be that of the outsourced equipment, these are listed below under the “Service Providers” and include earthmoving equipment, security and cleaning services and blasting.

**Table 4-5: Service Providers<sup>21</sup> for the First Five Operational Years (Updated 2020 prices)**

<b>LIST OF SPECIALISTS CONSULTANTS AND SERVICE PROVIDERS</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>
<b>Waste Management</b>	R 50 000	R 54 075	R 58 482	R 63 248	R 68 403
<b>Cleaning Services Ablutions</b>	R 25 000	R 27 038	R 29 241	R 31 624	R 34 202
<b>Emergency Services</b>	R 40 000	R 43 260	R 46 786	R 50 599	R 54 723
<b>MHS Doctor</b>	R 75 000	R 81 113	R 87 723	R 94 873	R 102 605
<b>Occupational Hygienist</b>	R 200 000	R 216 300	R 233 928	R 252 994	R 273 613
<b>Environmental monitoring</b>	R 1 000 000	R 1 080 500	R 1 160 964	R 1 260 497	R 1 360 806
<b>Drilling and Blasting</b>	R 5 000 000	R 5 407 500	R 5 848 211	R 6 324 840	R 6 840 315
<b>Laundry Service</b>	R 160 000	R 173 040	R 187 143	R 202 395	R 218 890
<b>Belt Splicing</b>	R 100 000	R 108 150	R 116 964	R 126 497	R 136 806
<b>Mobile Plant Hire</b>	R 600 000	R 648 900	R 701 785	R 758 981	R 820 838
<b>Transport Services</b>	R 1 230 000	R 1 330 245	R 1 438 660	R 1 555 911	R 1 682 717
<b>Security</b>	R 500 000	R 540 750	R 584 821	R 632 484	R 684 031
<b>Rock Engineer</b>	R 50 000	R 54 075	R 58 482	R 63 248	R 68 403
<b>Surveyor</b>	R 50 000	R 54 075	R 58 482	R 63 248	R 68 403
<b>TOTAL BUDGET (SERVICES)</b>	<b>R 9 080 000</b>	<b>R 9 819 021</b>	<b>R 10 611 672</b>	<b>R 11 481 439</b>	<b>R 12 414 755</b>

#### 4.2.4 Salary and Wages

The salary and wages provided in the MWP (2019) is divided into three groups called:

- Inhouse skills and services;
- Skills and services provided by subcontractors – Construction;
- Skills and services provided by service providers.

The inhouse number of workers start at 96 in Year 1 and then expanded to 100 and remain for the period up till Year 20 at 100. The estimated number of construction workers is estimated to 40 in Year 1, 20 in Years 2 and 3. The service providers will be 50 for the duration of the mining project.

<sup>21</sup> Source: MWP, 2019 - page 36.

**Table 4-6: Salaries and Wages (2020 constant prices)**

Category	2022	2023	2024	2025	2026
<b>Inhouse skills and services</b>	R 24 835 320	R 25 866 942	R 25 866 942	R 25 866 942	R 25 866 942
<b>Skills and services provided by subcontractors - Construction</b>	R 8 400 000	R 4 200 000	R 4 200 000	R 0	R 0
<b>Skills and services provided by service providers</b>	R 9 080 000	R 10 611 672	R 10 611 672	R 10 611 672	R 10 611 672
<b>Technical Skills Costs</b>	<b>R 42 315 320</b>	<b>R 40 678 614</b>	<b>R 40 678 614</b>	<b>R 36 478 614</b>	<b>R 36 478 614</b>

Category	2027	2028	2029	2030	2031
<b>Inhouse skills and services</b>	R 25 866 942	R 25 866 942	R 25 866 942	R 25 866 942	R 25 866 942
<b>Skills and services provided by subcontractors - Construction</b>	R 0	R 0	R 0	R 0	R 0
<b>Skills and services provided by service providers</b>	R 10 611 672	R 10 611 672	R 10 611 672	R 10 611 672	R 10 611 672
<b>Technical Skills Costs</b>	<b>R 36 478 614</b>	<b>R 36 478 614</b>	<b>R 36 478 614</b>	<b>R 36 478 614</b>	<b>R 36 478 614</b>

#### 4.2.5 Other Costs<sup>22</sup>

##### 4.2.5.1 Environmental Costs

In **Table 4-7** the term “Progressive total for rehabilitation” is interpreted as the total to be spent on rehabilitation annually over the 20-year mining period and as such used in CBA. In the MWP the cost is expressed in 2018 prices, which is adapted to 2020 prices and used in CBA model.

**The “Cost to mitigate” is allocated annually from the first year of production. The application of this amount is discussed in paragraph 4.2.6 Externality Costs.**

**Table 4-7: Estimated Rehabilitation Costs<sup>23</sup>**

CATEGORY	COST ESTIMATE - 2018	COST ESTIMATE – 2020
<b>Progressive total for rehabilitation</b>	R 12 578 920.00	R 13 711 023
<b>Cost to mitigate socio-economic conditions of directly affected</b>	R 3 500 000.00	R 3 815 000
<b>Total Costs</b>	<b>R 16 078 920.00</b>	<b>R 17 526 023</b>

<sup>22</sup> Source: MWP, 2019 - page 40.

<sup>23</sup> Source: MWP, 2019 - Table 23, page 39.

#### 4.2.5.2 Other Regulatory Costs Ramp up Royalty – Annual Medical Costs, Water Licenses, Initial Approval Process and EIAs<sup>24</sup>

Table 4-8 presents the different costs as defined by the relevant government departments.

Table 4-8: Regulatory Costs – (Updated 2020 prices)

Cost	2022	2023	2024	2025	2026
<b>Royalties</b>	R 2 485 661	R 2 688 242	R 2 907 334	R 3 144 282	R 3 400 541
<b>Mine Health and Safety Regulations</b>	R 980 553	R 1 060 468	R 1 146 896	R 1 240 368	R 1 341 458
<b>Occupational Health</b>	R 556 315	R 601 654	R 650 689	R 703 720	R 761 073
<b>Rates and Taxes</b>	R 199 170	R 215 402	R 232 957	R 251 943	R 272 476
<b>National Skills fund</b>	R 565 914	R 612 037	R 661 917	R 715 864	R 774 207
<b>TOTAL</b>	<b>R 4 787 613</b>	<b>R 5 177 803</b>	<b>R 5 599 793</b>	<b>R 6 056 177</b>	<b>R 6 549 755</b>

Cost	2027	2028	2029	2030	2031
<b>Royalties</b>	R 3 677 685	R 3 977 416	R 4 301 576	R 4 652 155	R 5 031 305
<b>Mine Health and Safety Regulations</b>	R 1 450 787	R 1 569 026	R 1 696 902	R 1 835 199	R 1 984 768
<b>Occupational Health</b>	R 823 101	R 890 184	R 962 734	R 1 041 197	R 1 126 054
<b>Rates and Taxes</b>	R 294 683	R 318 700	R 344 674	R 372 765	R 403 145
<b>National Skills fund</b>	R 837 305	R 905 545	R 979 347	R 1 059 164	R 1 145 486
<b>TOTAL</b>	<b>R 7 083 561</b>	<b>R 7 660 871</b>	<b>R 8 285 233</b>	<b>R 8 960 479</b>	<b>R 9 690 759</b>

#### 4.2.5.3 Financial Provision for the Social and Labour Plan<sup>25</sup>

The following table presents the estimated costs for the social and labour plan for the first 10 years of operations prescribed by the relevant department and used in the CBA.

Table 4-9: Social and Labour Plan Financial Assistance – (Updated 2020 prices)

	2022	2023	2024	2025	2026
<b>HRD Budget</b>	R 1 300 591	R 1 544 976	R 1 564 571	R 1 701 764	R 1 786 852
<b>LED Budget</b>	R 300 000	R 350 000	R 300 000	R 300 000	R 467 400
<b>Management of Downscaling</b>	R 199 744	R 223 713	R 283 846	R 317 907	R 171 700
<b>Total</b>	<b>R 1 800 335</b>	<b>R 2 118 689</b>	<b>R 2 148 417</b>	<b>R 2 319 671</b>	<b>R 2 425 952</b>

	2027	2028	2029	2030	2031
<b>HRD Budget</b>	R 1 876 195	R 1 970 005	R 2 068 506	R 2 171 931	R 2 237 089
<b>LED Budget</b>	R 467 400	R 467 400	R 467 400	R 467 400	R 467 400
<b>Management of Downscaling</b>	R 171 700	R 171 700	R 171 700	R 171 700	R 171 700
<b>Total</b>	<b>R 2 515 295</b>	<b>R 2 609 105</b>	<b>R 2 707 606</b>	<b>R 2 811 031</b>	<b>R 2 876 189</b>

<sup>24</sup> Source: MWP, 2019 - page 40.

<sup>25</sup> Source: MWP, 2019 - page 41.

#### 4.2.6 Externality Costs<sup>26</sup>

These costs refer to the possible negative impact of establishment of the mine on the current economic activities in MRA and surrounding zones.

In the table on rehabilitation costs, MWP (2019) **Table 36**, the following item appear on an annual basis: Cost to mitigate socio-economic conditions of directly affected persons. The amount allocated is R3.5 million annually in constant terms. We are of the opinion that this amount would be enough on an annual basis, if needed and no additional amount for buildings or tunnel repairs is recommended for application in the CBA. The amount of R3.5 million updated to a 2020 amount of R3.815 million per annum is used in the CBA model.

As the Economic Cost Benefit Analysis constructed as an economic price model, the estimated annual monetary Risk as calculated in **Paragraph 3.5.4** the **R 10.453million** projected negative impact is added to the model on annual basis. The purpose is to determine whether the mine will still be an economic viable unit should this Risk occur.

#### 4.2.7 Projected Revenue

The revenue model developed by the mining company and presented in the MWP (2019) has been built by assuming a fast ramp up of production and products at easily manageable rates. The model assumes lower initial production rates (and therefore lower capital expenditure) with process plant investments, phased to manage cash flows while volume growth is achieved.

Products are typically classified and priced according to silica content, grading size, range and homogeneity, iron content, whether the product is dried, supplied in bulk or bagged and annual volumes. Extensive historical sales volumes and pricing support these assumptions. Glass sand will be the primary source of revenue and in the initial phase will be supplied in a raw format with varying silica and iron content with beneficiation taking place offsite.

The major initial risk for a new sand deposit will be to achieve the required quality and volumes to service the depreciation charges and contractual requirements of customers. It is well documented that the early production from the initial layers is of varying quality and volumes take time to be achieved.

Particularly in the initial phases while the deposit is developed and overburden is removed lower grade aggregate products which are rejected for glass and special sand quality will also be sold to recover costs. These will go to industries such as construction and the primary aim is to recover costs while initially clearing the site sufficiently to produce high purity silica products.

##### 4.2.7.1 Sand Types

The following table presents the estimated production from the mine for the first 10-year period as provided by the MRP.

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<sup>26</sup> Results and Specialist Studies converted to Sensitivity Mapping by Jacana Environmentals cc (EAP)

**Table 4-10: Projected Mining Products (tonnes)<sup>27</sup>**

Year	2022	2023	2024	2025	2026
River Sand	37 113	38 233	39 366	40 498	41 804
Amber Sand	95 433	98 315	101 226	104 138	107 497
Flint Glass	34 462	35 502	36 554	37 605	38 818
Chemical Sand	5 302	5 462	5 624	5 785	5 972
Filter Sand	53 019	54 619	56 237	57 854	59 720

Year	2027	2028	2029	2030	2031
River Sand	43 024	44 275	45 723	47 465	48 685
Amber Sand	110 632	113 850	117 575	122 054	125 189
Flint Glass	39 950	41 113	42 457	44 075	45 207
Chemical Sand	6 146	6 325	6 532	6 781	6 955
Filter Sand	61 462	63 250	65 319	67 808	69 549

According to data provided by Consol Glass they estimate the following sales to take place:

- River Sand – 100%;
- Amber Sand – 20%
- Flint Sand – 0%;
- Chemical Sand – 100%;
- Filter Sand – 100%.

The result being that 80% of the Amber Sand and 100% of the Flint Glass Sand will be used by Consol at their three Gauteng facilities.

According to the data provided by Consol on the March 2017 Corporate Fact Sheet the three production facilities in Gauteng can deliver 580 000 tons of glass annually, 70% of the input comes from recycled glass. If the balance of 30% is converted to “Glass Sand” the total volume needed by Consol varies between 104 000 and 114 000 tons annually. This is in line with the estimation by Consol that they will sell only 20% of the Amber Sand and none of the Flint Sand which converts to 110 800 tons in year one.

#### 4.2.7.2 Price and Income

The price range for the different sand products was provided by Consol Glass on the 31<sup>st</sup> of May 2018 and upgraded by Mosaka to 2020 prices. **Table 4-11** presents the different prices as used in the CBA model.

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<sup>27</sup> Source: MWP, 2019 – page 10.

**Table 4-11: Product Price Forecast<sup>28</sup>**

2020			
Product	Pricing (R/ton)		
	Lower Limit	Medium Price	Upper Limit
River Sand	59	77	94
Glass Sand	295	325	354
Chemical Sand	584	649	714
Filter Sand	772	854	936

Source: Consol Glass and updated by Mosaka

As Amber and Flint sand are the main components of glass production, they have a special value for the company and instead of a price being applied per tonnage used by Consol Glass, a “value” was determined and applied. “Determining the ratio between the value of glass output and the cost of the glass sand provides a value of R448 per ton used for the volume of glass sand used by Consol. The value of R448/ton is 28% higher than the “Lower Limit<sup>29</sup>” price provided by Consol Glass and is in line with the EBITDA<sup>30</sup> margin range of 26% to 28%, published by the company on the 5<sup>th</sup> of April 2018 as part of their preparations to return to the Johannesburg Stock Exchange (JSE). For the balance of the Glass sand that is sold, as well as for the other sand groups, the price range in the table above was used”.

#### 4.2.8 Revenue Stream used in the CBA Model

**Table 4-12** presents the annual revenue stream a calculated using the projected tons of sand ore as provided in the MWP (2019).

**Table 4-12: Annual Revenue estimated with the different product prices**

Year	2022	2023	2024	2025	2026
Annual Value	Rand mil.	Rand mil.	Rand mil.	Rand mil.	Rand mil.
Low Price	R 85.11	R 87.68	R 90.28	R 92.87	R 95.87
Medium Price	R 94.34	R 97.19	R 100.06	R 102.94	R 106.26
High Price	R 103.56	R 106.69	R 109.85	R 113.01	R 116.65

Source: Mosaka

#### 4.2.9 CBA Results

To accept a specific Cost Benefit Analysis as positive the following parameters must all be above the minimum value:

- Net Present Value (NPV) must be positive;
- Internal Rate of Return (IRR) > 11.28%, the discount rate for the Current Priced Financial CBA;
- Internal Rate of Return (IRR) > 8%, the discount rate for the Constant Priced Financial CBA;

<sup>28</sup> Source: MWP, 2019 - page 16.

<sup>29</sup> Source: Consol Glass publication as part of the preparation to rejoin the JSE

<sup>30</sup> **EBITDA margin** is a measurement of a company's operating profitability as a percentage of its total revenue. It is equal to earnings before interest, tax, depreciation and amortization (**EBITDA**) divided by total revenue.



- Internal Rate of Return (IRR) >8%, the discount rate for the Economic Priced CBA
- Benefit Cost Ratio (BCR) >1.

The **Table 4-13** shows the results of the different prices used in the two different CBA models.

**Table 4-13:: CBA Results for the Financial and Economic Models**

Model Type	FCBA <sup>31</sup>	ECBA <sup>32</sup>	FCBA	ECBA	FCBA	ECBA
Price	Low	Low	Medium	Medium	High	High
Discount Rate	11.28%	8%	11.28%	8%	11.28%	8%
Net Present Value (Rand mil.)	-R 86,84	-R 150,39	R 73,93	R 17,85	R 154,90	R 71,03
Benefit Ratio	0,59	0,13	1,69	1,13	2,25	1,53
Internal Rate of Return	3,62%	-4,1%	17,91%	9,4%	26,19%	13,76%

**Table 4-13** show that for the “low prices” both models show negative answers, while the “medium” and “high” price structure indicate positive answers. It can therefore be stated that the mining proposal is financially and economically viable for the medium and high price structure.

In the risk analysis a situation was analysed where it is accepted that the silica ore used for glass production where Consol take up between 90% and 95% of the production. This may cause a higher price that would assist the mine to return positive results. It is economically acceptable as Consol take up by far the majority of the sand mined.

The models were run again for the “low price” option with a 20% increase for the “glass sand”, R46 per ton extra, the results are presented in **Table 4-14**.

**Table 4-14: CBA Results – Low Price 20% Increase**

Model Type	FCBA	ECBA
Price	Low	Low
Discount Rate	11.28%	8%
Net Present Value (Rand mil.)	R 113.96	R 35.51
Benefit Ration	1.96	1.27
Internal Rate of Return	21.89%	10.8%

**Table 4-14** show that the R46 per ton added to the “Low Price” the CBA results for both models turn positive.

The conclusion is that in terms of the Cost Benefit Analysis, the results indicate a feasible mine but will need detailed management to be a successful operation.

<sup>31</sup> FCBA – Financial Cost Benefit Analysis

<sup>32</sup> ECBA – Economic Cost Benefit Analysis

## 5 CONCLUSION

The area is an important agricultural producing area with intensive horticulture and poultry enterprises within the buffer area in which the concerns of the affected and interested parties were identified. The area has several AHs, some of which are not commercially very productive. Furthermore, the area is rich with underground water and irrigation pivots are a common sight.

In **Table 5-1** the possible negative impact of the proposed mining operation is presented in socio-economic parameters.

**Table 5-1: Possible Negative Impact of the proposed mine on Agriculture Production and Business Activities**

	GDP (R Mil)			Employment (Numbers)			Household Income (R Mil)		
	Direct	Indirect and induced	Total	Direct	Indirect and induced	Total	Total	Medium	Direct Low
<b>Zone 1</b>	-R 0.385	-R 0.369	-R 0.754	-1	-2	-3	-R 0.404	-R 0.284	-R 0.120
<b>Zone 2</b>	-R 4.908	-R 3.824	-R 8.733	-19	-13	-32	-R 2.713	-R 2.002	-R 0.710
<b>Zone 3</b>	-R 0.415	-R 0.381	-R 0.796	-0	-2	-2	-R 0.441	-R 0.310	-R 0.132
<b>Total</b>	<b>-R 5.708</b>	<b>-R 4.574</b>	<b>-R 10.282</b>	<b>-20</b>	<b>-17</b>	<b>-37</b>	<b>-R 3.558</b>	<b>-R 2.596</b>	<b>-R 0.962</b>

From **Table 5-1** it appears that as many as 20 direct jobs could be lost and a negative result of R 5.708 million reduction in direct GDP. The possible loss in income to low-income households is estimated at R0.962 million per annum.

In **Table 5-2** a comparison between the estimated negative impact of the mine on current activities and the projected positive impact of the proposed mine is presented together with the projected future values of the GDP, Low Household Income and direct employment opportunities.

**Table 5-2: Estimated Benefits Associated with the Operational Phase of the Proposed Mine**

	Current Agriculture and Businesses		Mining	Net Benefit from the mining activity	Future Total Activities
	Current	Estimated Loss	Projected		
<b>Direct GDP</b>	R 121.388 mil.	R 5.708 mil.	R 35.8 mil.	R 30.092mil.	R 151.48 mil.
<b>Direct Employment</b>	425	20	100	80	505
<b>Low Household Income</b>	R 24.8489mil.	R 0.962mil.	R 13.40	R 12.438 mil.	R 37.2869 mil.

The **Table 5-2** shows that although the proposed mine will impact negatively on the current land activities the net result is a positive improvement in benefits. Job opportunities will increase by 80 and an additional R 12.438 million will be paid to low-income households

The current land users are not the only parties that have an interest in the final decision, but also the users of the glass sand. As already explained Consol Glass is currently receiving quantities of glass sand from an existing mine in the Delmas area where the available product will be in short supply in

the next decade. As also explained about 30% of the output of the three processing units in Gauteng at Wadeville, Clayville and Nigel, depend on Glass Sand. Although Consol use about 70% recycled glass it is still a reasonable possibility exists that about 550 people currently employed at the three furnaces will probably have to be laid off if additional glass sand quantities are no longer available.

The analysis of the economic feasibility of the proposed silica mine shows that there are certain risks for the enterprises in close proximity to the proposed mine as an alternative land use. The issue in the Rietkol Project is which one of the two resource economic activities is the better land use option. Mining is the non-renewable resource user, while the current land-use activities, depending on the quality of environmental management, are renewable resource activities. Currently the economic activities within the MRA area are limited and the mine will be an economic improvement. However, for the intensive horticulture, poultry and equestrian activities in the Buffer Area, the mine will pose a certain financial and economic risk which is presented in the two tables above.

The CPI Security Business and Dr Jacobus Greeff are operating from buildings just outside the MRA area and will be exposed to an economic risk to the two business operations

For Rossgro Broilers and Goudhoek Boerperd, noise from blasting could be a problem that can be addressed by agreement with the involved managers to detonate at specific time schedules. Blasting could have an effect on the safety of competitors during equestrian events held at the equestrian centre.

As previous discussed Unex Roses might experience certain economic risks which is accommodated in the relevant discussions.

Pretorius Blomme to our interpretation will not be exposed to additional risks.

The Rossgro Egg Packhouse will not experience an additional economic risk for the first 15 years of mining, but if the mine expands in a westerly direction later on, they could experience an additional risk. The Rossgro broiler units should also not experience any additional economic risks.

MBFi should not experience any additional economic risk in the production areas, but the possibility exists that some risk factors can increase in the production units. However, no information was provided by the group, so it is not possible to express a solid opinion on the issues.

It therefore becomes a choice between “the positive socio-economic impact of the new capital investment” and “the economic feasibility of the project together with the possible negative impact on the current land users”.

Another issue that causes some concern is the possible impact on property values in the area. The municipal evaluation roll shows a value of R500 000.00 per holding. According to information received from some of the owners a more common sale value was R400 000.00 per unit. Property prices is as a rule very difficult to project, but experience has shown that in the short-term values decline but tend to recover in the medium to longer term.

If all the proposed mitigation factors, as defined in the specialist reports, are implemented and adhered to it can be stated that the proposed mining project is economically feasible and will only have a “low risk” on the current activities. The positive economic contribution to the Mpumalanga and Gauteng economies is an additional positive factor. It is therefore possible to recommend the development of the mine.

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## APPENDIX A: COST BENEFIT ANALYSIS

### Introduction

The CBA method provides a logical framework for evaluating development programmes, and can serve as an aid in decision-making processes. The following is a brief overview of the theory underlying the CBA method.

The theoretical foundations of CBA are: benefits are defined as increases in human wellbeing (utility) and costs are defined as reduction in human wellbeing. For a project of policy to qualify on cost-benefit grounds, its social benefits must exceed its social costs. "Society" is simply the sum of individuals. The geographical boundary for a CBA is usually the nation, but can be readily extended to wider limits.

### Basic Aggregation Rules

There are two basic aggregation rules. Firstly, aggregating benefits across different social groups or nations involves summing willingness to pay for benefits, its willingness to accept compensation for losses (WTP and WTA, respectively), regardless of the circumstances of the beneficiaries or losers. A second aggregation rule requires that higher weights be given to benefits and costs accruing to disadvantages or low-income groups. One rationale for the second rule is that marginal utilities or income will vary, being higher for the low-income group.

The notions of WTP and WTA are firmly grounded in the theory of welfare economics and correspond to the notions of compensation and equivalent variations. WTP and WTA should not, according to past theory, diverge very much. In practice they appear to diverge, often substantially, and with  $WTA > WTP$ . Hence, the choice of WTP or WTA may be of importance when conducting a CBA.

### Discounting

Aggregating over time involves discounting. Expressing future benefits and costs in present value is known as discounting. Inflation can result in future benefits and costs appearing to be higher than is really the case. Inflation should be netted out to secure constant price estimates.

Costs and benefits that are immediately incurred are judged differently by the community from costs and benefits that materialize over a period of time. Usually, a community would prefer receiving a benefit today rather than reaping the benefits in the future, while deferred costs are more attractive than immediate payment. Therefore, the money value of costs and benefits over time cannot simply be added together, and the time preference of the community has to be taken into account through the use of a weighting process. This is done by calculating the net present value by discounting future cash-flows at a rate that reflects the value of a benefit or cost over time, known as the social discount rate. In other words, at what real interest rate will the community be prepared to forego immediate benefits in exchange for longer term benefits?

Suppose  $b_0, b_1, b_2, \dots, b_n$  are the project benefits in years 0, 1, 2, ..., n and  $c_0, c_1, c_2, \dots, c_n$  are the costs in years 0, 1, 2, ..., n, respectively, and  $i$  is the social discount rate, then the present value of the benefits is given by:

$$b_0 \div [(1+i)]^0 + b_1 \div [(1+i)]^1 + \dots + b_n \div [(1+i)]^n$$

And the present value of the costs is given by

$$c_0 \div [(1+i)]^0 + c_1 \div [(1+i)]^1 + \dots + c_n \div [(1+i)]^n$$

These present values are then used to calculate various assessment criteria, while assisting in the evaluation of each development sphere. These criteria are:

- Net Present Value (NPV).
- Internal Rate of Return (IRR).
- Benefit Cost Ratio (BCR).

### Net Present Value (NPV)

The difference between the benefits and costs (the net benefits) in the specific year is discounted to the present by using the social discount rate. The discounted sum of all these net benefits over the economic project life is defined as the NPV. In terms of terminology set out above:

$$NPV = \sum_{j=0}^n b_j \div [(1+i)]^{-j} - \sum_{j=0}^n c_j \div [(1+i)]^{-j}$$

The criteria for the acceptance of a project are that the NPV must be positive; in other words, funds will be voted for a project only if the analysis produces a positive net present value. Where a choice has to be made between mutually exclusive projects, the project with the highest present value will be chosen since it maximizes the net benefits to the community.

### Internal Rate of Return (IRR)

The IRR is the discount rate at which the present value of costs and benefits are equal. It is therefore the value of the discount rate,  $r$ , which satisfies the following criteria:

$$\sum_{j=0}^n b_j \div [(1+r)]^{-j} - \sum_{j=0}^n c_j \div [(1+r)]^{-j} = 0$$

Only projects with an IRR higher than the social discount rate, which forms a limit, will be considered for funding. The IRR must be handled carefully, because there are situations in which mathematical solution of the above equation is not unique. This happens when the stream of net benefits over the assessment period changes its sign (positive or negative) more than once.

### Benefit Cost Ratio (BCR)

The discounted BCR is the ratio of the present value of the benefits to the present value of the costs, i.e.

$$BCR = \left\{ \sum_{j=0}^n b_j \div (1+r)^{-j} \right\} \div \left\{ \sum_{j=0}^n c_j \div (1+r)^{-j} \right\}$$

A project will be considered for funding if the BCR is greater than 1.

### Appropriate Discount Rate

When considering an appropriate discount rate, note must be taken of the various points of departure in the economic literature as well as of the rates applied in other countries and by international development institutions.

The points of departure described in the literature can be broadly divided into three schools of thought, namely those who argue that the discount rate should be equal to the marginal return on capital (opportunity cost of capital), those whose arguments rests on long-term real interest rate (cost of funding to the State), and those who advocate a social time preference rate.

The first two schools take an economic view, whilst the third school adopts a multiple-goal approach which includes social aims. There is no consensus which method should be used to determine the

social discount rate that would apply for a specific country. Therefore, a relative pragmatic approach takes the following factors into account:

- The discount rate should not be influenced by business cycle conditions and policy, since the preferences that find expression in this rate are aimed at the extension of the long-term welfare structure.
- A low discount rate generally favours projects with a higher capital cost and low future current costs, while the opposite applies to high discount rates. Since labour costs are part of current expenditure, a high discount rate favours the employment of labour in the future. If the real social discount rate is lower than the real implicit discount rate in the private sector, then investment by the public sector will be encouraged at the expense of investment by the private sector. The larger the gap between the two discount rates, the stronger the effect.

### **Financial Discount Rate**

In the case of public projects, where CBA is being performed for financial purposes, calculations are done at either current price, where inflation is taken into consideration or at constant/real prices, where inflation is excluded.

In terms of the financial analysis, the discount rate used is equal to the market rate, or weighted marginal cost of capital, plus uncertainty and a risk premium. It should be noted that if the calculation is being done in constant/real prices, the discount rate used should be in real terms. For instance, if the discount rate in current prices is 10% and the prospects for inflation over the project appraisal period is 5%, and then the real discount rate is approximately 5%. It can be calculated as follows:

$$((1.10 \div 1.05) - 1) \times 100 = 4.76\%$$

Therefore, the real discount rate is not exactly 5% but 4.76%.

Due to the fact that projections are made over a long period into the future, and the fact that the future inflation rate is dependent on various economic factors (e.g., worldwide shocks such as oil price, etc.), it is generally difficult to estimate long-term price movements. In this study, the Consultants have used a real discount rate of 5%, and an inflation rate of 6%. Using the methodology described above, this yields a nominal discount rate of 11%.

### **Economic Discount Rate**

Although the calculation of the social time preference rate (STPR) is very difficult to determine, this has not stopped some analysts attempting empirical estimates. According to Kirkpatrick and Weiss (1996) "... such estimates are normally in the 1 percent to 5 percent range, since per capita consumption growth will rarely exceed 3 percent annually, and the conventional estimates of the elasticity of the marginal utility of consumption are typically between 1.0 and 1.5." Walshe and Dafferen calculated that the STPR is slightly in excess of the potential growth rate of an economy.

The study uses an economic discount rate of 8%, which is standard to most studies of this nature.

### **Market *versus* Shadow Prices**

As indicated above, the CBA can be conducted in financial (market) as well as economic (shadow) prices. Market prices are those perceived prices at which products and services are traded in the market place, irrespective of the level of interference in the market, e.g., the market wage rate of labour, the price of 2kg of maize meal, the price of 1 kilowatt-hour of electricity, etc. In theory, market prices are mainly manifestations of consumers' willingness to pay.

Shadow prices (economic prices) are regarded as the opportunity costs of products and services when the market price, for whatever reasons, does not reflect these costs in full. Examples are the shadow wages of labour, where minimum wages are fixed at levels higher than market prices; shadow price for fuel, where taxes and subsidies are excluded; and shadow exchange rates are pegged and/or some kind of exchange control is still in place. The shadow price is therefore nominal (market) price, adjusted for the effect of interventions or other factors that are causing the market not to perform its natural role.

In practice, shadow prices should only be used when the market price of products and services do not reflect their scarcity value or economic contributions. In cases where market prices give an indication of the scarcity of products and services, market prices are used not only for financial analysis, but also for economic analysis.

### **Financial and Economic Cost Benefit Analysis**

The private and public sectors evaluate projects very differently. The private sector is mostly interested in the profitability of a project and the return on capital that will be achieved. In doing so, the private sector makes use of market prices (i.e., the prices that would be paid in the open market for inputs, labour, etc.) when determining the value of direct project-related costs and financial benefits. Furthermore, a financial CBA evaluated the project using market-determined interest and return rates that reflect the cost of private funds, uncertainties and risk.

In contrast, evaluating a public sector project involves determining a broader range of costs and benefits that will affect the community. Furthermore, when calculating the value of costs and benefits, economic analysis re-evaluates the project by making use of prices that reflect the relative economic scarcity/value of inputs and outputs. As such, in the public sector it is necessary to evaluate and weigh the wider benefits emanating from a project against the capital expenditure and costs associated with a project, using discount and return rates that reflect the time preferences of the community, known as the social discount rate.

The table below summarises the main differences between a financial and economic CBA.



**Table 6-1: Comparison of Financial and Economic Costs Benefit Analysis**

<b>Attributes</b>	<b>Economic CBA</b>	<b>Financial CBA</b>
<b>Perspective</b>	The broader community	Project shareholders/capital providers
<b>Goal</b>	The most effective application of scarce resources	Maximization of net value
<b>Discount Rate</b>	Social discount rate	Market determined weighted cost of capital
<b>Unit of Valuation</b>	Opportunity costs	Market prices
<b>Scope</b>	All aspects necessary for a rational, economic decision	Limited to aspects that affect profits
<b>Benefits</b>	Additional goods, services, income and/or cost saving	Profit and financial return on capital employed
<b>Costs</b>	Opportunity costs of goods and services foregone	Financial payments and depreciation calculated according to generally accepted accounting

## APPENDIX B: THE SOCIAL ACCOUNTING MATRIX

A Social Accounting Matrix (SAM) is a comprehensive, economy-wide database, which contains information on the flow of resources that take place between the different economic agents that exist within an economy (i.e., business enterprises, households, government, etc.) during a given period of time – usually one calendar year.

When economic agents in an economy are involved in transactions, financial resources change hands. The SAM provides a complete database of all transactions that take place between these agents in a given period, thereby presenting a “snapshot” of the structure of the economy for that time period. As a system for organising information, a SAM presents a powerful tool in terms of which the economy can be described in a complete and consistent way:

Complete in the sense that it provides a comprehensive accounting of all economic transactions for the entity being represented (i.e., country, region/province, city, etc.), and Consistent in that all incomes and expenditures are matched.

Consequently, a SAM can provide a unifying structure within which the statistical authorities can compile and present the national accounts.

Like the traditional Input-Output Table, the SAM reflects the inter-sectorial linkages in terms of sales and purchases of goods and services, as well as the remuneration of production factors that forms the essence of any economy’s functioning. What is also of importance is that a SAM reflects the economic related activities of households in some detail. Households are responsible for decisions that have a direct and indirect effect on important economic variables such as private consumption expenditures and savings. These economic aggregates are important drivers of the economic growth processes and ultimately the creation of employment opportunities and wealth. Private consumption expenditure, for example, comprises approximately 60 percent of total gross final domestic spending in the economy. By combining households into meaningful categories, such as a range of income levels, the impact on these households’ welfare of a changing economic environment is made possible by the SAM.

It is clear from the above that because of the intrinsic characteristics of the SAM, once compiled, it renders itself as a useful tool for analytical purposes. Especially, based on the mathematical traits of the matrix notations that describe its structure, a SAM can be transformed into a powerful econometric tool/model. For example, the model can be used to quantify the probable impact on the economy of a new infrastructural project such as a new power station – both the construction phase and the operational phase will be modelled.

Thus, apart from serving as an extension to a country’s National Accounts, the SAM in its model form opens up many opportunities for the economic analyst to conduct rigorous policy and other impact analyses for the purpose of ensuring optimal benefit to the stakeholders concerned.

### **Application(s) of the SAM**

The development of the SAM is very significant as it provides a framework within the context of the International System of National Accounts (SNA) in which the activities of all economic agents are accentuated and prominently distinguished. By combining these agents into meaningful groups, the SAM makes it possible to clearly distinguish between groups, to research the effects of interaction between groups, and to measure the economic welfare of each group. There are two key reasons for compiling a SAM:

Firstly, a SAM provides a framework for organising information about the economic and social structure of a particular geographical entity (i.e., a country, region or province) for a particular time period (usually one calendar year), and

Secondly, to provide a database that can be used by any one of a number of different macro-economic modelling tools for evaluating the impact of different economic decisions and/or economic development programmes.

Because the SAM is a comprehensive, disaggregated, consistent, and complete data system of economic entities that captures the interdependence that exists within a socio-economic system, it can be used as a conceptual framework for exploring the impact of exogenous changes in such variables as exports, certain categories of government expenditure, and investment on the entire interdependent socio-economic system. The SAM, because of its finer disaggregation of private household expenditure into relatively homogenous socio-economic categories that are recognisable for policy purposes, has been used to explore issues related to income distribution.

The SAM's main contribution in the field of economic policy planning and impact analysis is divided into two categories:

#### **As a Primary Source of Economic Information**

As a detailed and integrated national and regional accounting framework consistent with officially published socio-economic data, a SAM instantly projects a picture of the nature of a country or region's economy. It lends itself to both descriptive and structural analysis.

#### **As a Planning Tool**

Due to its mathematical/statistical underpinnings it can be transformed into a macro-econometric model that can be used to:

- Conduct economic forecasting exercises/scenario building.
- Conduct economic impact analysis both for policy adjustments at a national and provincial level and for large project evaluation.
- Conduct self-sufficiency analysis i.e., gap analysis to determine, with the help of the inter industry and commodity flows contained in the provincial SAM, where possible investment opportunities exist, and
- Calculate the inflationary impacts on provincial level of price changes instigated at national level (i.e., administered prices, VAT, etc.).

To summarise, the SAM mechanism provides a universally acceptable framework within which the economic impact of development projects and policy adjustments can be reviewed and assessed at both national and provincial/regional levels. It serves as an extension to the official National Accounts of a country's economy and, therefore, provides a wealth of additional information, especially when disaggregated to more detailed levels.

## APPENDIX C: PUBLIC PARTICIPATION MEETING: EXTRACTS OF COMMENTS AND RESPONSES RELATED TO THE SOCIO-ECONOMIC IMPACT<sup>33</sup>

### DIRECTLY AFFECTED PARTIES

#### Comments from MRA Landowners

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
<p>I act under instructions and a mandate received from the Rossgro Group of Companies, represented by Rd. N Rossouw (hereinafter referred to as “my client”).</p> <p>The above---mentioned properties are owned by Magnum Eggs (Edms) Bok, Rossouw Pluimvee Braaikuikens (Edms) Bpk, Rustig Landgoed (Edms) Bpk and Rossgro Voere (Edms) Bpk, all companies in the Rossgro Group of Companies.</p> <p>My client operates an extensive Egg Producing, Chicken Broiler and Chicken Feed Stock business on the above properties which are within and adjacent to the proposed mining area of the proposed Rietkol Silica Mine.</p> <p>I refer to the Background Information Document (“BID”) attached to your letter dated 12 February 2016 and which came to the knowledge of my clients, as well as your latest letter to affected and interested parties dated 6 October 2016.</p> <p>You are hereby advised that my client as referred to above are affected and an interested party, and you are requested to register it, and the writer as its authorized representative, on your data base for this project, and advise on all intended documentation, reports and meetings as may be submitted and proposed in future; the contact details as which appear on this letterhead.</p> <p>We take notice of your notification that “the project is still in the early phase of planning and that no formal applications have been submitted to Government”.</p> <p>Kindly advise when application for the Mining Right has been made, and at that time, kindly let me have a copy of the Acceptance Letter of the Regional Manager, Mpumalanga Region of the Department of Mineral</p>	<p>Johann Minnaar on behalf of Rossgro Group of Companies Rietkol 237 IR Ptn 2, RE/31, 71, RE/90, 103 and Geluk 234 IR Ptn 2 &amp; 24 and others.</p> <p>MRA landowner</p> <p>Email 24 April 2021</p>	<p>We acknowledge receipt of your letter and confirm that you have been registered. Please note that a delegation from Consol will contact you for a meeting.</p> <p>A meeting was held between Rossgro and Nhlabathi (Consol) on 10 November 2016. The meeting was held to introduce representatives from the owners’ team and to outline the proposed mining project and the way forward. The threats related to the impact of mining on farming activities were highlighted by Rossgro.</p> <p>In respect of the request for a copy of the draft Mining Work Programme and Social and Labour Plan, Consol will make this available once the Mining Right application has been accepted by the CA, but excluding any information Consol may deem confidential.</p> <p>Note: Also refer to further responses on comments raised by Mr Minnaar on behalf of his clients, received on 18 February 2018.</p>

<sup>33</sup> Comments and Response Register for Final Scoping Report (FSR) dated May 2021.

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
<p>Resources, as well as copies of the draft application Sketch Plan, the draft Mining Works Programme and the draft Social and Labour Plan. Your attention in this respect is drawn to the provisions of Regulation 40(2) of the EIAR which states that “The public participation process contemplated in this regulation must provide access to all information that has or may have the potential to influence any decision with regard to an application...”</p> <p>You are advised, at this earlier stage of the proposed project that my client will suffer irreparable loss and damages should the proposed mine be established on its properties and adjacent thereto. Environmental degradation associated with silica mining such as air pollution, dust pollution, noise and water depletion are not conducive to the business of my client as explained above.</p> <p>My client reserves the right to elaborate on the potential environmental, financial and social impact that the proposed mine will have on its business at the appropriate time.</p> <p>It is placed on record that the proposed development of this project together with new coal mines adjacent to my client’s operations which are currently planned will have a cumulative impact on the business operations of my client specifically, and to the chicken industry in the region in general. This cumulative impact from an economic, social and environmental perspective should be investigated and included in the Scoping Report when it is drafted.</p> <p>The new coal mine projects which will affect the business of my clients are: Palmietkuilen, Eloff Mining (Exxaro), Kangala Colliery Extension (Universal Coal), Leandra South, and Anglo Leslie 2. Information on all these projects is in the public domain and can be researched by you.</p> <p>My clients reserve the right to object against the granting of the mining right in terms of the provisions of Section 10 of the MPRDA, once it is in possession of the required documents as referred to above.</p> <p>Detail representation will be made in substantiation of its objection in terms of Section 10 of the MPRDA.</p> <p>The letter is written without prejudice of any of the rights of my clients, and all their rights are reserved.</p>		
<p>4. I will now deal with the contents of the DRS and supporting baseline studies applicable to the DSR relevant to my client’s, extensive Egg Producing, Chicken Broiler and Chicken Feed Stock business (“the business”) on the above properties which are within and adjacent to the proposed mining area of the proposed Rietkol Silica Mine. It must</p>	<p>Johann Minnaar on behalf of Rossgro Group of Companies Rietkol 237 IR Ptn 2, RE/31, 71, RE/90, 103 and Geluk 234 IR Ptn 2 &amp; 24 and others.</p>	<p>Noted. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase, including impacts on groundwater levels and quality, air quality and property value. The potential impact on the economic activities of Rossgro will be assessed as part of the macro-economic impact assessment.</p>

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
<p>not be construed or implied that my client necessarily agrees with the contents of the DSR which we do not specifically address in this letter, and my client's rights are reserved to comment in future on any of those issues if it deems it necessary, and once it is in receipt of the draft Environmental Impact Assessment Report and the necessary Environmental Specialist Reports which will follow the DSR.</p> <p>5. You are advised, at this early stage of the proposed project that my client will suffer irreparable loss and damages should the proposed mine be established on properties adjacent or nearby to the affected properties.</p> <p>6. Environmental degradation associated with mining such as air pollution, dust pollution, noise, water depletion and polluted water are not conducive to the business of my client as explained above.</p> <p>7. The below mentioned studies should also focus particular on the chicken business of my client also with regard to the health and well-being of the chickens, and anti-pollution measures with regard to the contamination of feed stock with dust and silica dust should be investigated.</p>	<p>MRA landowner Email 21-2-2021</p>	<p>The possible main macro-economic impact could be the possible impact on the available water and quality of the water. This will be determined applying the groundwater specialist report.</p>
<p>13. <u>Socio-economic Impact:</u> The social and financial impact of the employees of the business should be investigated and in the event that the business has to close down due to the negative impact that the proposed mine would have on the business as explained above. The financial impact on the business must be investigated as well. In this regard you are referred to the provisions of Chapter 5, Section 23(2)(b) of the National Environmental Management Act, No. 107 of 1998 (NEMA) which provides that the Applicant must identify, predict and evaluate the actual and potential impact on, inter alia, the socio-economic conditions of the area, in this case, specifically to the business of my client.</p>	<p>Johann Minnaar on behalf of Rossgro Group of Companies Rietkol 237 IR Ptn 2, RE/31, 71, RE/90, 103 and Geluk 234 IR Ptn 2 &amp; 24 and others. MRA landowner Email 18-03-2021</p>	<p>The potential impact on the economic activities of Rossgro will be assessed as part of the macro-economic impact assessment, including impacts on GDP and employment.</p> <p>The possible main macro-economic impact could be the possible impact on the available water and quality of the water. This will be determined applying the groundwater specialist report.</p> <p>In addition, a social impact assessment will be undertaken to address the impacts on the surrounding community and land use activities.</p>
<p>14. <u>Cumulative Impact:</u> It is placed on record that the proposed development of this project together with new coal mines adjacent and nearby to the business that are currently planned will have a cumulative impact on the business operations of my client specifically, and to the chicken industry in the region in general. This cumulative impact from an economic, social and environmental perspective should be investigated and included as part of the specialized environmental studies. The new coal mine projects which will affect the business of my clients are: Palmietkuilen, Eloff Mining (Exxaro), Kangala Colliery Extension (Universal Coal), Leandra South, and Anglo Leslie 2.</p>	<p>Johann Minnaar on behalf of Rossgro Group of Companies Rietkol 237 IR Ptn 2, RE/31, 71, RE/90, 103 and Geluk 234 IR Ptn 2 &amp; 24 and others. MRA landowner Email 18-03-2021</p>	<p>Cumulative effects will be investigated as far as it is practical and relevant.</p> <p>It is noted that the closest operational mine to the proposed Rietkol Project is more than 8 km away (Kangala Coal).</p>

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
Information on all these projects is in the public domain and can be researched by the Applicant.		

### Comments from MRA Land Occupants

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
None received to date.		

### Comments from Land Claimants

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
No land claims registered as per DRDLR correspondence.		

### Comments from the Municipalities

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
N/A		

### Comments from Organs of State

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
N/A		

## OTHER AFFECTED PARTIES

### Comments from Neighbouring Landowners

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
3. I will now deal with the contents of the DRS and supporting baseline studies applicable to the DSR relevant to the business of my client on the above properties, which are adjacent to the proposed mining area of the proposed Rietkol Silica Mine. It must not be construed or implied that my client necessarily agrees with the contents of the DSR which we	Johann Minnaar on behalf of Unex Roses Plot 198, 201, 202, 204 Neighbouring landowner to the MRA area	Noted. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase, including impacts on groundwater levels and quality, air quality and property value. The potential impact on the economic activities of Unex Roses will be assessed as part of the macro-economic impact assessment.

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
<p>do not specifically address in this letter, and my client's rights are reserved to comments in future on any of those issues if it deems it necessary, and once it is in receipt of the draft Environmental Impact Assessment Report and the necessary Environmental Specialist Reports which will follow the DSR.</p> <p>4. You are advised, at this earlier stage of the proposed project that my client will suffer irreparable loss and damages should the proposed mine be established on properties adjacent or nearby to the affected properties.</p> <p>5. Environmental degradation associated with mining such as air pollution, dust pollution, water depletion and polluted water are not conducive to the business of my client as explained above.</p>	<p>Email 23-03-2021</p>	<p>The financial and economic and level of employment importance of Unex Roses in terms of the local economy will necessitate that it be analysed separately and reported on.</p>
<p>6. The below mentioned studies should also focus particular on the business of my client also with regard to anti-pollution measures with regard to the accumulation of silica dust on the hothouses, the arable grazing, roses and prickly pears, and the increased financial cost of the removal of excessive dust from the hothouses. In this regard it should be noted that the removal of dust on the hothouses will necessitate an increase in water consumption and the employment of more labour intensive methods.</p>	<p>Johann Minnaar on behalf of Unex Roses Plot 198, 201, 202, 204 Neighbouring landowner to the MRA area Email 23-03-2021</p>	<p>As indicated above, the potential impact on the economic activities of Unex Roses will be assessed as part of the macro-economic impact assessment.</p> <p>Dust monitoring will be implemented on granting of the mining right, prior to any construction activities. If the data indicate excessive (above prescribed standards) dust fallout in the vicinity of Unex Roses, the necessary discussions will be held with the company at the time.</p>
<p>10. <u>Socio-economic Impact</u>: The social and financial impact of the employees of the business should be investigated and in the event that the business has to close down due to the negative impact that the proposed mine would have on the business as explained above. The financial impact on the business must be investigated as well. In this regard you are referred to the provisions of Chapter 5, Section 23(2)(b) of the National Environmental Management Act, No. 107 of 1998 (NEMA) which provides that the Applicant must identify, predict and evaluate the actual and potential impact on, inter alia, the socio-economic conditions of the area, in this case, specifically to the business of my client.</p>	<p>Johann Minnaar on behalf of Unex Roses Plot 198, 201, 202, 204 Neighbouring landowner to the MRA area Email 18-03-2018</p>	<p>The potential impact on the economic activities of Unex Roses will be assessed as part of the macro-economic impact assessment, including impacts on GDP and employment.</p> <p>The financial and economic importance of Unex Roses in terms of the local economy will necessitate that it be analysed separately and reported on.</p> <p>In addition, a social impact assessment will be undertaken to address the impacts on the surrounding community and land use activities.</p>
<p>11. <u>Cumulative Impact</u>: It is placed on record that the proposed development of this project together with new coal mines adjacent and nearby to the business that are currently planned will have a cumulative impact on the business operations of my client specifically, and to the flower and roses producing industry in the region in general. This cumulative impact from an economic, social and environmental perspective should be investigated and included as part of the specialized environmental studies. The new coal mine projects which</p>	<p>Johann Minnaar on behalf of Unex Roses Plot 198, 201, 202, 204 Neighbouring landowner to the MRA area Email 23-03-2021</p>	<p>Cumulative effects will be investigated as far as it is practical and relevant.</p> <p>It is noted that the closest operational mine to the proposed Rietkol Project is more than 8 km away (Kangala Coal).</p>



Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
will affect the business of my clients are: Palmietkuilen, Eloff Mining (Exxaro), and Kangala Colliery Extension (Universal Coal). Information on all these projects is in the public domain and can be researched by the Applicant.		
<b>Dust:</b> It will have a huge impact on the grow of roses. The greenhouses are invented to let the maximum sunlight during the day. The amount of dust that will come from the mine will land on the roofs of thr greenhouses because of their height. The dust will minimise the sunlight that must reach the plants.	Wally Lewis General Manager of Unex Roses. Letter: 28 May 2021	The dust was taken into consideration in determining the economic risk factor.
<b>Vibration and Blasting:</b> Due to the fact that it will be an open cast mine, the blasting and vibration at the mine will affect the water The blasing and vibration is ahuge safety risk for all our structures,	Wally Lewis General Manager of Unex Roses. Letter: 28 May 2021	The vibration and blasting risk were taken into consideration in determining the economic risk factor.
Owner of holding 278, 279, 281. A business Combined Private Investigations is situated on these 3 holdings. On this holding is an office, as well as 3 accommodation units for workers of the company. On this premises we also have a Workshop and a shed, 3 boreholes, diesel pump with underground 15000 litre tank. As well as a cell phone tower. At these 3 properties, we also do livestock farming with about 50 Drakensberg cattle and we do grass land farming to feed the cattle.	Roy Robertson Family Trust Landowner Plot 278, 279 & 281 Neighbouring landowner to the MRA area Email 23-02-16	Noted. The current land use will be shared with the specialists for consideration, with specific mention of the blasting and vibration, and macro-economic and social specialists.
Based on the Environmental Impact Evaluation and Mitigation measures and specifically the Impact Risk Matrix (Table 63: Initial High-Level Risk Impact Matrix Summary) our client's immovable properties, as above, will be impacted negatively as is clearly set out in the report. The properties are adjacent to the proposed location of the mine. Our client therefore objects to the proposed location of the mine based on the direct negative impact it will have on the properties as per Table 63 and Table 4. These are, inter alia, as follows: 1. Infrastructure area: Loss of soil, impact of fauna and flora, killing of animals, loss of biodiversity and pollution. 2. Hazardous chemicals and waste: Pollution due to accidental spillage. 3. Mining: Lowering of groundwater levels. 4. Communities: Increased dust, noise impact, traffic etc. 5. Residual impact: Post closure land use, impact on ecosystem. 6. Negative visual impact. 7. Lighting: Constant lighting due to night-time lighting. 8. The purpose for which our client's properties are used will be affected negatively by the proposed mine and will therefore greatly reduce in value as our client will no longer be in a position to use the properties for the purposes it is currently used for.	Arthur Channon on behalf of Roy Robertson Family Trust Plot 278,279,281 Neighbouring landowner to the MRA area Email 19-03-2018 Meeting on the 5 <sup>th</sup> of May 2021 at the site and the issues were discussed	Noted. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase, including impacts on groundwater levels and quality, air quality and property value. The potential impact on the economic activities situated on these properties will be assessed as part of the macro-economic impact assessment.

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
All our clients' rights remain strictly reserved but our client will consider as acceptable, reasonable and fair offer for the three properties, in its totality.		
We are concerned about the impact on our property values.	Kobus Greeff Plot 277 Neighbouring landowner to the MRA area Meeting 5 May 2021	A detailed macro-economic study will be done, where property values will be addressed.

### Comments from Neighbouring Land Occupants

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
We want economic development, but the area already has a shortage in water and electricity supply. We are also very dependent on agriculture for our livelihoods.	Matkgetlane, Wilson Shorty Occupant of Plot 152 Neighbouring Land Occupant Survey 11-03-2016	Noted, your comments will be considered during the social impact assessment that addresses both impacts and benefits to the community.
The project is going to create economic growth, skills development and bursaries for our children.	Gumede, Thabisile Occupant of Plot 152 Employed by Pretorius Blomme Neighbouring Land Occupant Survey 12-03-2016	Noted, your comments will be considered during the social impact assessment that addresses both impacts and benefits to the community.
The unemployed will get the opportunity of working and the lives of the people will change for the better.	Ntsundu, Mariam Occupant of Plot 152 Neighbouring Land Occupant Survey 12-03-2016	Noted, your comments will be considered during the social impact assessment that addresses both impacts and benefits to the community.
The mine will create employment opportunities, which will improve the standard of life.	Sifunda, Rudolph Siphesihle Occupant of Plot 152 Employed by Unex Roses Neighbouring Land Occupant Survey 12-03-2016	Noted, your comments will be considered during the social impact assessment that addresses both impacts and benefits to the community.
To utilize local labour where possible, as community we will give our full support for the mine in order to create opportunities for the community.	Dlamini, Martha Occupant of Plot 152 Neighbouring Land Occupant Survey 12-03-2016	Noted, your comments will be considered during the social impact assessment that addresses both impacts and benefits to the community.

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
Seeing that you will not be able to employ everybody, those working on farms directly affected by the mine will also be affected. Will you provide farmers with an alternative place to continue their farming, so that we can remain employed, or what is going to happen to them if they cannot continue to farm? Specifically, those farms where the mine footprint will be.	Land occupant / Labour tenant Meeting 10-3-2018	The Specialist studies are also looking at those aspects that will impact the farmers and their land use activities, such as Air Quality, Blasting, Groundwater and Economic Livelihoods. Once these studies are complete, we will be able to present the possible impacts on those properties that are likely to be affected, and propose mitigation measures to avoid or minimize the impacts. There are properties that are directly affected by the mine due to mining or infrastructure placement, these will also be assessed in terms of job losses and economic livelihoods and mitigation measures proposed.
People are not educated, is the mine willing to educate them, and what happens if the mine does not fulfil its promises.	Land occupant / Labour tenant Meeting 10-3-2018	If the company obtains a Mining Right, they must in terms of that Right, report to DMR every year on the promises that they have made and the progress in terms of keeping those commitments and promises. That includes the Social and Labour Plan commitments, employment, impact on the communities, impact on the landowners and the economic value of the area. They also have to report on the monitoring and substantiate the report with the monitoring data. If promises are not fulfilled, DMR will intervene, and in the worse case the mine is at risk to lose their Mining Right. So, there are controls. It will be recommended that a grievance procedure be established where people can lodge complaints, concerns and suggestions, and this will need to be submitted to DMR on an annual basis as well.

### Comments from Landowners within a 1km radius (not direct neighbours)

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
<i>Translated:</i> We request the following information: A list of all the landowners in the Rietkol Mining Project. Within the designated area. Their e-mail addresses contact numbers and addresses. 2. As discussed by telephone, a confidentiality agreement between us the landowners and Consol. 3. The statement of "the mine of silica, sand, clay etc." The "etc" is a Gray area and opens the door for whatever we do not know or you may know. 4. The majority of the Preferred area Modder East Orchards and smaller portion Rietkol. It also creates concern because what's still on Rietkol? The purpose of the list of landowners is to communicate with everyone so that we can all speak the same mouth and keep informed of all the parties. We will, however, require certain information from you and will also inform you. It may be that the information you require from us will be delivered to you within the requested time.	Pretorius, Leon Landowner Plot 285 Landowner within 1km MRA buffer Email 17-02-16	<i>Translated:</i> As consultants, we must respect the privacy of landowners, and it will be irresponsible to make private information available without their knowledge or approval. The legislation does not require us to publish this information, and unfortunately, we are unable to comply with this request. The information we request is treated confidentially and is only used as input in our evaluation. The raw data is not made available to anyone, not even to the client (Consol). Therefore, we suggest that the specialists (social and economic specialists) who use the information enter into a confidentiality agreement with you. If you are happy with this, we will send you a draft agreement for your input. The following minerals will possibly be included in the application: Glass Sand (Silica), Silica sand (general), Sand (general), Silica Sand, Clay (CA), Ball Clay (CL), Concrete Sand, Building Sand, Clay (general), Crusher Sand (Silica), Foundry Sand (Silica), Filling Sand (Silica), Fuller's Earth (Clay), Group (Clay), Metallurgical Silica, Shale/Brick Clay, Silcrete (Silica), The prospecting right of several Modder East Orchards Agricultural holdings and part of the farm Rietkol 237 IR was already approved by DMR in 2009 under the name Rietkol. However, in terms of current information, it has been decided to apply for a Mining Right on only certain portions / holdings.

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<p><i>Translated:</i> Response to response above date 17-02-2016.</p> <p>The information will not be used for marketing, but will inform the affected parties of developments and also to speed up communication between landowners. Such as arranging information meetings etc. Everyone is affected by the same process and the residents welcome the communication method. The owners concerned want to make joint and informed decisions.</p> <p>It is only reasonable for us to protect ourselves, so we prefer to establish a confidentiality agreement regarding any information that has to be given to another party or institution.</p> <p>Related to possible minerals to be mined, please be specific and exact.</p>	<p>Pretorius, Leon Landowner Plot 285 Landowner within 1km MRA buffer Email 19-02-16</p>	<p><i>Translated:</i> Can we suggest that a meeting be held between the consultants (Public Participation, Socio-economic specialists) to discuss the aspects.</p> <p>Please provide 2 or 3 available days to confirm the availability of the specialists.</p>
<p><i>Translated:</i> As I mentioned before and as you have given feedback. "Rietkol mining Project" already registered in 2009. This is the first time I hear about it, as mentioned.</p> <p>The name creates confusion among all the people in the area. The largest part of the area is Modder East Orchards. From our perspective, the name "Rietkol" is misleading and does not necessarily mean the right community. As a result, you will not receive all the registrations of the affected parties.</p> <p>What is not correct, is the spelling of Borleng, it should be Botleng. You may need to go door to door, to make sure you get in touch with everyone.</p> <p>We that are being affected will soon meet. At the end of the meeting, we will inform you of what date will be appropriate for your specialists to address us. Unfortunately, it will also be after 4 March 2016 as all are not immediately available.</p> <p>It will also be requested that a confidentiality agreement be signed between you and the affected parties. I know what you answered but it is not necessarily the view of the affected people. So, you will not receive all registrations by 4 March 2016.</p>	<p>Pretorius, Leon Landowner Plot 285 Landowner within 1km MRA buffer Email 25-02-16</p>	<p><i>Translated:</i> Can we suggest that a meeting be held between the consultants (Public Participation, socio-economic Specialists) to discuss the aspects.</p> <p>Please provide 2 or 3 available days to confirm the availability of the specialists.</p>
<p>4. I will now deal with the contents of the DRS and supporting baseline studies applicable to the DSR relevant to my client's, extensive business of planting flowers of various cultivars in hothouses (tunnels) and the marketing thereof ("the business") on the above properties which are adjacent to the proposed mining area of the proposed Rietkol Silica Mine. It must not be construed or implied that my client necessarily agrees with the contents of the DSR which we do not specifically address in this letter, and my client's rights are reserved to comment in future on any of those issues if it deems it necessary, and once it is in</p>	<p>Johann Minnaar on behalf of PJ Pretorius Blomme CC Plot 285 Landowner within 1km MRA buffer Email 18-03-2018</p>	<p>Noted. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase, including impacts on groundwater levels and quality, air quality and property value. The potential impact on the economic activities of Pretorius Blomme will be assessed as part of the macro-economic impact assessment.</p> <p>The possible main macro-economic impact could be the possible impact on the available water and quality of the water. This will be determined applying the groundwater specialist report.</p>

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<p>receipt of the draft Environmental Impact Assessment Report and the necessary Environmental Specialist Reports which will follow the DSR.</p> <p>5. You are advised, at this earlier stage of the proposed project that my client will suffer irreparable loss and damages should the proposed mine be established on properties adjacent or nearby to the affected properties.</p> <p>6. Environmental degradation associated with mining such as air pollution, dust pollution, water depletion and polluted water are not conducive to the business of my client as explained above.</p>		
<p>7. The below mentioned studies should also focus particular on the business of my client also with regard to anti-pollution measures with regard to the accumulation of silica dust on the hothouses and the flowers, and the increased financial cost of the removal of excessive dust from the hothouses. In this regard it should be noted that the removal of dust on the hothouses will necessitate an increase in water consumption and the employment of more labour intensive methods.</p>	<p>Johann Minnaar on behalf of PJ Pretorius Blomme CC Plot 285 Landowner within 1km MRA buffer Email 18-03-2018</p>	<p>As indicated above, the potential impact on the economic activities of Pretorius Blomme will be assessed as part of the macro-economic impact assessment.</p> <p>Dust monitoring will be implemented on granting of the mining right, prior to any construction activities. If the data indicate excessive (above prescribed standards) dust fallout in the vicinity of Pretorius Blomme, the necessary discussions will be held with the company at the time.</p>
<p>11. <u>Socio-economic Impact</u>: The social and financial impact of the employees of the business should be investigated and in the event that the business has to close down due to the negative impact that the proposed mine would have on the business as explained above. The financial impact on the business must be investigated as well. In this regard you are referred to the provisions of Chapter 5, Section 23(2)(b) of the National Environmental Management Act, No. 107 of 1998 (NEMA) which provides that the Applicant must identify, predict and evaluate the actual and potential impact on, inter alia, the socio-economic conditions of the area, in this case, specifically to the business of my client.</p>	<p>Johann Minnaar on behalf of PJ Pretorius Blomme CC Plot 285 Landowner within 1km MRA buffer Email 18-03-2018</p>	<p>The potential impact on the economic activities of Pretorius Blomme will be assessed as part of the macro-economic impact assessment, including impacts on GDP and employment.</p> <p>The possible main macro-economic impact could be the possible impact on the available water and quality of the water. This will be determined applying the groundwater specialist report.</p> <p>In addition, a social impact assessment will be undertaken to address the impacts on the surrounding community and land use activities.</p>
<p>12. <u>Cumulative Impact</u>: It is placed on record that the proposed development of this project together with new coal mines adjacent and nearby to the business that are currently planned will have a cumulative impact on the business operations of my client specifically, and to the flower and roses producing industry in the region in general. This cumulative impact from an economic, social and environmental perspective should be investigated and included as part of the specialized environmental studies. The new coal mine projects which will affect the business of my clients are: Palmietkuilen, Eloff Mining (Exxaro), and Kangala Colliery Extension (Universal Coal). Information on all these projects is in the public domain and can be researched by the Applicant.</p>	<p>Johann Minnaar on behalf of PJ Pretorius Blomme CC Plot 285 Landowner within 1km MRA buffer Email 18-03-2018</p>	<p>Cumulative effects will be investigated as far as it is practical and relevant.</p> <p>It is noted that the closest operational mine to the proposed Rietkol Project is more than 8 km away (Kangala Coal).</p>

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<p>This mine will create maybe jobs for a 100 people, Unex alone employs 160 people, and I have about 65 people on a permanent base. Transport company have about 80 people, then all the other small holdings. You create 100 jobs and we lose 500 jobs where is the logic.</p>	<p>Pretorius, Leon Landowner Plot 285 Landowner within 1km MRA buffer Meeting 9-3-2018</p> <p>&amp; Martin van Zyl</p>	<p>Comment noted, this will be addressed in the macro-economic specialist study.</p>
<p>There are a few concerns regarding the process.</p> <p>1. If you look at what was said about skills development, will you be able to guarantee that those people undergoing skills development will indeed get a job.</p> <p>2. In terms of employment numbers. If we look at the economic state of the country and how business is thinking in terms of profitability, more businesses are mechanising to cut-down on employment (e.g., how farming was done 10 years ago - with labour, now utilising tractors and machines to do the work). Similarly, the mine is not looking for unskilled labour, they are using machines to mine and need skilled labour for those machines. The mine will also not employ more people if the government says so, they will employ the minimum people they need to run a profitable enterprise. Although they might do all the upliftment promises made by building schools, etc, it still doesn't guarantee a job for the guy sitting here that is unemployed. Unfortunately, the majority of the communities here are semi-skilled and unskilled, with all due respect.</p> <p>3. I got the feeling in yesterdays and today's meeting, we discuss this mine, but no matter what we say, this mine will go ahead, it is a foregone conclusion.</p> <p>4. We do not fall within the blasting zone. What is going to happen to the surrounding businesses, if the mine blasts and our water is cut-off. If that happens, I shut-down within a week. Everyone working for me, please stand-up. If I have to shut-down, the employment is also gone (<i>approximately 80 people stood up</i>). If I am negatively affected by the blasting, what kind of compensation will be for my business and my workers. How will the mine handle such a damage claim, will I need to proof that blasting damaged my groundwater and that is why my business needed to shut-down.</p>	<p>Pretorius, Leon Landowner Plot 285 Landowner within 1km MRA buffer Meeting 10-3-2018</p>	<p>1. &amp; 2. Employment / Skills Development: Noted.</p> <p>3. Foregone conclusion: What we are busy with now is consultation to explain the process and the Environmental Impact Assessment being done. The impact study will determine the impacted areas / zones. This process is so that we can conduct impact assessments, so that we can determine what the impacts will be.</p> <p>4. As an example Consol owns Silica Quartz at Rietfontein. At that operation we are surrounded by farmers and communities and we have a very good relationship with them. If they have complaints, they come to the mine and we solve them together. Remember that silica is utilised for a number of agricultural products like fertilizer, it is also used to treat water, so it is not a toxic product. Sometimes people expect the worse, but in actual fact the impacts are not as severe as anticipated. Therefore, allow the impact assessments to be completed and then we talk about how we prevent those.</p>
<p>6. Max employment = 100 (as per 3.6) a. How many will be sourced / moved from existing operations leaving actual employment opportunities at??</p>	<p>Sarel Kritzinger</p>	<p>Noted. The potential impact on the existing economic activities and the benefits of the proposed mining activity will be assessed as part of the macro-economic impact assessment, including impacts/benefits on GDP and employment.</p>

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<p>7. Economic benefits (as per 5.3)</p> <p>a. What technology will be available / used that local communities can use in future for their own business?</p> <p>b. Skills development for maximum 100 employees – not a real benefit to the local community and unemployed.</p> <p>c. Asset base: What future development – all assets will be removed after LOM expired and only asset left will be a massive hole in the ground.</p> <p>d. Local procurement: No new opportunities will be created as the mine already operate in the Delmas municipal area and have established suppliers and service providers. If new opportunities are created it will be limited and only a few.</p> <p>8. Job Creation (as per 5.5)</p> <p>a. “Employ local community provided sufficient skills are available”. Majority are unemployed and unskilled – thus no real job creation</p> <p>b. A false message is sent to locals and creates an expectation that will ultimately result in unhappiness and protests which will destabilize the area.</p>	<p>Goudhoek SA Boerperd Stoet / Ovomart (Pty) Ltd / SJN Kritzinger cc Plot: 158, 160, 161, 162. Landowners within the 1km MRA buffer Email 19-03-2018</p>	<p>The developer (applicant) for the Rietkol Mining Operation (Rietkol Project) is Nhlabathi Minerals (Pty) Ltd (Nhlabathi), a wholly owned subsidiary of Apex Silica Mining (Pty) Ltd. Apex Silica Mining has another mining operation in the Delmas area. The Silica Quartz mining operation has a Life of Mine of 20 years. Skills transfer will occur between the two mining operations however it is not envisaged to transfer the current employees from Silica Quartz to the Rietkol project. As part of the Mining Right Application process a detailed SLP was submitted including portable skills development and community upliftment programmes.</p> <p>The rehabilitation plan includes the removal of infrastructure and the sloping and levelling of the sides of the pit to allow for an open water body. Nhlabathi will commence discussions with the Victor Khanye Local Municipality to develop the mining right areas as an open space that will complement the surrounding development at end of LoM.</p>
<p>13. Land use and agricultural activities (as per 8.11.5.2)</p> <p>a. SA Boerperd stud and Equestrian Centre not listed although we are within a 1km radius of the proposed mine.</p> <p>b. There are various signboards up advertising the Stud and Equestrian Centre.</p> <p>c. No information was included / investigated related to the equestrian operation. We host various events throughout the year with the number of competitors in excess of 100 per competition.</p>	<p>Sarel Kritzinger Goudhoek SA Boerperd Stoet / Ovomart (Pty) Ltd / SJN Kritzinger cc Plot: 158, 160, 161, 162. Landowners within the 1km MRA buffer Email 19-03-2018</p>	<p>Noted. This section of the report, as well as associated maps will be revised accordingly in the FSR.</p> <p>The macro-economic and social specialists will be made aware of the additional land use activities, and will address this in their impact studies.</p>
<p>15. Mining Activities (as per 8.11.5.3)</p> <p>a. Check which mines are still active or are in state of rehabilitation, also no blasting take place at these operations.</p>	<p>Sarel Kritzinger Goudhoek SA Boerperd Stoet / Ovomart (Pty) Ltd / SJN Kritzinger cc Plot: 158, 160, 161, 162. Landowners within the 1km MRA buffer Email 19-03-2018</p>	<p>Noted. The mining activities will be double-checked, with a distinction between operational and decommissioned/closed mines. If necessary, this section of the report will be revised in the FSR.</p>
<p>16. Monetary value of current activities (as per 8.11.6)</p> <p>a. Buffer area (as per 8.11.6.2) not accurate – Horses and equestrian not included. See item 15 above.</p>	<p>Sarel Kritzinger Goudhoek SA Boerperd Stoet / Ovomart (Pty) Ltd / SJN Kritzinger cc Plot: 158, 160, 161, 162.</p>	<p>Noted. The macro-economic specialist will make contact with Goudhoek to obtain the necessary information to update their baseline information in the specialist report and EIAR.</p>

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	Landowners within the 1km MRA buffer Email 19-03-2018	
<p>Water: This commodity cannot be replaced by humans. As you know the whole area, is depending on groundwater. Not only for farming but also more so for human consumption. Any disturbance of the ground formation will cause that the dolomite will cave in and boreholes included. That already happened at Bapsfontein, and to the east of Delmas. If the water is contaminated, it will affect quite a number of people and agriculture.</p> <p>Value of property: Our properties will have no value without clean water. Water is the main issue required if you want to sell your property. All banks have this requirement if one would apply for financing.</p> <p>Modder East Orchards is known for the underground lake and if for mining to start, they will have to pump a lot of water to somewhere. Where will that be? The mine will flood constantly, as the water will seep through all the time.</p> <p>Mining interference: Dust, trucks, road deteriorate. Explosions and vibrations will cause cracks in our homes with a tremendous amount of dust. Presently we enjoy wonderful clean air with no pollution. We have invested our life savings to enjoy this wonderful gift of nature. What impact will that have on our health, property value and general living standards? Especially in winter time.</p> <p>Conclusion: Does this mineral deposit justify the consequence it will create? We are all positive for job creation, but what will be done to compensate for our life investment? Will the mine even consider to buy our properties at Municipal valuation?</p>	<p>Dennis Webster Plot 266, 268, 263 Landowner within 1km MRA buffer Email 21-03-2018</p>	<p>Noted. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase, including impacts on groundwater levels and quality, air quality and property value.</p> <p>Other studies include a Health Impact Risk Assessment (HIRA), traffic impact assessment and a social impact assessment. Impact of air blast and vibration on all structures within the blast impact zone will be addressed as part of the blasting impact assessment.</p> <p>The potential impact on the existing economic activities and the benefits of the proposed mining activity will be assessed as part of the macro-economic impact assessment, including impacts/benefits on GDP and employment.</p> <p>A cumulative impact zone will be determined around the proposed mining activities once all the specialist studies have been completed, and only then will a decision be taken on the proposed buy-out of properties.</p>

### Comments from Landowners outside the 1km radius

Comments/Suggestion/Question/Concern	Stakeholder, date & method	Response
<p>Most important – mining over aquifer, water is precious Effect of increased mining activity on water supply from borehole. Increased subsidence and incidents of sinkholes, this is a dolomitic area. Degradation of current poorly maintained local and provincial infrastructure, not limited to road surfaces, electricity supply and water use.</p>	<p>Dirk &amp; Luanne Smalle Landowner Plot 103, 104 Landowner outside 1km MRA buffer Email 26-10-2016 &amp; 11-11-2016</p>	<p>Noted. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase. The concerns raised by the Smalle family will be forwarded to the specialists for consideration during their assessments.</p>



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<p>Increase in noise and air pollution as well as blasting and tremors. This is not acceptable in agricultural area!</p> <p>Increase in socio-economic problems due to a lack of housing, crime, etc</p> <p>Decline in property value and sense of place</p>		
<ol style="list-style-type: none"> <li>1. Property value will decrease after the mining start, due to the blasting noise, dust, and water usage.</li> <li>2. Borehole water, the lack of water or decrease in water levels. The quality of our water.</li> <li>3. More land invasions-to live closer to the mine and or waiting to be employed.</li> <li>4. Animals (Horses) that can be injured – due to the blasting.</li> <li>5. Damage to our buildings due to blasting.</li> </ol>	<p>Karin Badendorst-Brooks Landowner outside 1km MRA buffer Email 16-03-2018</p>	<p>Noted. Impacts associated with the proposed Rietkol Project will be identified during the EIA Phase, including impacts on groundwater levels and quality, air quality and property value. Impact of blasting on infrastructure and horses will be addressed as part of the blasting impact assessment. Influx of employment seekers will be addressed in the social impact assessment.</p> <p>The concerns raised will be forwarded to the specialists for consideration during their assessments.</p>
<p>What happens to our horses and animals when you blast?</p> <p>When an animal is in a situation where they know there will be load noise, they can handle it. But like horses, if you blast, they will run and hurt themselves. Who will pay those costs, or must we change our land use activities? I have 11 horses with normal fencing; they will hurt themselves breaking through the fence.</p>	<p>Karin Badendorst-Brooks Landowner outside 1km MRA buffer Meeting 9-3-2018</p>	<p>We will share your concerns with the noise and blasting specialists. The specialist will address your concerns in their studies.</p>