

Social Impact Assessment for the Proposed Extension of Pit 1, Pipeline from Dorstfontein West to Dorstfontein East and the Disposal of Discard into the Opencast Pit

Report Prepared for

Exxaro Coal Central (Pty) Ltd

Report Number 499507/SIA



Report Prepared by

The logo for srk consulting, featuring a stylized orange 'V' shape to the left of the text 'srk consulting' in a sans-serif font.

April 2017

Social Impact Assessment for the Proposed Extension of Pit 1, Pipeline from Dorstfontein West to Dorstfontein East and the Disposal of Discard into the Opencast Pit

Exxaro Coal Central (Pty) Ltd

SRK Consulting (South Africa) (Pty) Ltd
265 Oxford Rd
Illovo 2196
Johannesburg
South Africa

e-mail: johannesburg@srk.co.za

website: www.srk.co.za

Tel: +27 (0) 11 441 1111
Fax: +27 (0) 11 880 8086

SRK Project Number 499507

April 2017

Compiled by:

Victoria Braham
Social Scientist

Email: vbraham@srk.co.za

Authors:

V Braham

Peer Reviewed by:

Vassie Maharaj
Partner

Anita Bron
Principal Social Scientist

Executive Summary

SRK Consulting (South Africa) (Pty) Ltd (SRK) was appointed as the social study specialist as part of the Environmental Authorisation process for the Proposed Extension of Pit 1, the Pipeline from Dorstfontein West to Dorstfontein East and the Disposal of Discard into the Opencast Pit (the Dorstfontein East Extension Project/the Project).

The proposed Project will be an extension of the existing opencast operations at Dorstfontein East, located approximately 18 km from the town Ga-Nala (formerly Kriel). The project falls within the Emalahleni Local Municipality and Nkangala District Municipality in Mpumalanga Province.

Exxaro Central Coal (Pty) Ltd (Exxaro) proposes to develop one of two mining options: Option 1, which is the extension of existing opencast workings on the eastern side in an altered direction and Option 2, which includes the extension of the same pit on the right hand side. In addition to this, Option 2 would include an underground component from 2021, ultimately opening a pit room using continuous miners. Both options require the construction of a dewatering pipeline. Three route options for the pipeline, as well as the two mining options have been presented and assessed in this report.

Potential social impact as a result of the Dorstfontein East Extension Project Option 1

The potential social impacts were identified as follows:

- As a result of the extension of the open pit, loss of cultivated land to leasing farmers, impacting on potential crop yield;
- Due to the occurrence of additional trucks on the roads, and the incidence of construction workers on site, health and safety impacts on local communities may include construction workers lighting fires on site, littering and driving irresponsibly;
- Impact on local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation;
- As a result of blasting activities during construction and operation, potential damage to adjacent landowners' and occupiers' infrastructure; and
- Decommissioning and closure of mining project: resulting in job losses.

Potential social impact as a result of the Dorstfontein East Extension Project Option 2

Apart from the impacts described above, the potential additional social impacts were identified as follows:

- As a result of operational underground mining activities and associated activities, potential local employment opportunities will become available, increasing access to financial capital for workers;
- As a result of the additional underground operations there will be additional trucks on the roads, impacting on local communities' health and safety i.e. operation vehicle drivers may drive irresponsibly;
- As a result of blasting activities during construction and operation, potential damage to adjacent landowners'/occupiers' infrastructure; and
- As a result of past underground mining activities air vents as well as access shafts pose a safety threat to those traversing the surface area following decommissioning and closure, if shafts and vents are left open/unsecured.

The construction and operation of the Dorstfontein East Extension Project do not present any major social risks, assuming that all activities during construction and operation will be executed in line with relevant Exxaro standards and requirements, Exxaro Safety, Health and Environmental policies, as well as relevant South African regulations such as the Mine Health and Safety Act No. 29 of 1996.

Based on social aspects in the study area, SRK recommends that, if possible, mining Option 2 is the chosen means of mining, due to the additional employment requirements of, ideally local people, during the construction and operations phase. Additionally, from a social perspective, the Route 1 pipeline is preferred, as it follows existing service and transport corridors and dissects less of the farmland currently leased to farmers.

Table of Contents

Executive Summary	i
Disclaimer.....	v
List of Abbreviations.....	vi
1 Background	1
1.1 Introduction	1
1.2 Project Details	1
1.3 Project Location	2
1.4 Legal and Regulatory Framework.....	5
2 Approach to the Socio-economic Study	6
2.1 Objectives of the Socio-economic Study	6
2.2 Methodology.....	6
2.2.1 Data Collection	6
2.2.2 Compilation of a Socio-economic Baseline.....	6
2.2.3 Identification and Rating of Impacts	7
2.2.4 Mitigation Measures and Recommendations	8
2.3 Details of the Social Team	8
2.4 Stakeholder Issues.....	8
2.5 Assumptions and Limitations	9
3 Social Context	10
3.1 Broad Socio-economic Context	10
3.2 Land Use.....	11
3.3 Project-affected Socio-economic Context.....	14
3.3.1 Key Population Demographics	14
3.3.2 Key Household Information.....	15
3.3.3 Education	16
3.3.4 Socio-economic Profile.....	17
3.3.5 Service Delivery	18
4 Social Impacts	20
4.1 Discussion: Option 1 and Option 2 Opencast Impacts	23
4.1.1 Pre-construction and Construction.....	23
4.1.2 Operation.....	24
4.1.3 Decommission and Closure	25
4.2 Discussion: Option 2 Underground Impacts	36
4.2.1 Pre-construction and Construction.....	36
4.2.2 Operation.....	36
4.2.3 Decommission and Closure	36
4.3 Discussion: Cumulative Impacts.....	41
5 Options Analysis	43

5.1	Mining Method.....	43
5.2	Pipeline Routes.....	43
6	Conclusions.....	44
6.1	Social Impact Assessment.....	44
6.2	Mining and Pipeline Route Options Recommendation	44

List of Tables

Table 1-1:	Comparative table of the two mining options	1
Table 2-1:	Social team	8
Table 3-1:	Key Socio-demographic information	10
Table 4-1:	Summary of Option 1 and Option 2 opencast impacts	21
Table 4-2:	Estimated employment levels and numbers during operation	25
Table 4-3:	Potential construction phase impacts: Option 1 and Option 2 opencast component	26
Table 4-4:	Potential operation phase impacts: Option 1 and Option 2 opencast component.....	32
Table 4-5:	Potential decommissioning and closure phase impacts: Option 1 and Option 2 opencast component	35
Table 4-6:	Potential construction phase impacts: impacts unique to Option 2 underground component...	37
Table 4-7:	Potential operation phase impacts: impacts unique to Option 2 underground component	38
Table 4-8:	Potential decommissioning and closure phase: impacts unique to Option 2 underground component	40
Table 4-9:	Potential cumulative impacts in the Mpumalanga Highveld Region: Option 1 and Option 2.....	42

List of Figures

Figure 1-1:	Dorstfontein East Extension Project locality	3
Figure 1-2:	Approximate locations of the Dorstfontein East Extension Project infrastructure and options ...	4
Figure 2-1:	Methodology for rating significance of impacts	7
Figure 2-2:	Significance impact rating matrix	8
Figure 3-1:	Age distribution	11
Figure 3-2:	Unemployment rate.....	11
Figure 3-3:	Land use surrounding the Dorstfontein East Extension Project	13
Figure 3-4:	Ward 25 locality map.....	14
Figure 3-5:	Ward 25 demographics	15
Figure 3-6:	Ward 25 households	16
Figure 3-7:	Ward 25 education	17
Figure 3-8:	Ward 25 economics	18
Figure 3-9:	Ward 25 service delivery.....	19
Figure 5-1:	Photographs along the proposed Pipeline Route 1	43

Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Exxaro Coal Central (Pty) Ltd. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ELM	Emalahleni Local Municipality
EMP	Environmental Management Programme
LM	Local Municipality
NEMA	National Environmental Management Act No. 107 of 1998
NDM	Nkangala District Municipality
SIA	Social Impact Assessment
SLP	Social and Labour Plan
SMME	Small Medium Micro Enterprises
SRK	SRK Consulting (South Africa) (Pty) Ltd
StatsSA	Statistics South Africa

1 Background

1.1 Introduction

Exxaro Coal Central (Pty) Ltd (Exxaro) Dorstfontein operation is conducting an Environmental Authorisation (EA) process for the extension of Pit 1, the pipeline from Dorstfontein West to Dorstfontein East and the disposal of discard into the opencast pit (the Dorstfontein East Extension Project/the Project). SRK Consulting (South Africa) (Pty) Ltd (SRK) was required to provide a Social Impact Assessment (SIA) of the proposed extensions' potential risks to and impacts on the socio-economic context.

1.2 Project Details

Located in the Dorstfontein mining complex, the Dorstfontein East current operation requires an extension of its Open Pit 1 and the construction of a pipeline from Dorstfontein West to Dorstfontein East and the disposal of discard into the opencast pit. These activities are currently not part of the existing Environmental Management Programme (EMP) for Dorstfontein East, and as such an EMP amendment is required as per the National Environmental Management Act (Act No 107 of 1998) [NEMA].

Dorstfontein East is an opencast mine located almost 18 km from Ga-Nala, formerly known as Kriel. The mine is located within Emalahleni Local Municipality (ELM) and started its operations in 2011 (Refer to Figure 1-1 for a locality map). Currently only opencast mining is practised and in future underground mining is planned as well. Two opencast pits are currently mined on the eastern and western side of the resource area with mining taking place both in the No. 2 and No. 4 seams. The current activities have been approved by both the Department of Mineral Resources (DMR) and the Department of Water and Sanitation (DWS).

Exxaro is now planning to extend its operations on the western side of the Dorstfontein East mine referred to as Pit 1 Extension. The area is part of the current approved mining right area but it has not been included in the current EMP and Life of Mine (LOM). Two mining options have been developed for Pit 1 Extension, and are described in Table 1-1.

Table 1-1: Comparative table of the two mining options

Option 1	Option 2 Opencast Phase	Option 2 Underground Phase
Mining method		
<ul style="list-style-type: none"> Opencast method of mining will continue as normal from the existing Pit 1 until the planned pit is depleted; Pit 1 Extension will follow with a slight change in the mining direction; and Roll over method suggested. The roll over method involves the removal of a long strip of overburden. This method is favoured where coal is located close to the surface. 	<ul style="list-style-type: none"> Pit 1 Extension will follow existing pits depletion; and Mining of Pit 1 Extension by means of opencast methods on the right hand side of the North Eastern side of the Pit 1 extension and to mine the left hand side North West of the Pit 1 Extension. 	<ul style="list-style-type: none"> Underground construction phase in Option 2 will commence at the end of 2021; First production is planned for April 2022 ramping up to full production by June 2022; The second phase will be introduced in March 2023 as pit room is opened up by the first section; and Will be mining the No. 4 seam only.
Equipment used		
<ul style="list-style-type: none"> Combination of excavators, front-end-loaders as well as in-pit coal drilling machines, 	<ul style="list-style-type: none"> Opencast mining for the area to the east through the use of earth moving mining equipment to conduct the 	<ul style="list-style-type: none"> Conventional mechanized underground mining using continuous miners.

Option 1	Option 2 Opencast Phase	Option 2 Underground Phase
haul trucks and track bulldozers.	<p>opencast mining on the right hand side of the igneous intrusion (sheet of newer rock that has “intruded” between older layers of rock); and</p> <ul style="list-style-type: none"> Here, the addition of a combination of excavators, front-end-loaders as well as in-pit coal drilling machines, haul trucks and track bulldozers (as in Option 1). 	
Estimated production		
<ul style="list-style-type: none"> Production rates may be adjusted during the life of the Pit 1 Extension; Opencast will be mined at a run of mine production of \pm 180 Kilotons per month mining both the No. 4 and No. 2 seam; and Production is planned to ramp up from 500 Kilotons to 1.3 Megatons per annum over a 10 year period. 	<ul style="list-style-type: none"> Production at a reduced rate of estimated 40 Kilotons per month (480 Kilotons per annum); and Reduction due to limited pit length. 	<ul style="list-style-type: none"> 1 191 630 tons in 2022, reducing to 688 908 tonnes in 2023.
Life of Mine		
<ul style="list-style-type: none"> Estimated LOM: 10 years. 	<ul style="list-style-type: none"> Estimated LOM: 7 years. 	<ul style="list-style-type: none"> Estimated LOM: 2 years.

Source: Mining Works Programme DCME Pit 1 NW Extension, 2016

In addition to the mining method options, three potential pipeline routes have been proposed for the Dorstfontein East Extension Project. All options travel outside of the footprint of the Project, however all are in an area that is disturbed by existing mine and agricultural activities. Figure 1-2 indicates the locations of these three route options.

The location of the discard dump is within the current mine footprint, while the extension of the open pit and the pipeline route will be new additions, outside of the existing mine footprint. The discard dump is assessed as part of both options and not as a stand-alone activity.

1.3 Project Location

The Dorstfontein complex is situated in the Mpumalanga Highveld Region within the ELM that forms part of the Nkangala District Municipality (NDM). The Mpumalanga Highveld Region accounts for 83.0% of South Africa's total coal production, and the project is surrounded by coal mines and power stations. Ga-Nala (Kriel) is approximately 8 km to the southwest of the current operations, while Thubelihle is approximately 5.5 km southwest. Dorstfontein West, which is an underground mine, is reaching the end of its life, and is gradually being replaced by the Dorstfontein East Extension Project, which is an opencast mine. Dorstfontein West is approximately 5 km southwest of Dorstfontein East. Figure 1-1 shows the location of the municipalities and towns in relation to the Dorstfontein East Extension Project.

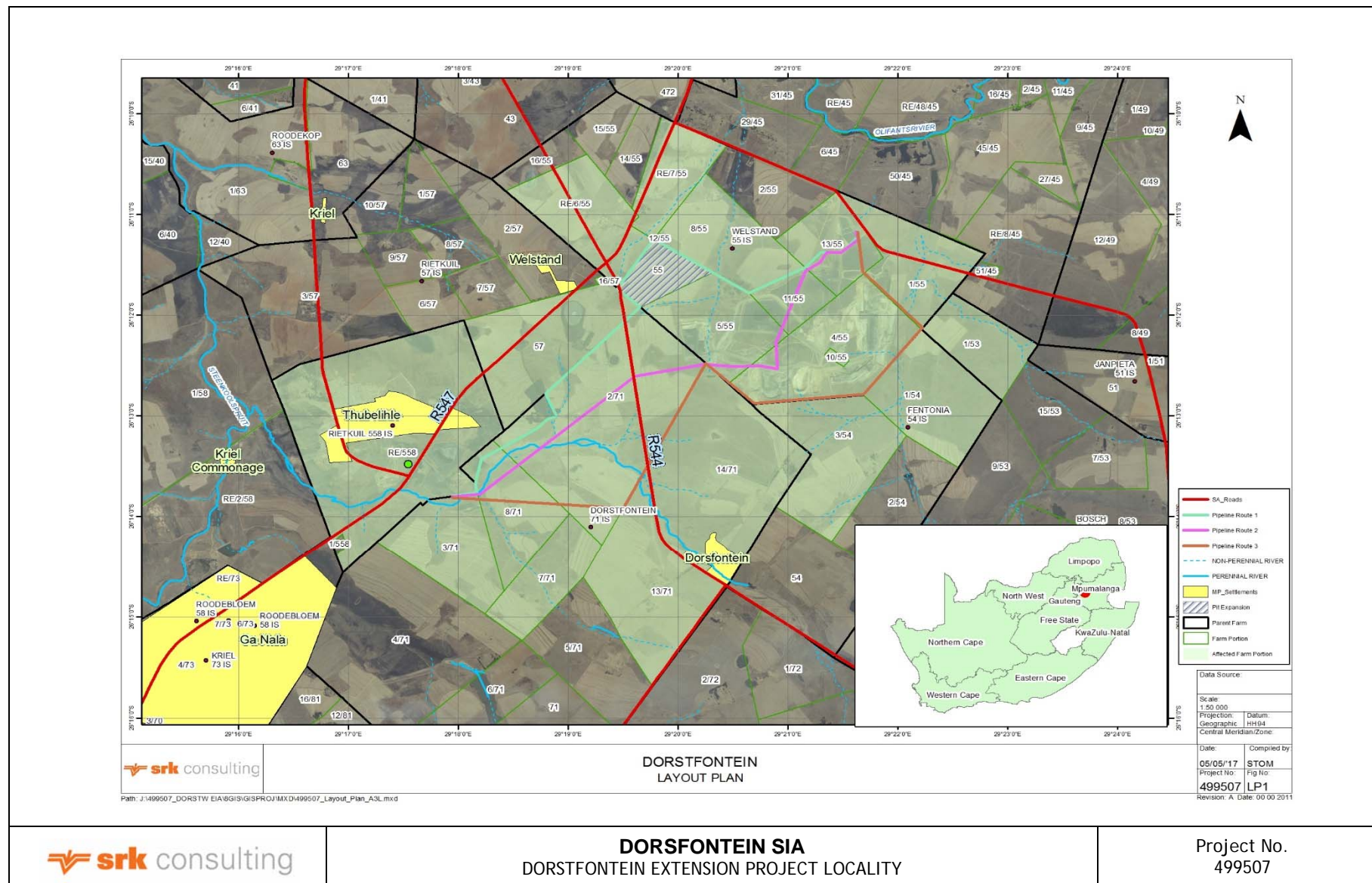


Figure 1-1: Dorstfontein East Extension Project locality

Source: Dorstfontein Coal Mine East Mine Expansion Project EMP, 2008

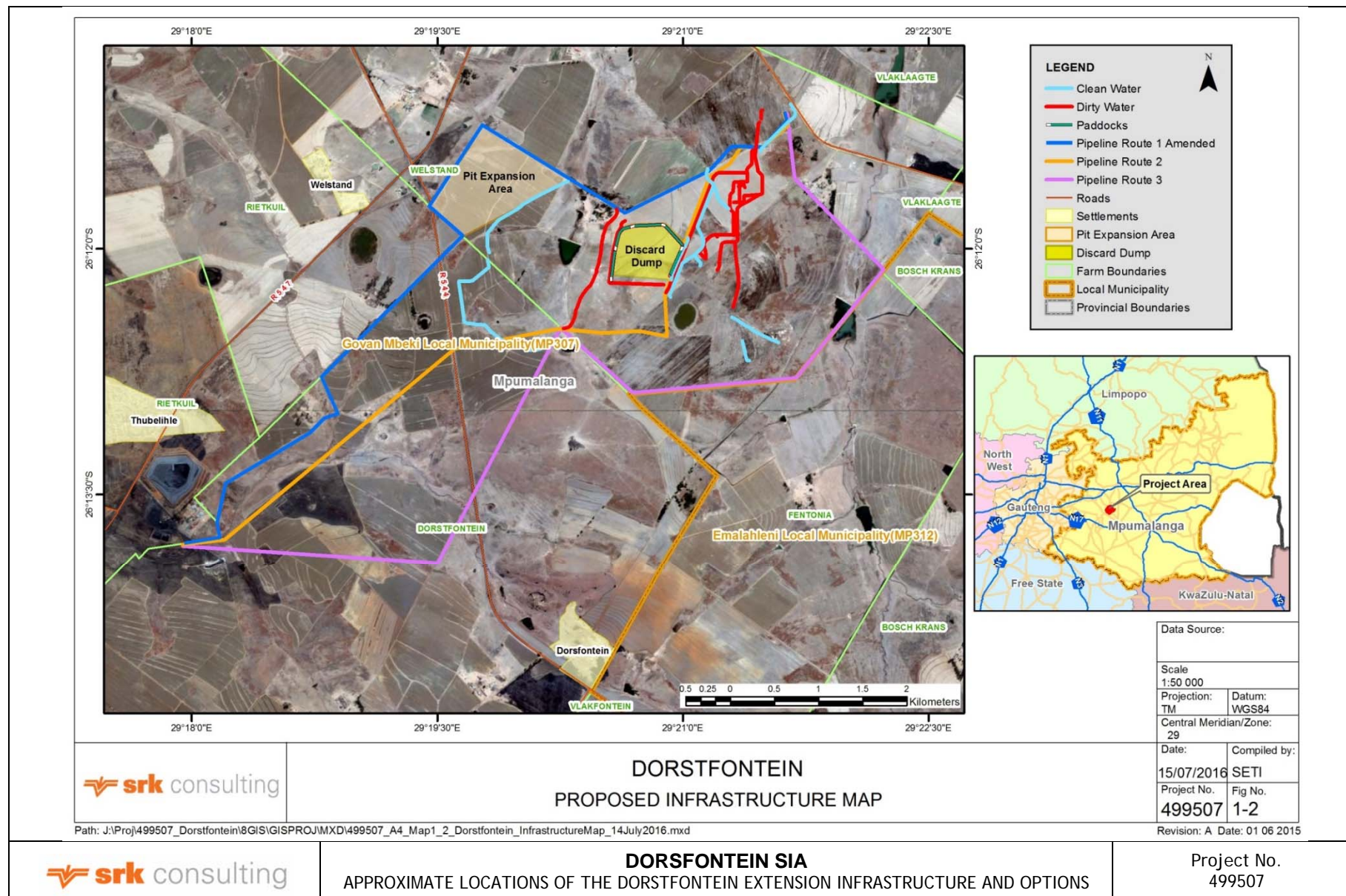


Figure 1-2: Approximate locations of the Dorstfontein East Extension Project infrastructure and options

1.4 Legal and Regulatory Framework

This report is guided by the NEMA. The function of NEMA is to provide co-operative and environmental governance by establishing principles for decision-making on matters affecting the environment. The project's legal requirements contained in the NEMA are discussed in the SRK final Environmental Impact Assessment (EIA) report number 499507.

2 Approach to the Socio-economic Study

2.1 Objectives of the Socio-economic Study

The primary objective of the study is to encourage sustainable development during the construction and operation of the Dorstfontein East Extension Project. To support the primary objective, the secondary objectives of the social study are to:

- Describe the socio-economic environment of the study area highlighting those attributes and components, which may influence or be influenced by the proposed Dorstfontein Extension;
- Identify and discuss the opportunities provided by the proposed project;
- Identify and discuss negative impacts (if any) including health and safety risks;
- Provide mitigation measures where feasible, so as to reduce negative impacts and enhance positive impacts; and
- Assess the three pipeline routes and recommend a preferred route.

2.2 Methodology

SRK employed impact assessment methodologies that align with local legal requirements. For this specific project, secondary data was used to meet the objectives of the SIA. The methodology for this project included:

2.2.1 Data Collection

A SIA was conducted to meet the objectives of the study. No site visit was undertaken and as such, a desktop study was done, using available secondary data sources. The secondary data sources that were consulted included: project specific reports and information, data generated by Statistics South Africa (StatsSA), municipal documents, and satellite imagery.

Project data sources:

- SRK Pretoria for Exxaro, Mine Works Programme DCME Pit 1 NW Extension, June – July 2016.
- GCS for Exxaro, August 2009. East Mine Expansion Project Environmental Management Programme. DME Reference No: MP 30/5/1/2/2/51MR.
- Exxaro website. Consolidated Mineral Resources Ore Reserves Report. Accessed 25 July 2016. http://www.exxaro.com/ar/2015/Consolidated_Mineral_Resources_Ore_Reserves_Report.pdf.

Statistics South Africa:

- StatsSA, Statistical Release P0211. Quarterly Labour Force Survey, Quarter 4, 2014.
- StatsSA, Census 2001 and 2011. Municipal Fact Sheet.
- StatsSA, Census 2011. Supercross software.

Municipal documents:

- ELM Integrated Development Plan, 2016.
- ELM Spatial Development Framework, 2012.

Satellite imagery:

- Google Earth 17/05/2016.
- Google Earth 09/09/2015.
- Google Earth 01/03/2011.
- Google Earth 09/18/2007.

2.2.2 Compilation of a Socio-economic Baseline

The information collected through the desktop review was used to compile a socio-economic baseline profile. The following variables were discussed: population size and growth, household size and growth, number of female headed households and formal dwellings, age distribution, and employment rates.

2.2.3 Identification and Rating of Impacts

Social impacts were identified and rated as per the scope of work. The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management process; secondly, it serves to show the primary impact characteristics, as defined below, used to evaluate impact significance. The impact significance rating system is presented in Figure 2-1, and involves three parts:

- **Consequence:** Define impact consequence using the three primary impact characteristics of severity of impact, spatial scope of impact and duration of impact;
- **Likelihood:** Define impact likelihood using the two primary impact characteristics of frequency of activity/duration of aspect and frequency of impact; and
- **Significance:** Use the matrix to determine the significance impact rating (Figure 2-2).

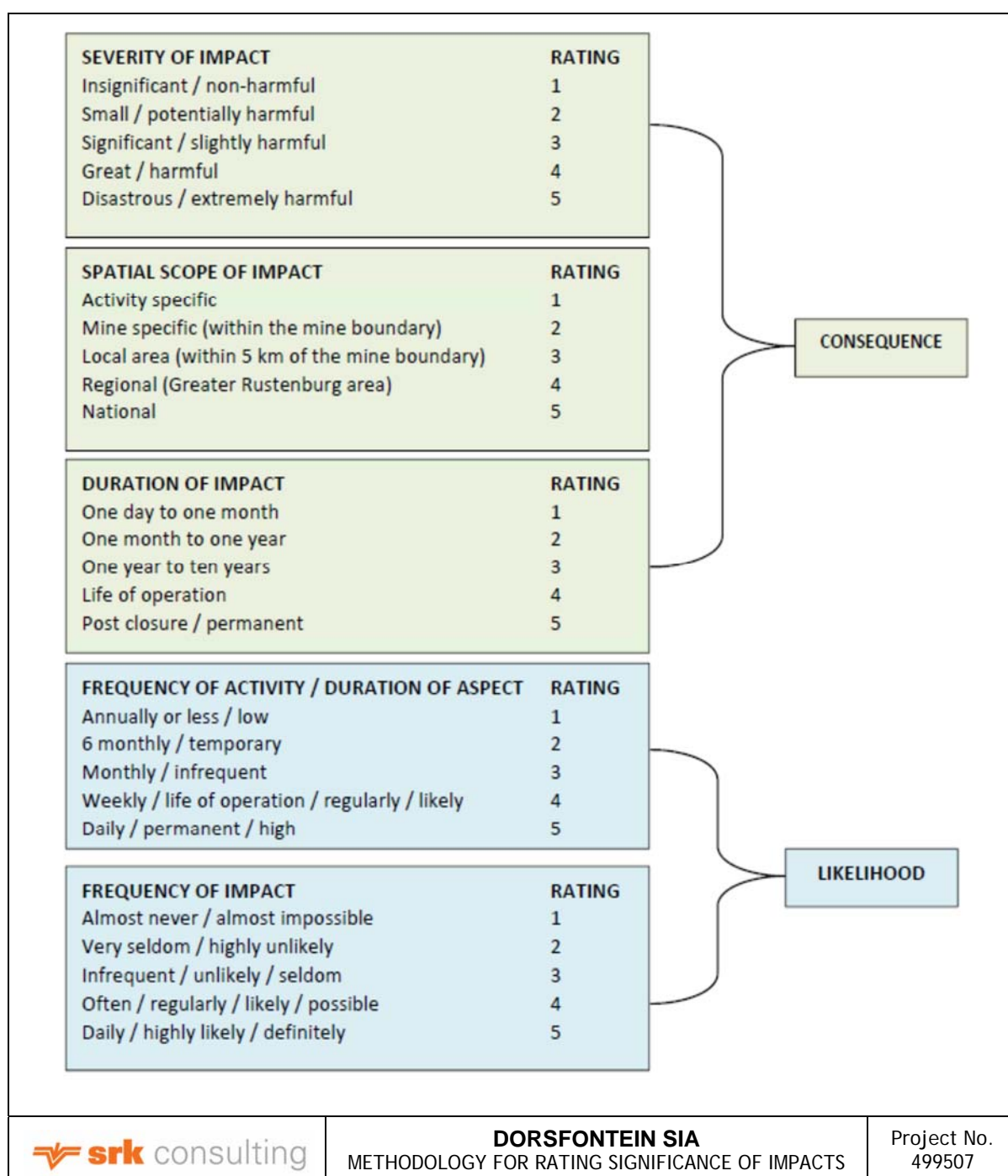


Figure 2-1: Methodology for rating significance of impacts

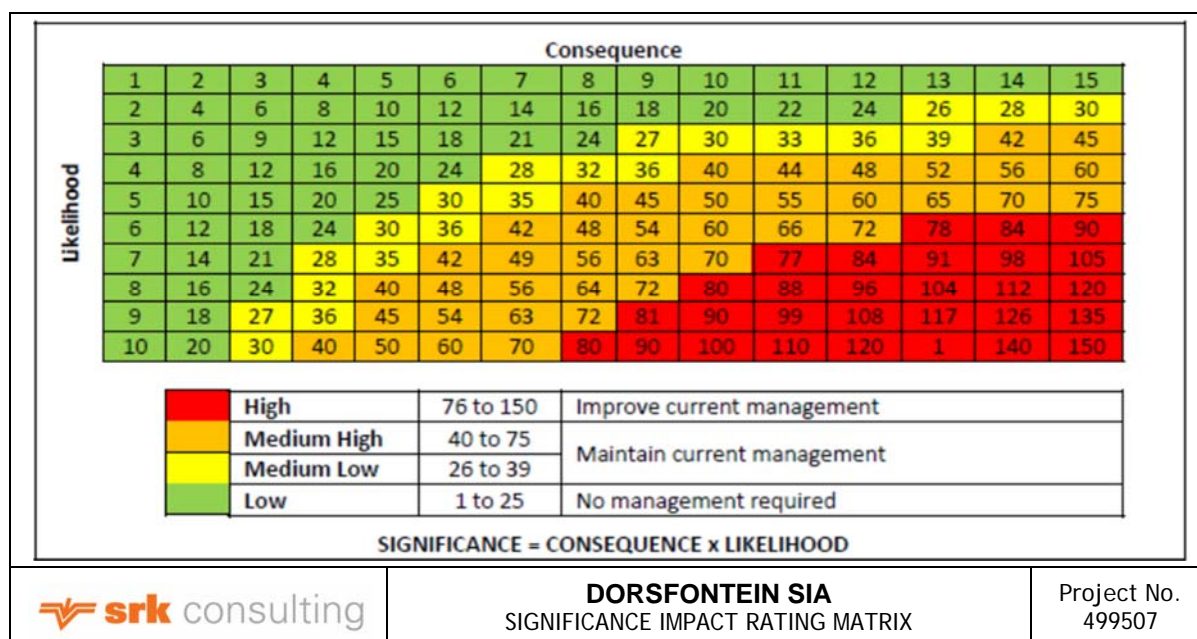


Figure 2-2: Significance impact rating matrix

2.2.4 Mitigation Measures and Recommendations

Mitigation measures were identified to enhance positive impacts, and to avoid/mitigate potential negative impacts. The impact rating was repeated to assess the expected extent, duration, magnitude, likelihood (probability), and significance of impacts after mitigation. The post-mitigation rating gives an indication of the residual impact after mitigation.

2.3 Details of the Social Team

SRK conducted the social study for the proposed project. SRK's environmental and social consultants include a multi-disciplinary team of some 50 professional staff supported by well over 300 allied specialists that provide services including EIAs and SIAs, and management planning to meet in-country and good international industry practice requirements. The team for this study is listed in Table 2-1:

Table 2-1: Social team

Name	Qualifications	Experience	Role on the Project
Vassie Maharaj	Partner, BSc Biochemistry and Physiology	19+ years	Partner Review
Anita Bron	Principal Social Scientist, MA Research Psychology	18+ years	Technical Review
Victoria Braham	Social Scientist, BSocSci Hons Environmental Management	5 years	Project Lead

2.4 Stakeholder Issues

At the time of completing this report, no project specific issues and comments related to the social context had been raised during the public consultation process for this amendment. However, issues and concerns raised at public meetings conducted by GCS in 2007 during the scoping phase of the original Dorstfontein East Mine Expansion Project EMP included:

- Impact on affected farms, crop value and options;
- Impact on infrastructure due to blasting activities;
- Impact on water quality, adjacent watercourses and wetlands; and

- Impact on farm processes and scheduling.

2.5 Assumptions and Limitations

SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. No site visit was conducted for the study, and as such results are based on a desktop analysis of secondary data sources.

Opinions presented in this report apply to the information about the site and the project as it existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Statistics provided by StatsSA should be regarded as indicative of the social context, and not as conclusive.

3 Social Context

3.1 Broad Socio-economic Context

ELM has a population density of 148 people per km², and as per Table 3-1 (StatsSA, 2011) and population growth rate of 3.6% between 2001 and 2011. The ELM's population density is nearly two times higher than that of the NDM, which has a density of 78 people per km².

A similar pattern is evident for the growth in the number of households, with ELM and NDM showing a growth of 3.6% and 2.6% respectively from 2001 to 2011. The size of households had decreased, and was at 3.2 persons per ELM household in 2011. If the ELM population continues to grow at or above 3.6% per annum, the following issues identified in the ELM 2016/17 Integrated Development Plan will continue to be exacerbated:

- Growth in formal settlements and back rooms (it is estimated that 10 000 people reside in these);
- Water supply to informal settlements costing about R 800 000 per month and the residents are not contributing to the cost of these services;
- Strain on water, sanitation, electricity and roads resulting in quality and capacity problems;
- Increase in unemployment particularly amongst the youth and unskilled; and
- Issues of crime, prostitution and drug abuse

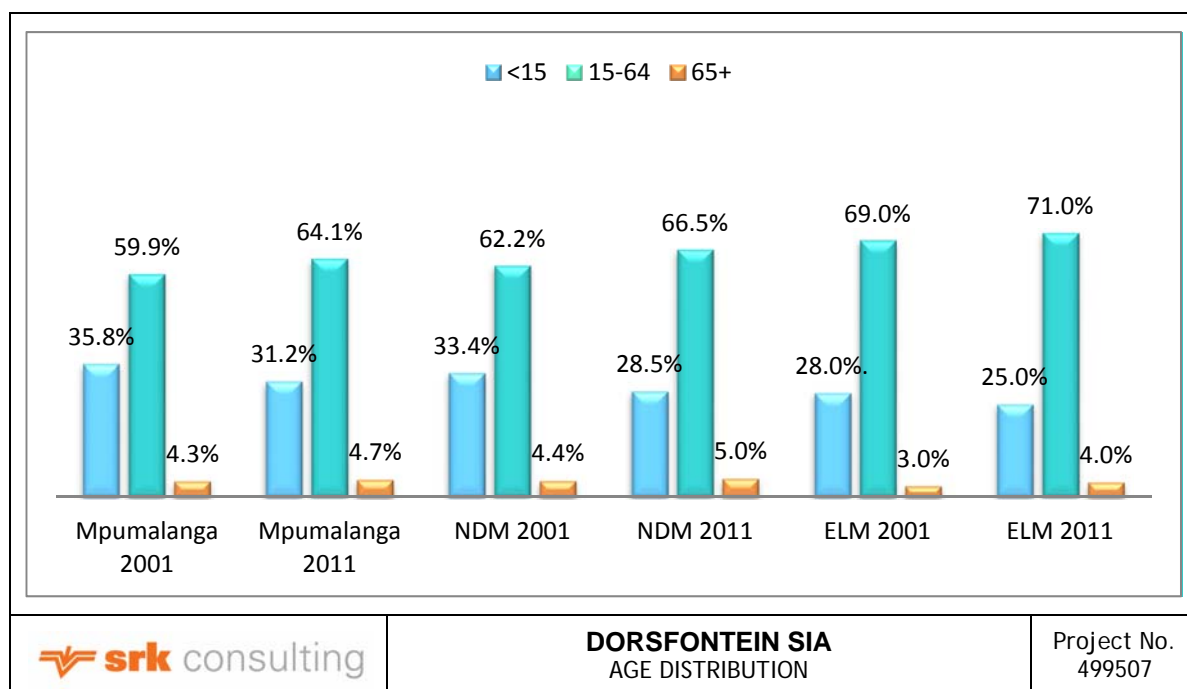
From 2001 to 2011, the number of formal dwellings in the ELM, the NDM and Mpumalanga Province had increased by 23.1%, 9.3% and 20.0% respectively.

Table 3-1: Key Socio-demographic information

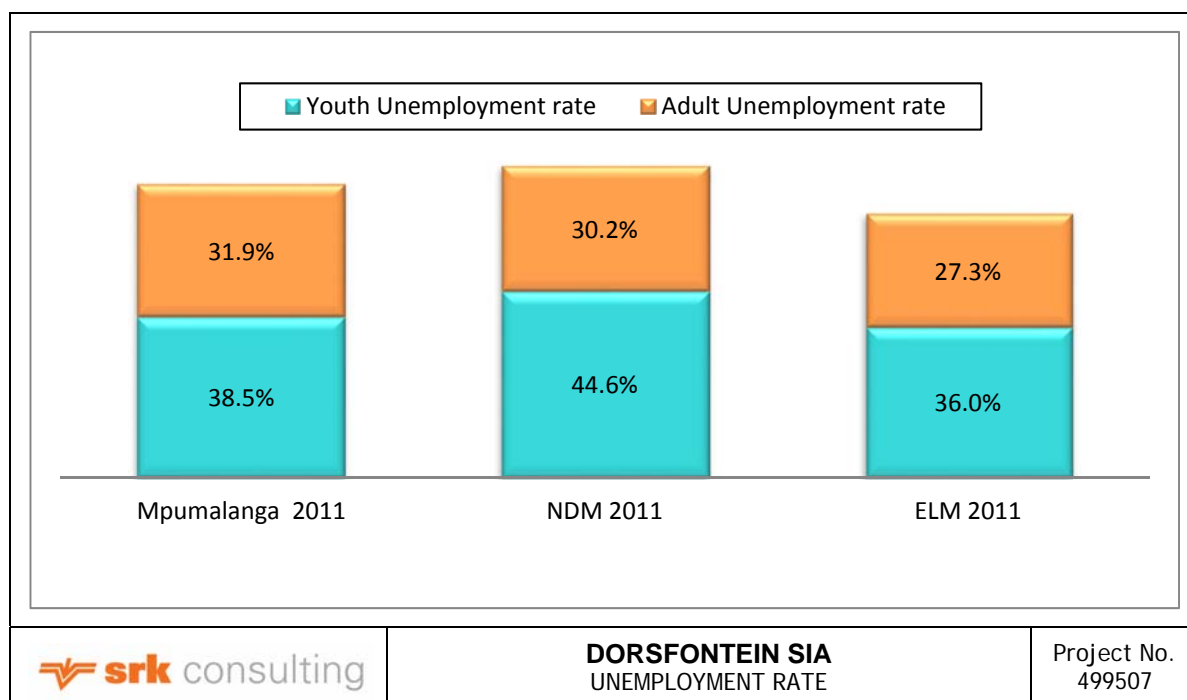
Variable	Mpumalanga Province	Nkangala District Municipality	Emalahleni Local Municipality
km ²	76 495	16 758	2 678
2001 population	3 365 554	1 018 422	276 413
2011 population	4 039 939	1 308 129	395 466
% growth between 2001 and 2011	0.9	2.5	3.6
2001 households	785 424	245 429	74 917
2011 households	1 075 488	356 911	119 874
% increase from 2001 to 2011	20.0	9.3	23.1
Average household size 2011	3.8	3.4	3.2
% Female headed households 2011	40.0	36.0	27.9
% Formal dwellings 2001 and 2011	68.5 and 83.8	74.8 and 82.8	67.1 and 77.2

Source: StatsSA, census 2011

Figure 3-1 shows a similar age distribution pattern for the Mpumalanga Province, NDM and the ELM, with the highest percentage of 15-64 year olds in ELM. This group is considered to be the working age group. Figure 3-2 reflects the unemployment rate for the working age group and the youth (15-34). The unemployment rate for youth exceeds 40.0% and exceeds 30.0% for the working population.

**Figure 3-1: Age distribution**

Source: StatsSA, census 2001 and 2011

**Figure 3-2: Unemployment rate**

Source: StatsSA, census 2001 and 2011

3.2 Land Use

Figure 3-3 illustrates that the predominant land uses and land cover in the immediate surrounds of the mining area are that of cultivated commercial fields and grassland. There is a large wetland extent to the eastern boundary of the project site. Significant urban pockets are located in Ga-Nala (Kriel) and Thubelihle to the Southwest, which are 8 km and 5.5 km away respectively. Bare, mine bare and semi-bare land historically or currently used for mining activities are identifiable throughout the area surrounding Dorstfontein East (predominantly coal mining and electricity generation) and include:

- Matla power station and colliery (west);
- Kriel power station and colliery (west);
- Isibonelo colliery (south);
- Kusile prospecting right (northwest);
- Syferfontein colliery (south);
- Rietspruit colliery (north); and
- Tavistock colliery (north).

Other important features to mention include the R544 and R547 to the West/Southwest of the project as well as the Olifants River which meanders just over 2 km north of the project footprint.

A comparative assessment between Google Earth satellite imagery of 2007, 2011 and 2015 illustrates that Ga-Nala (Kriel) has experienced significant urban growth, while land use changes, largely relating to the expansion and development of mining activities and decrease in agricultural lands, are observable between 2007-2015.

The area between Dorstfontein West and East (within which the proposed pipeline route will be located) is dominated by cultivated dryland and grazing land. As such, this area is already largely disturbed.

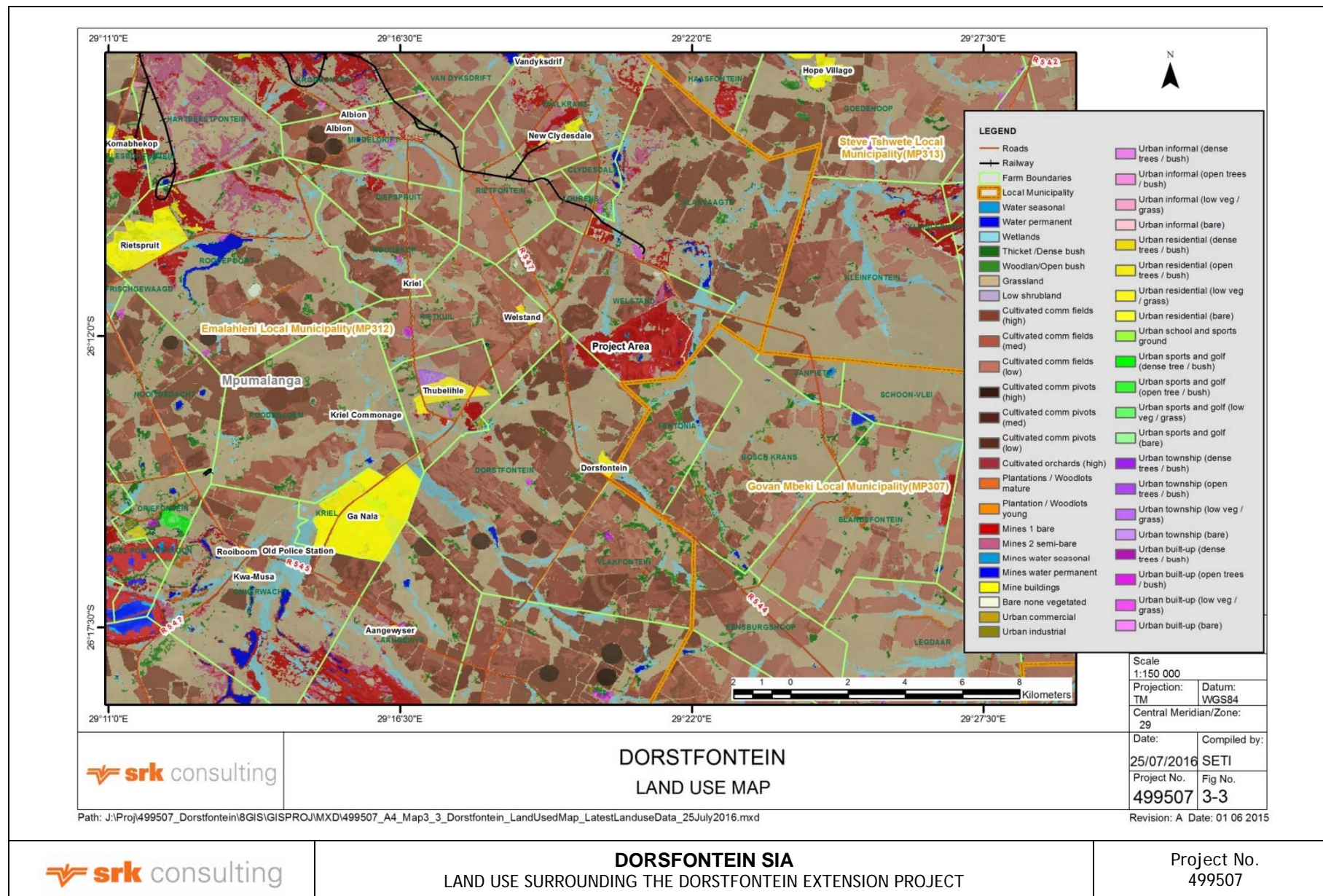


Figure 3-3: Land use surrounding the Dorstfontein East Extension Project

3.3 Project-affected Socio-economic Context

The project-affected socio-economic context is geographically determined to be located in Ward 25 of ELM (Figure 3-4). A baseline summary of key socio-economic information for the ward is provided in the sub-sections below.

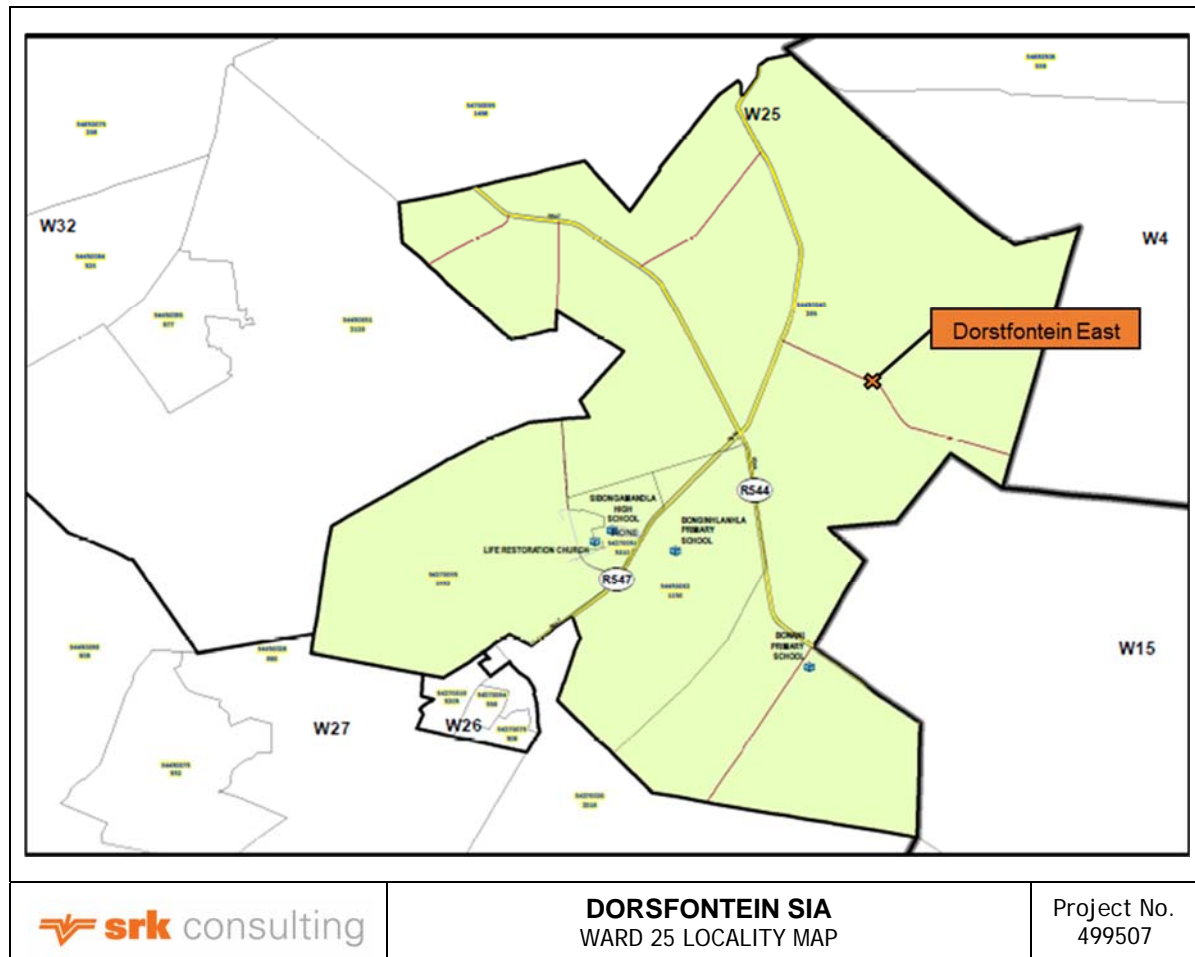


Figure 3-4: Ward 25 locality map

Source: Municipal Demarcation Board, 2016

3.3.1 Key Population Demographics

According to stats derived from StatsSA (see Figure 3-5), Ward 25 spans a geographical area of 219.7 km². It has a population of 14 938, with a median age of 25 and isiZulu (54.0%) being the most widely spoken language. The majority of the population is male (52.0%), and 76.0% of the population is currently residing in the ward were born in the Mpumalanga Province (StatsSA, 2011).

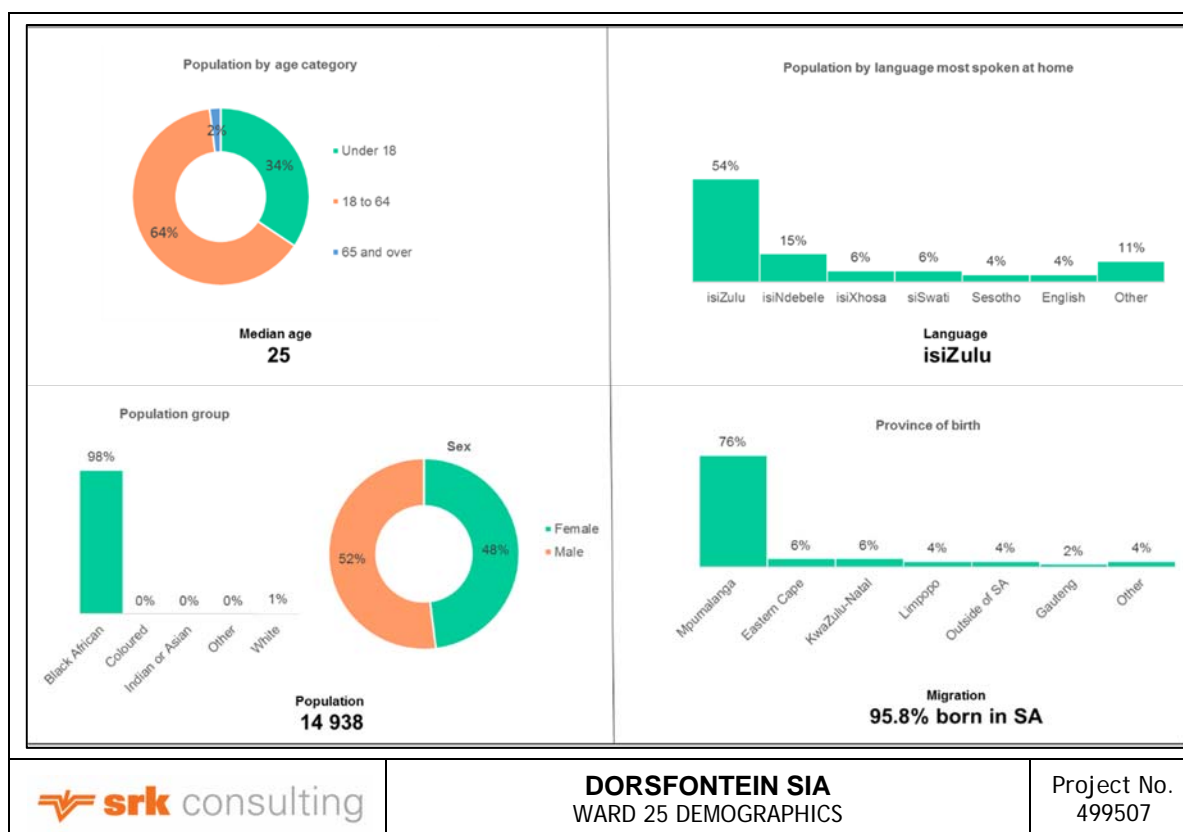


Figure 3-5: Ward 25 demographics

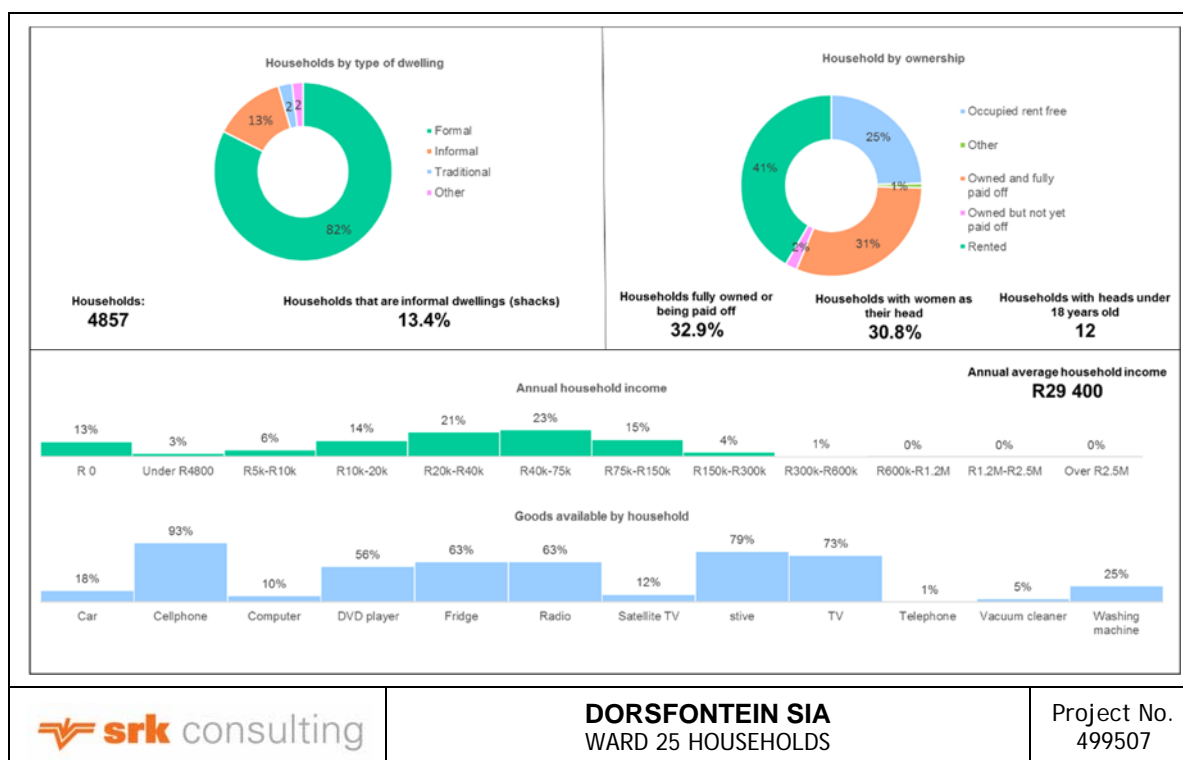
Source: StatsSA census, 2011

3.3.2 Key Household Information

Of the 4857 dwellings in Ward 25, 82.0% are considered to be formal, while 13.4% are informal (shack) dwellings. The majority of households are renters (41.0%), while 31.0% are owned and fully paid off. A significant amount of the households are female-headed (30.8%). These households, along with the 12 households that were identified as child-headed signify the presence of vulnerable groups in the study area (StatsSA, 2011).

The average annual household income in Ward 25 is R 29 400, signifying that a significant percentage of the population earn a low to moderate income. However, 13.0% of households do not earn a formal income, and would be reliant on subsistence lifestyles and grant systems. Like most surrounding wards, Ward 25 has developed around mining and energy generation activities, and as such those that are employed are often dependent on the mines for both income and social upliftment programmes (StatsSA, 2011).

See Figure 3-6 for a summary of household statistics for the study area.

**Figure 3-6: Ward 25 households**

Source: StatsSA census, 2011

3.3.3 Education

Education levels in the study area are lower than those in the province and district municipality. While 61.2% had completed Grade 9 or higher in the study area, the NDM level was 65.3%, while the provincial level sat at 62.8%. The study area also demonstrates lower levels of students having completed Matric or tertiary education. The province recorded 37.5% of students having achieved matric or higher, NDM 38.3% and the study area 27.1%. However, the statistics representing those having not received any formal education is the same as NDM (1.0%) and lower than that of the province (14.0%) (StatsSA, 2011).

The reasons for low education levels in the study area could be attributed to the lack of educational infrastructure, transport restrictions and access to funding. Sustaining livelihoods, which require children to leave school early so as to help with work around the house and earning an income, also contribute to lower education levels in peri-urban parts of the country. This theory is supported by the fact that an estimated 15.9% of 15-17 year olds in the study area are in the labour force, which is significantly higher than the rate in both Mpumalanga (11.7%) and NDM (11.5%) (StatsSA, 2011).

See Figure 3-7 for a summary of education levels in the study area.

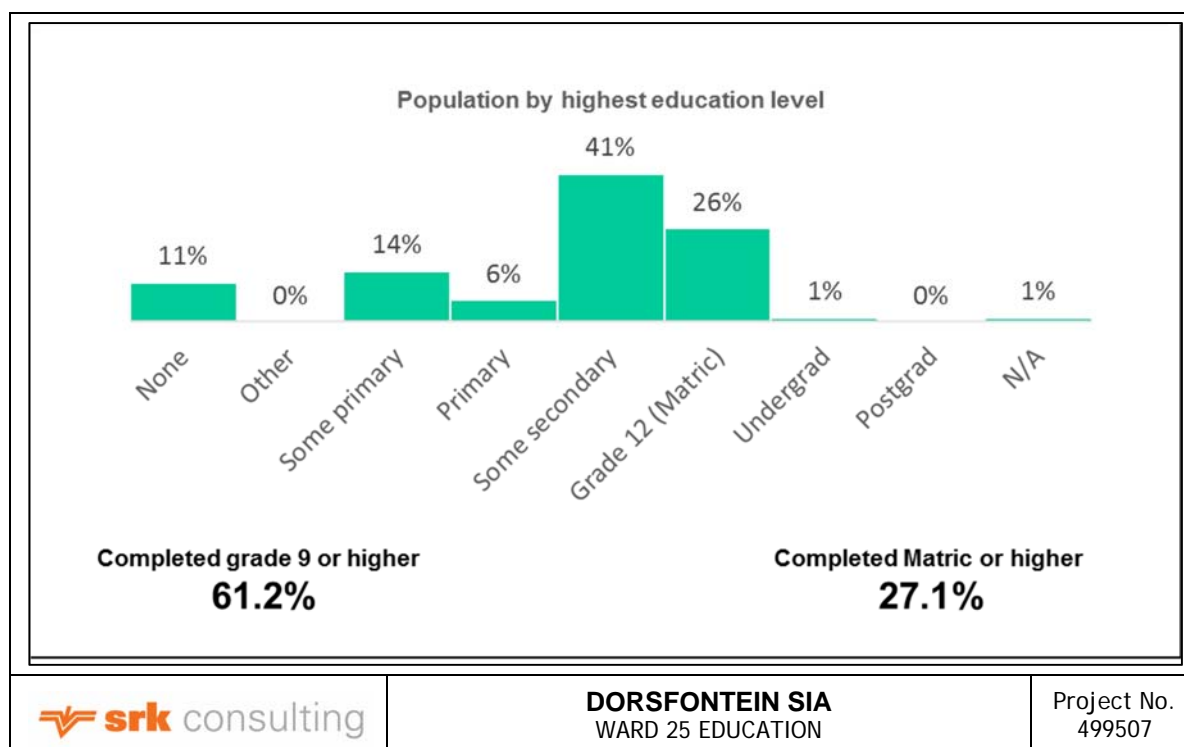


Figure 3-7: Ward 25 education

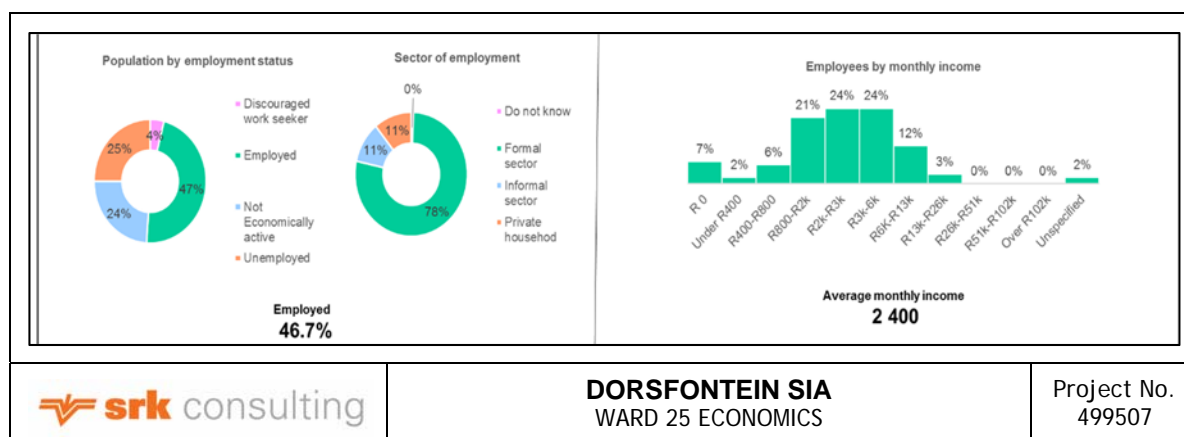
Source: StatsSA census, 2011

3.3.4 Socio-economic Profile

See Figure 3-8 for a summary of socio-economics in the study area. The employment rate in the study area (46.7%) is superior to both NDM (40.7%) and the province (37.5%). However, unemployment levels in the study area (25.0%) are poor when compared with those of the NDM (18.0%) and the province (17.0%). There is also a large percentage of the working population currently not economically active (24.0%). This would indicate high levels of dependency on household members who are employed and vulnerability to poverty where breadwinners cease to be employed (StatsSA, 2011).

Most of those employed are employed in the formal sector (78.0%), however as is the case in many parts of South Africa, the informal sector employs 11.0% of the working population in the study area. Specialist feedback from the area suggest that many small spaza shops were to be found, particularly around busy road intersections and close to mine and energy generation activities, where workers and contractors were the foremost customers (SRK, 2017).

Average individual monthly income in the study area was as per that in both the province and NDM, around R2 400. This is low; but, considered to be above the World Banks' poverty line (\$1 a day) and just above the South African minimum wage, which is currently R 2 340 a month (Labour guide, 2016). Low income averages here are associated with low skills levels and low skilled job-requirements in many of the mining operations in the wider study area surrounds (StatsSA, 2011).

**Figure 3-8: Ward 25 economics**

Source: StatsSA census, 2011

3.3.5 Service Delivery

See Figure 3-9 for a summary of service delivery in the study area. The status of service delivery to the study area is better than that in both the province and NDM, however ongoing service delivery constraints and legacy reliance on industry and not the municipality for provision is an ongoing issue that remains unresolved.

While there are a significant number of people living in informal dwellings (shacks), the vast majority (80.0 %+) have access to formalised water, electricity, refuse and sanitation services. However, access to electricity is varied, whereby only 57.0% of households have access to electricity for cooking, lighting and heating and 12.0% do not have access to electricity at all. The study area demonstrates particularly good sanitation statistics, as only 8.0% of households make use of pit latrines and 90.0% have access to chemical and/or flushing toilets (StatsSA census, 2011).

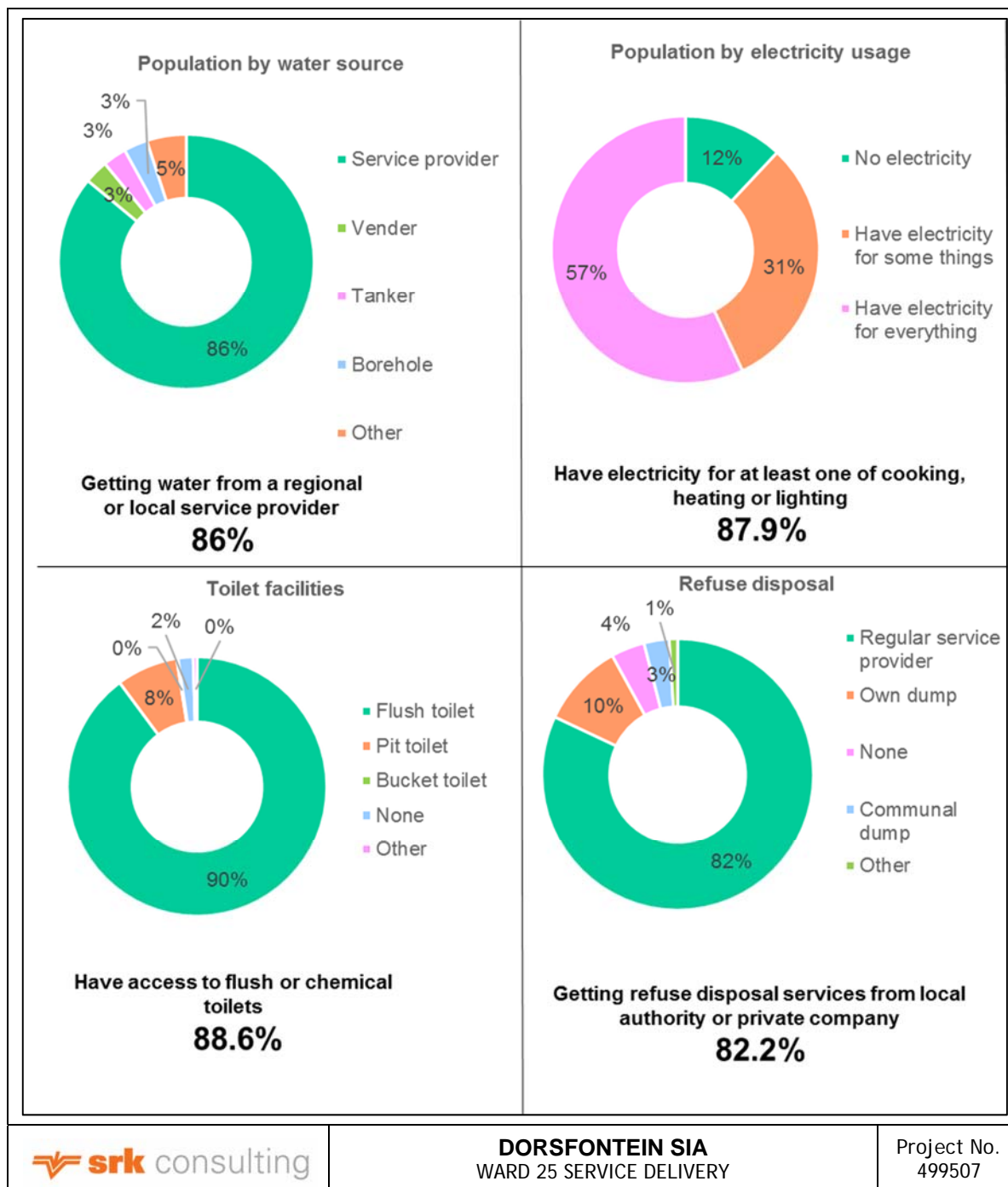


Figure 3-9: Ward 25 service delivery

Source: StatsSA census, 2011

4 Social Impacts

Based on baseline information, key social aspects were identified for consideration going into the impact assessment phase. In summary, the households in the study area have, by and large, good access to amenities and services. Statistics also suggest that both income and education levels are in keeping with provincial levels. Employment levels are low, indicating the presence of a breadwinner supporting multiple dependents living in their households.

Land use in the area is largely comprised of mining, energy generation and farming activities. It is therefore understood that the study area is impacted and largely surrounded by brownfields. As such, the proposed Dorstfontein East Extension Project would be a small contributor to a larger group of cumulative impacts in the study area and its surrounds. Finally, Dorstfontein is located in an area that does not sustain a large land occupation number (i.e. few immediately adjacent residents).

The summary of potential socio-economic impacts during construction, operation and closure for both Option 1 and Option 2 are discussed in Table 4-1. Detailed impacts and mitigation measures are discussed in Table 4-3 to Table 4-8, while potential cumulative impacts are assessed in Table 4-9.

Table 4-1: Summary of Option 1 and Option 2 opencast impacts

Impact	Significance Before Mitigation	Significance After Mitigation
Option 1 and Option 2 Opencast impacts		
Pre-construction and Construction		
Construction activities, including the clearing of land and excavation for a pipeline dissecting the landscape which will impact on the rural and agricultural sense of place (-)	<i>Low</i>	<i>Low</i>
As a result of the extension of the open pit, loss of cultivated land to leasing farmers, impacting on potential crop yield (-)	<i>Medium high</i>	<i>Low</i>
As a result of the dissecting of land by clearing and excavations for construction of proposed pipeline, constraints to access to cultivated land to leasing farmers, impacting on day to day farm activity (-)	<i>Medium low</i>	<i>Low</i>
Impact on local economy due to economic opportunities for local and regional business (informal as well) from supplying services and materials to contractors during the construction phase (+)	<i>Low</i>	<i>Medium low</i>
Due to the occurrence of additional trucks on the roads, and the incidence of construction workers on site, health and safety impacts on local communities may include construction workers lighting fires on site, littering and driving irresponsibly (-)	<i>Medium high</i>	<i>Low</i>
Potential increase in social pathologies and negative health impacts due to contractor camp and potential squatting of job seekers (-)	<i>Medium low</i>	<i>Low</i>
As a result of construction activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	<i>Low</i>	<i>Medium low</i>
As a result of blasting activities during construction, potential damage to adjacent landowners/occupiers infrastructure and/or crops (-)	<i>Medium low</i>	<i>Low</i>
As a result of blasting activities during construction, potential irritation to adjacent landowners/occupiers infrastructure and/or crops (-)	<i>Medium low</i>	<i>Low</i>
Operation		
As a result of the extension there will be additional trucks on the roads, impacting on local communities' health and safety (Operation vehicle drivers may drive irresponsibly) (-)	<i>Medium low</i>	<i>Low</i>
Impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation (-)	<i>Medium high</i>	<i>Low</i>
As a result of operation and associated activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	<i>Low</i>	<i>Medium low</i>

Impact	Significance Before Mitigation	Significance After Mitigation
As a result of blasting activities during operation, potential damage to adjacent landowners/occupiers infrastructure (-)	<i>Medium low</i>	<i>Low</i>
As a result of blasting activities during operation, potential irritation to adjacent landowners/occupiers (-)	<i>Medium low</i>	<i>Low</i>
<i>Decommissioning and Closure</i>		
Decommissioning and closure of mining project: job losses (-)	<i>Medium high</i>	<i>Medium high</i>
Option 2 underground mining impacts		
<i>Pre-construction and Construction</i>		
As a result of pre-construction construction and associated activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	<i>Low</i>	<i>Medium low</i>
<i>Operation</i>		
As a result of operational underground mining activities and associated activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	<i>Medium high</i>	<i>Medium high</i>
As a result of the additional underground operations there will be additional trucks on the roads, impacting on local communities' health and safety (Operation vehicle drivers may drive irresponsibly) (-)	<i>Medium high</i>	<i>Low</i>
As a result of additional blasting activities (underground) during operation, potential damage to adjacent landowners/occupiers infrastructure (-)	<i>Medium high</i>	<i>Low</i>
As a result of underground mining activities, there is potential for the occurrence of subsidence, impacting on the safety surface land dwellers and users (-)	<i>Medium low</i>	<i>Low</i>
<i>Decommissioning and Closure</i>		
As a result of past underground mining activities air vents as well as access shafts pose a safety threat to those traversing the surface area following decommissioning and closure, if shafts and vents are left open/unsecured (-)	<i>Medium high</i>	<i>Low</i>
Cumulative Impacts		
Cumulative impacts to the Mpumalanga Highveld due to development in the region (+/-)	<i>Medium low</i>	<i>Low</i>

4.1 Discussion: Option 1 and Option 2 Opencast Impacts

4.1.1 Pre-construction and Construction

It is important to note that while this project will have socio-economic impacts, they will largely be negligible because the study area is already largely impacted by mining activities and located in a brownfield area. As such, influence on the perceived agricultural and rural sense of place would be largely undetected due to existing mining infrastructure and activities, some of which have been in existence for more than 20 years.

Any extension to the pit, as required in both options for this project would ultimately result in the loss of cultivated land on the farm Welstand. It is understood that the cultivated land in the proposed pit expansion area is leased and not owned by current users, and as such, if handled correctly, the impact on farmer's crop yields will be manageable and will not harm the seasonal livelihoods of affected farmers. This is also true of the proposed pipeline. It is understood that where possible, the pipeline will run below ground and where it does not, will be placed in existing service corridors, including along farm roads. However, disruption in accessibility to farmland is of concern during construction, whereby farmers would not have access to certain parts of the field and could have damage incurred on crops while pipelines are being excavated and installed.

In terms of local economy, there is the potential for multiple benefits to both local and regional businesses, as well as local employment opportunities. This would be highest during the construction phase, due to the requirement of significant contractor numbers (for services and materials). This has opportunities for both the formal and informal sectors, as smaller enterprises, including spaza shops, are likely to be established during the construction period to supply contractors and others with food and other amenities. According to the updated mine works programme, additional people would be hired during the construction phase. This is positive, and would provide financial capital to those employed. Many available jobs during construction would require low skills levels, and as such there is potential for local work seekers who largely appear to have a low skills base.

The construction phase of the project also has a number of negative potential impacts. Construction material and supplies will need to be transported to and from the study area. This will result in additional trucks and construction vehicles on the study area roads, which can cause damage to the road surface as well as littering and irresponsible driving (i.e. speeding). Although the immediate construction area is not currently inhabited, the outlying parts of the study area are frequented by school children, herders and their livestock, other light motor vehicles and pedestrians. Additionally, those inhabiting land in close proximity to the construction area will experience heightened sound irritation, from both the trucks as well as contractors on site. At this stage, the exact number of additional trucks was not known.

Linked to contractors on site are social pathologies arising from the influx of job seekers and contractor camps. These job seekers, who can potentially travel from across national borders, are known to settle informally in close proximity to construction sites, and like the contractor camps, encourage social pathologies including prostitution, gambling, crime and in some instances, xenophobic violence. High unemployment levels in the study area have the potential to exacerbate and foster such behaviours should they develop.

Blasting during construction will be required in order to remove geological features to access mine seams and extend the mine pit. This blasting will produce both irritating dust as well as potential damage to adjacent structures. Surrounding crops (mainly mealies) are most likely to be affected by blasting, as dust can potentially settle on and disturb the natural growth of the crop. Dust may also cause health concerns, irritating the eyes, nose and mouth cavities of local people and their livestock. Unmitigated blasting has been known to cause damage to adjacent infrastructure, which in the case of the study area, will potentially result in grievances relating to blast-related damages.

4.1.2 Operation

Mining roads are already well established in and around the study area, however traffic will most likely be increased during operation due to the additional tonnage of waste material and ore product requiring transport. Potential impacts will be irresponsible driving by truck drivers, potentially resulting in further degradation and potholing of roads, livestock being hit by vehicles and people from the community crossing the road at unmarked areas.

The arrival of non-local employees and job-seekers into the area may have negative health consequences. Employees who live in single quarters are at risk to highly risky behaviour that increases the possibility of contracting HIV/AIDS and other diseases (Onoya, 2014). HIV/Aids prevalence in the study area is reportedly low (Exxaro, 2015) and an influx of people may therefore result in significant impacts in this regard.

Job seekers and members of their families may move into the study area, thus competing with local residents for basic services like water supply and energy sources. This will put pressure on natural resources and may lead to environmental pollution through poor sanitation and waste management, which may result in negative health impacts. There may be conflict with local residents as a result.

It is critical to point out that the impacts relating to influx in the study area are existing and cumulative impacts, and that Dorstfontein East Extension's contribution to this is part of a greater impacted system caused by other mines and operations in the area already and as such, additional impacts not expected to be significant.

Should Option 2 be chosen, the employment at operation would require new employees to mine the extended pit. As such, the employment opportunities of local work seekers will be available, although relatively low and unlikely. For the entirety of the operation, an estimated 128 jobs will be created during peak production (See Table 4-2).

According to the Social Labour Plan (SLP), the vast majority of contractor employees (110) are required to be skilled technical and academically qualified workers, junior management, foreman and superintendents, although stating that local people will be employed where possible. In light of the local socio-economic situation, however, it is unlikely that a high number of local people will have the skills and education required to work on the project. Considering the poverty levels in the study area, one job could have quite a significant impact in terms of (for example) financial security, peace of mind, on-going economic activity and sustaining quality of life. This is taken into account when rating the consequence of the impact.

Table 4-2: Estimated employment levels and numbers during operation

Category	Number
Site management	4
Maintenance management	1
Supervisory	5
Operators	90
Maintenance crew	15
Labour (unskilled)	4
Drill and blast	6
Clerical	3
Total	128

Source: Dorstfontein East Pit Extension Mine Works Programme, 2016

Dust will be generated during operation activities, from blasting activities. Construction vehicles and machinery moving along roads will also generate dust during operation. Windblown dust from the opencast pit could be a source of increased dust levels. The main source of dust during operations is however expected to come from dust caused by vehicle entrainment. This dust can be both irritating to human health, crop growth and from an aesthetic point of view, due to the dark pigment of some of the dust. Additionally, blasting activities during operation have the potential to cause damage to infrastructure on adjacent properties due to ground and air vibrations and fly rock.

The noise and dust during the life of operation could result in irritation on a physical and psychological level, as well as actual or perceived physical illness. Dust and noise might be mitigated to an acceptable level, yet still be a nuisance and irritation to receptors.

Finally, although a hard aspect to tangibly assess, sense of place and cultural heritage are assessed during operation. In many mining towns and communities, a process of cultural dilution threatens to damage cultural aspects of communities, as outside influences brought in by migrant workers, contractors and other influencers begin to impact on culture and tradition in the local area. However, indication is that the sense of place in the Dorstfontein study area is already highly impacted and the existence of man-made pipelines and other mining infrastructure (including the extended pit), will have a low impact on an already heavily impacted area. However, a grievance reporting mechanism as well as continued communication with adjacent land owners and leasers in the area is recommended to mitigate the possible impacts.

4.1.3 Decommission and Closure

Once the project has reached closure phase, those directly and indirectly employed by the mine will face unemployment and re-enter the job market.

Table 4-3: Potential construction phase impacts: Option 1 and Option 2 opencast component

Pre-construction and Construction	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
Construction activities, including the clearing of land and excavation for a pipeline dissecting the landscape which will impact on the rural and agricultural sense of place (-)	3	2	2	3	21	<ul style="list-style-type: none"> Where possible, pipeline infrastructure should be located as far away from private infrastructure as possible; Where possible, pipeline infrastructure should run along existing farm and regional roads to avoid disturbing rural/agricultural features; Where possible, allow surface farmers to continue farming activities despite pipeline presence; Implement noise and dust management measures as recommended by relevant specialists; and Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to operation and need to be ongoing and frequent. 	2	2	2	2	12
	Significant	Mine specific	One month to one year	Unlikely	Low		Small	Mine specific	One month to one year	Highly unlikely	Low
As a result of the extension of the open pit, loss of cultivated land to leasing farmers, impacting on potential crop yield (-)	4	2	5	5	55	<ul style="list-style-type: none"> Timeous communication with farm leaser on open pit expansion land to give sufficient notice as to when construction will commence so he/she may plan accordingly; and Disbursement of agreed upon compensation package for loss of portion of the farmers potential harvest, or compensation for the entire harvest where a season is interrupted. 	1	2	2	5	25
	Harmful	Mine specific	Permanent	Highly likely	Medium high		Insignificant	Mine specific	One month to one year	Highly likely	Low

Pre-construction and Construction	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
As a result of the dissecting of land by clearing and excavations for construction of proposed pipeline, constraints to access to cultivated land to leasing farmers, impacting on day to day farm activity (-)	3	2	2	4	28	<ul style="list-style-type: none"> Where possible, avoid pipeline options which dissect farmland; Where possible, attempt to install the route which runs along existing service corridors, including along roads; and Should the above not be possible, compensation and or replacement land processes must be considered according to land and crop market value. 	2	2	2	3	18
	Significant	Mine specific	One month to one year	Likely	Medium low		Small	Mine specific	One month to one year	Unlikely	Low
Impact on local economy due to economic opportunities for local and regional business (informal as well) from supplying services and materials to contractors during the construction phase (+)	2	4	2	3	16	<ul style="list-style-type: none"> Procurement of suppliers must be as per the SLP and Exxaro policy and standards; Develop a register of local business; Open communication channel with the local community around Exxaro regarding opportunities to register on the Exxaro suppliers list to manage expectations; Potential upskilling and training allowances to be included as per the SLP; Where it is possible, request contractors hire/use local personnel; Identify opportunities for the employment/procurement and training of people and contractors from the local area. 	3	4	2	4	36
	Small	Regional	One month to one year	Unlikely	Low		Small	Regional	One month to one year	Possible	Medium low

Pre-construction and Construction	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
						<ul style="list-style-type: none"> • Opportunities for local employment may include activities related to site clearance, digging of trenches and building of the open pit; • Based on these opportunities, develop a recruitment and training strategy that the main construction contractors will have to adhere to; • Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; • Employment and training of the local youth and females where possible; and • Communication with locals regarding service/job opportunities and skills requirements to manage expectations. 					
Due to the occurrence of additional trucks on the roads, and the incidence of construction workers on site, health and safety impacts on local communities may include construction workers lighting fires on site, littering and driving irresponsibly (-)	3	3	2	5	40	<ul style="list-style-type: none"> • Construction vehicles to be road worthy and drivers to adhere to speed limits; • Fires are prohibited on site and emergency procedures are in place; • Contractors adhere to Exxaro standards and requirements, Exxaro Safety Health and Environmental policies, as well as relevant South African regulations such as the Occupational Health and Safety Act No. 181 of 1993, as amended; • Inform Exxaro employees and neighbouring landowners and inhabitants about construction timeframes and activities, and give regular updates; and • Ensure a grievances procedure is in place and communicated. 	2	3	2	3	21
	Significant	Local area	One month to one year	Definitely	Medium high		Small	Local area	One month to one year	Unlikely	Low

Pre-construction and Construction	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
Potential increase in social pathologies and negative health impacts due to contractor camp and potential squatting of job seekers (-)	3	3	3	4	36	<ul style="list-style-type: none"> Ensure a grievances procedure is in place for local people to log grievances; Implement local recruitment and training strategies and policies, and clearly communicate these locally through relevant authorities and media; Do not recruit informally at the gate but follow a formal recruitment process; Make use of local accommodation for workers, as opposed to a construction camp; Inform Exxaro employees and neighbouring landowners and inhabitants about local recruitment strategies and policies, and give regular updates; Monitor the surrounding area for illegal informal settlement and develop a strategy to deal with illegal settlement; and Ensure that all contractors and their employees attend inception training, addressing Exxaro standards and requirements, Exxaro Safety Health and Environmental policies, relevant South African regulations, the environmental management plan, and recruitment strategies. 	2	3	2	3	21
	Significant	Local area	One year to ten years	Likely	Medium low		Small	Local area	One month to one year	Unlikely	Low
As a result of construction activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	3	3	2	3	24	<ul style="list-style-type: none"> Where it is possible, hire/use local personnel; Identify opportunities for the employment/procurement and training of people and contractors from the local area; Opportunities for local employment may include activities related to site clearance, digging of trenches and building of the open pit; 	3	3	3	4	36
	Significant	Local area	1 month to one year	Unlikely	Low		Significant	Local area	One month to one year	Likely	Medium low

Pre-construction and Construction	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
						<ul style="list-style-type: none"> Based on these opportunities, develop a recruitment and training strategy that the main construction contractors will have to adhere to; Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; Employment and training of the youth and females where possible; Implementation of employment and procurement policy; and Communication with locals regarding job opportunities and skills requirements to manage expectations. 					
As an indirect result of blasting activities during construction, potential damage to adjacent landowners/occupiers infrastructure and/or crops (-)	3	3	2	4	32	<ul style="list-style-type: none"> Alert adjacent land owners of construction blasting activities and times in a timeous manner; Ensure requirements for human health and safety relating to blasting are adhered to avoid unnecessary damage to infrastructure and/or crops; Ensure management measures indicated by blasting specialist study are adhered to; and Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to construction and need to be ongoing and frequent. 	3	2	2	3	21
	Significant	Local area	One month to one year	Likely	Medium Low		Significant	Mine specific	One month to one year	Unlikely	Low

Pre-construction and Construction	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
As an indirect result of blasting activities during construction, potential irritation to adjacent landowners/occupiers infrastructure and/or crops (-)	3	3	2	4	32	<ul style="list-style-type: none"> Alert adjacent land owners of construction blasting activities and times in a timeous manner; Ensure requirements for human health and safety relating to blasting are adhered to avoid unnecessary escape of irrigational dust; Ensure management measures indicated by blasting specialist study are adhered to; and Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to construction and need to be ongoing and frequent. 	3	2	2	3	21
	Significant	Local area	One month to one year	Likely	Medium Low		Significant	Mine specific	One month to one year	Unlikely	Low

Table 4-4: Potential operation phase impacts: Option 1 and Option 2 opencast component

Operation	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
As a result of the extension there will be additional trucks on the roads, impacting on local communities' health and safety (Operation vehicle drivers may drive irresponsibly) (-)	3	3	4	3	30	<ul style="list-style-type: none"> Operation vehicles to be road worthy and drivers to adhere to speed limits; Employees and contractors adhere to Exxaro standards and requirements, Exxaro Safety Health and Environmental policies, as well as relevant South African regulations such as the Occupational Health and Safety Act No. 181 of 1993, as amended; Inform Exxaro employees and neighbouring landowners and inhabitants about operation activities (specifically for blasting); and Ensure a grievances procedure is in place. 	3	3	4	2	20
	Significant	Local area	Life of operation	Unlikely	Medium Low		Significant	Local area	Life of operation	Highly unlikely	Low
Impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation (-)	3	4	4	4	44	<ul style="list-style-type: none"> Ensure a grievances procedure is in place for local people to log grievances; Implement local recruitment and training strategies and policies, and clearly communicate these locally through relevant authorities and media; Do not recruit informally at the gate but follow a formal recruitment process; Make use of local accommodation for contract workers, as opposed to a contractor's camp; Inform Exxaro employees and neighbouring landowners and inhabitants about local recruitment strategies and policies, and give regular updates; Monitor the surrounding area for informal settlement and develop a strategy to deal with informal settling; and 	4	3	2	2	18
	Significant	Regional	Life of operation	Likely	Medium high		Regional	Local area	One month to one year	Unlikely	Low

Operation	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
						<ul style="list-style-type: none"> Ensure that all contractors and their employees attend inception training, addressing Exxaro standards and requirements, Exxaro Safety Health and Environmental policies, relevant South African regulations, the environmental management plan, and recruitment strategies. 					
As a result of operation and associated activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	3	3	4	2	20	<ul style="list-style-type: none"> Where it is possible, hire/use local people; Identify opportunities for the employment/procurement and training of people and contractors from the local area. Opportunities for local employment may include activities related to office cleaning, ground maintenance and mining; Based on these opportunities, develop a recruitment and training strategy that operations recruiters will have to adhere to; Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; Employment and training of the youth and females where possible; Implementation of employment and procurement policy; and Communication with locals regarding job opportunities and skills requirements to manage expectations. 	3	3	4	3	30
	Significant	Local area	Life of operation	Highly unlikely	Low		Significant	Local area	Life of operation	Unlikely	Medium Low
As a result of blasting activities during operation, potential damage to adjacent landowners/occupiers infrastructure (-)	3	3	2	4	32	<ul style="list-style-type: none"> Alert adjacent land owners of operational blasting activities in a timeous manner; Ensure requirements for human health and safety relating to blasting are adhered to avoid unnecessary damage; Ensure management measures indicated by blasting specialist study are adhered to; and 	3	3	2	2	16
	Significant	Local area	One month to one year	Likely	Medium Low		Significant	Local area	One month to one year	Highly unlikely	Low

Operation	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
						<ul style="list-style-type: none"> Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to operation and need to be ongoing and frequent. 					
As a result of blasting activities during Operation, potential irritation to adjacent landowners/occupiers (-)	3	3	2	4	32	<ul style="list-style-type: none"> Alert adjacent land owners of construction blasting activities and times in a timeous manner; Ensure requirements for human health and safety relating to blasting are adhered to avoid unnecessary escape of irrigational dust; Ensure management measures indicated by blasting specialist study are adhered to; and Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to construction and need to be ongoing and frequent. 	3	3	2	2	16
	Significant	Local area	One month to one year	Likely	Medium Low		Significant	Local area	One month to on year	Highly unlikely	Low
Manmade features (pipeline) dissecting the landscape which will impact on the rural and agricultural sense of place (-)	2	3	4	3	27	<ul style="list-style-type: none"> Where possible, pipeline infrastructure should be located as far away from private infrastructure as possible; Where possible, pipeline infrastructure should run along existing farm and regional roads to avoid disturbing rural/agricultural features; Where possible, allow surface farmers to continue farming activities despite pipeline presence; Implement noise and dust management measures as recommended by relevant specialists; and Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to operation and need to be ongoing and frequent. 	3	3	4	2	20
	Small	Local area	Life of Operation	Unlikely	Medium low		Small	Local area	Life of operation	Highly unlikely	Low

Table 4-5: Potential decommissioning and closure phase impacts: Option 1 and Option 2 opencast component

Decommissioning and Closure	Pre-management measures					Management Measures	Post-management measures				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
<i>The decommissioning and closure of the Dorstfontein East extension project would be handled as part of the greater mine closure planning process. As such, any impacts at closure would incur would occur and be addressed across the entirety of the mine and not per independent components and projects.</i>											
Decommissioning and closure of mining project: job losses (-)	4	4	5	5	65	<ul style="list-style-type: none"> Update and implement the Local and Human Resources Plan in the SLP that addresses the impacts associated with retrenchment, job losses and reduced demand for local goods and services; Update existing closure plan which will aim to reinforce the objectives of the SLP by reducing the reliance on the mine for employment by promoting skills transfer to enable alternative livelihoods; Communicate the termination conditions to all employees – including contractors and sub-contractors; The upskilling of workers to enhance re-employment opportunities following closure and decommissioning must be implemented well in advanced of the decommissioning phase; Where possible, Exxaro must provide assessment and counselling services for affected individuals; Comprehensive self-employment training and re-employment programmes need to be established; Management of expectations during the operations phase; and Establishment of clear criteria for socio-economic projects and corporate social investment activities, that incorporate partnerships, exist strategy and sustainability. 	3	4	5	4	48
	Great	Regional	Permanent	Definitely	Medium High		Significant	Regional	Permanent	Likely	Medium Low

4.2 Discussion: Option 2 Underground Impacts

4.2.1 Pre-construction and Construction

The only apparent social impact caused by Option 2's underground construction would be the additional employment opportunities over and above those already created during the construction of the opencast component. Like Option 1, this provides access to financial capital and potential employment on low skilled jobs for the local community. This is of particular importance for the study area community, which has a low monthly income average and likely reliance on one member of the household to provide an income. As such, the more local employment that is generated, the less vulnerable households are to poverty and food insecurity, albeit on a short term basis.

4.2.2 Operation

The specialist has assumed that the addition of an underground operation at The Dorstfontein East Extension would result in the employment of additional workers, ideally from the local community. This can be considered a potential means of increasing financial capital access to workers employed over the operations phase. This is a significantly positive socio-economic impact, specifically because of the unemployment levels nationally, regionally and (specifically) locally. With an already flooded unemployment market, operations should be encouraged to create jobs and the indirect livelihoods they sustain.

While Option 1 and Option 2's opencast components would result in additional trucks on the roads, the addition of the underground component would mean a larger material and ore turnover, therefore requiring additional trucks during operation and therefore on the road. While the number of trucks on the regional and local roads is already heavily impacted by cumulative mining and energy production operations, any addition to the current load will result in additional health and safety concerns resulting from irresponsible driving, deteriorating road conditions and local people's health and safety behaviour.

Subsidence has been recorded in mine communities around the study area, including in the closely located Ga-Nala (Kriel) and Rietspruit. Subsidence can have numerous consequences for humans, including the complete disappearance of sections of surface land into sinkholes, weakening of man-made surface infrastructure (including houses, silos, roads, irrigation lines etc.) and endangerment to crops and livestock grazing land. While subsidence is a geotechnical impact, when left without frequent monitoring it has the potential to cause damage to social services and infrastructure. Unfortunately, these appear later than the commencement of subsidence events, and as such, damage can be irreversible.

As per Options 1 and 2 opencast operations, blasting will take place during operation of Option 2's underground mining component. Although dust generation will be less than that of the opencast components, underground blasting has a significantly stronger impact on social structures specifically related to ground vibrations. Ground vibrations may enter houses, farm storage structures and other man-made infrastructure through the ground, while air blasts can enter these structures through the walls and roofs. Both have the potential to cause cracking, rattling and the displacement of hanging or secured objects which may become loose or break.

4.2.3 Decommission and Closure

Following closure, a number of mine shafts, including access and ventilation shafts will be left accessible and as part of the mine closure programme, need to be sealed and if this is not possible, secured. Left unsealed and with open access, these shafts and vents pose a significant health and safety threat to surface users (including farmers and herders). Both humans and livestock could potentially fall or crawl into access and ventilation shafts.

Table 4-6: Potential construction phase impacts: impacts unique to Option 2 underground component

Pre-construction and Construction	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
As a result of pre-construction construction and associated activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	3	3	2	3	16	<ul style="list-style-type: none"> Where it is possible, hire/use local personnel; Identify opportunities for the employment/procurement and training of people and contractors from the local area. Opportunities for local employment may include activities related to office cleaning, ground maintenance and land clearance; Based on these opportunities, develop a recruitment and training strategy that construction recruiters will have to adhere to; Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; Employment and training of the youth and females where possible; Implementation of employment and procurement policy; and Communication with locals regarding job opportunities and skills requirements to manage expectations. 	3	3	2	4	32
	Significant	Local area	One month to one year	Unlikely	Low		Significant	Local area	One month to one year	Likely	Medium low

Table 4-7: Potential operation phase impacts: impacts unique to Option 2 underground component

Operation	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
As a result of operational underground mining activities and associated activities, potential local employment opportunities will become available, increasing access to financial capital for workers (+)	3	3	4	3	30	<ul style="list-style-type: none"> Where it is possible, hire/use local personnel; Identify opportunities for the employment/procurement and training of people and contractors from the local area. Based on these opportunities, develop a recruitment and training strategy that operation recruiters will have to adhere to; Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; Employment and training of the youth and females where possible; Implementation of employment and procurement policy; and Communication with locals regarding job opportunities and skills requirements to manage expectations. 	3	3	4	4	44
	Significant	Local area	Life of operation	Unlikely	Medium low		Significant	Local area	Life of operation	Likely	Medium high
As a result of the additional underground operations there will be additional trucks on the roads, impacting on local communities' health and safety (Operation vehicle drivers may drive irresponsibly) (-)	3	3	4	4	40	<ul style="list-style-type: none"> Operation vehicles to be road worthy and drivers to adhere to speed limits; Employees and contractors adhere to Exxaro standards and requirements, Exxaro Safety Health and Environmental policies, as well as relevant South African regulations such as the Occupational Health and Safety Act No. 181 of 1993, as amended; Inform Exxaro employees and neighbouring landowners and inhabitants about operation activities (specifically for blasting); and Ensure a grievances procedure is in place. 	2	3	3	2	16
	Significant	Local area	Life of operation	Likely	Medium high		Small	Local area	Life of operation	Highly unlikely	Low

Operation	Pre-mitigation					Mitigation	Post-mitigation				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
As a result of additional blasting activities (underground) during operation, potential damage to adjacent landowners/occupiers infrastructure (-)	3	3	4	4	40	<ul style="list-style-type: none"> Alert adjacent land owners of operational blasting activities in a timeous manner; Ensure requirements for human health and safety relating to blasting are adhered to avoid unnecessary damage; Ensure management measures indicated by blasting specialist study are adhered to; and Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to operation and need to be ongoing and frequent. 	2	3	2	2	14
	Significant	Local area	Life of operation	Likely	Medium High		Small	Local area	One month to one year	Highly unlikely	Low
As a result of underground mining activities, there is potential for the occurrence of subsidence, impacting on surface land dwellers and users (-)	3	3	4	3	30	<ul style="list-style-type: none"> Employees and contractors adhere to Exxaro standards and requirements, Exxaro Safety Health and Environmental policies, as well as relevant South African regulations such as the Occupational Health and Safety Act No. 181 of 1993, as amended; Inform Exxaro employees and neighbouring landowners and inhabitants about operation activities (specifically for blasting); Educate surface land owners and dwellers of potential safety issues relating to subsidence; Communicate any studies or information to surface dwellers and owners should subsidence be encountered; and Ensure a grievances procedure is in place. 	3	3	2	2	16
	Significant	Local area	Life of operation	Unlikely	Medium Low		Significant	Local area	One month to one year	Highly unlikely	Low

Table 4-8: Potential decommissioning and closure phase: impacts unique to Option 2 underground component

Decommissioning and Closure	Pre-management measures					Management Measures	Post-management measures				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
<i>The decommissioning and closure of the Dorstfontein East extension project would be handled as part of the greater mine closure planning process. As such, any impacts at closure would incur would occur and be addressed across the entirety of the mine and not per independent components and projects.</i>											
As a result of past underground mining activities air vents as well as access shafts pose a safety threat to those traversing the surface area following decommissioning and closure, if shafts and vents are left open/unsecured (-)	3	2	5	4	40	<ul style="list-style-type: none"> Adherence to the Mine Closure Plan; Restriction of access to previously mined areas, using fencing, security or other means which will secure potentially hazardous areas; Visible and obvious signage to indicate the above; Education of those using/in close proximity to land of dangers of trying to access restricted zones; and Wherever possible, the permanent closure/sealing of access and circulation vents and shafts to previously mined underground workings. 	2	4	2	2	16
	Significant	Mine area	Permanent	Likely	Medium High		Significant	Mine area	One month to one year	Highly unlikely	Low

4.3 Discussion: Cumulative Impacts

The Dorstfontein East Extension Project falls in the Highveld Coal region, a well-established mining area with very few greenfields sites remaining. As such, while the addition of the Dorstfontein expansion will have an effect on the surrounding environment, it will be one of multiple existing contributors, and as such, the standalone impact of the expansion will be relatively low in comparison to the cumulative effects of existing operations. Therefore, when assessing over all contribution to social impacts already prevalent in the study area, the Dorstfontein East Expansion Project could be deemed negligible on a cumulative, level.

Table 4-9: Potential cumulative impacts in the Mpumalanga Highveld Region: Option 1 and Option 2

Cumulative impacts	Pre-management measures					Management Measures	Post-management measures				
Impact	Severity	Spatial scope	Duration	Frequency	Significance	Description	Severity	Spatial scope	Duration	Frequency	Significance
<p><i>The expansion of the Dorstfontein East Mine is one of many planned or in operation mines in the Mpumalanga Highveld. In combination with other planned and existing mining developments, the mining industry has the potential to change the economic status of this region, to both benefit and potentially harm the surrounding communities, environmental resources, and ecology of the area.</i></p>											
Cumulative impacts to the Mpumalanga Highveld due to development in the region (+/-)	4	4	5	2	26	<ul style="list-style-type: none"> The management of the cumulative social and economic impacts which mining developments may have on the region will be critical in reducing negative impacts and enhancing positive impacts and will require the involvement of all stakeholders including mines, local and provincial government, affected communities, and relevant interest groups in the development of a strategy for the Mpumalanga Highveld Region; and Dorstfontein East should participate and contribute to such an initiative to address the cumulative impacts of development of the Mpumalanga Highveld Region. 	1	4	5	1	10
	Great	Regional	Permanent	Highly unlikely	Medium low		Insignificant	Regional	Permanent	Unlikely	Low

5 Options Analysis

5.1 Mining Method

Although there is little difference between the proposed opencast methods between Option 1 and Option 2, the decision to go with either has apparent negligible socio-economic impacts. However, the additional employment requirements of workers, ideally from the local community during construction and operations phase suggests that Option 2 is the preferred option. This is because local employment opportunities will become available, increasing access to financial capital for workers. This is of particular importance to those employed from the local area because of the low socio-economic base and vulnerability to poverty and unemployment.

The extension of the existing pit only (Option 1) is a continuation of the existing operation programme at Dorstfontein East and as such there are little to no additional employment opportunities outside of the construction phase, however there will be a continuation in the employment of existing employees. Additionally, it would result on an estimated LOM of 10 years. While Option 2's opencast component has a shorter life of mine at an estimated seven years, with the addition of the underground component, the life of mine will be extended by at least an additional two years from mining the number 4 seam lower. This extended LOM has the potential to increase even further should the number 2 seam be mined at a later stage. This offers potential job and livelihood security going beyond 2023.

In addition to this positive socio-economic impact, the construction labour force requirement for construction of both the opencast extension and underground workings will be significantly higher than that of Option 1. This also has an added benefit of requiring additional construction and operation materials and services, which can be provided by both local and regional service providers, thereby injecting added income into the local and regional economic sector. Bearing all the above in mind, Option 2 is the preferred socio-economic option.

5.2 Pipeline Routes

Figure 5-1 indicates the position of the three alternative pipeline routes that were identified for the proposed Dorstfontein Expansion Project. All three routes, to some extent, use existing roads and infrastructure corridors. This is particularly true of Route 1, which makes use of existing farm and mine roads and crosses the R544. As such, Route 1 is the preferred route of the Social Specialist, as it does not dissect as many of the surrounding cultivated farms, which is the case for both Routes 2 and 3. Importantly, all three routes are in close proximity to or dissect agricultural areas, however should the majority of the pipeline infrastructure be buried, the only real interruptions to everyday access and farm activity will occur at construction as the pipes are excavated and installed on agriculture lands. Following this, farmer would be able to continue their activities, provided that the pipelines largely run underground. Should the pipelines run along the surface, significant socio-economic impacts would be felt. Of particular concern is the loss of sense of place and the compensation that would be required should crops be damaged, lost or intersected permanently. As such this is not recommended by the social specialist and would have potential risks associated with project timing and cost.



Figure 5-1: Photographs along the proposed Pipeline Route 1

6 Conclusions

6.1 Social Impact Assessment

The construction and operation of the Dorstfontein East Extension Project do not present any major socio-economic risks, assuming that all activities during construction and operation will be executed in line with relevant Exxaro standards and requirements, Exxaro Safety, Health and Environmental policies, as well as relevant South African regulations such as the Mine Health and Safety Act No. 29 of 1996.

The impact assessment, after the implementation of mitigation measures, generated the results described in the impact after mitigation table and aligns with the objectives of this SIA. The main benefit of the project could be the employment and procurement of services from the communities within the study area during construction, followed by those in the region. However, in light of the lack of skills and education evident within the study area, it is unlikely that these communities will optimally benefit from employment and procurement from Dorstfontein East Extension Project.

To ensure that the local area and the region will benefit from the project, the critical recommendation is that identification, training and development of local people and suppliers commence prior to commencement of the project.

The potential impacts that could be experienced as a result of the influx of job seekers and employees are the main potential negative impact in light of the low performing social statistics of the communities in the study area. However, this could be considered as a cumulative impact due to the high number of mines and energy generation activities currently underway and planned in the broader study area.

6.2 Mining and Pipeline Route Options Recommendation

Based on social aspects in the study area, SRK would recommend that mining Option 2 is the chosen means of mining, due to the additional employment requirements of, ideally local people, during the construction and operations phase. Additionally, from a social perspective, the Route 1 pipeline is preferred, as it follows existing service and transport corridors and dissects less of the farmland currently leased to farmers.

Prepared by

SRK Consulting - Certified Electronic Signature



499507/42849/Report

2143-2346-966-BRAV

This signature has been printed digitally. The Author has given permission for use for this document. The details are stored in the SRK Signature Database

A handwritten signature in black ink, appearing to read 'Victoria Braham', written over the digital signature block.

Victoria Braham

Social Scientist

Reviewed by

SRK Consulting - Certified Electronic Signature



499507/42849/Report

5096-3003-9440-BRAN

This signature has been printed digitally. The Author has given permission for use for this document. The details are stored in the SRK Signature Database

A handwritten signature in black ink, appearing to read 'Anita Bron', written over the digital signature block.

Anita Bron

Principal Social Scientist

SRK Consulting - Certified Electronic Signature



499507/42849/Report

5025-9542-9000-MAVA

This signature has been printed digitally. The Author has given permission for use for this document. The details are stored in the SRK Signature Database

A handwritten signature in black ink, appearing to read 'Vassie Maharaj', written over the digital signature block.

Vassie Maharaj

Partner

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

SRK Report Distribution Record

Report No.

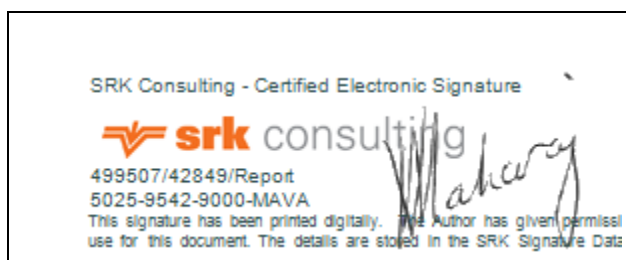
502182/SIAr_Rev_2

Copy No.

1

Name/Title	Company	Copy	Date	Authorised by
Andrew Caddick	SRK Consulting Pretoria	1		Vassie Maharaj

Approval Signature:



This report is protected by copyright vested in SRK (South Africa) (Pty) Ltd. It may not be reproduced or transmitted in any form or by any means whatsoever to any person without the written permission of the copyright holder, SRK.