DRAFT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED EXXARO DORSTFONTEIN WEST EXPANSION PROJECT WITHIN THE JURISDICTION OF EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

JULY 2020

NSOVO ENVIRONMENTAL CONSULTING

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Prepared For:	
Exxaro Coal Central (Pty) Ltd Dorstfontein West Mine Att: William Seabi Tel: 079 496 3304 Email: William.Seabi@exxaro.com	exxaro POWERING POSSIBILITY
Prepared By:	
Nsovo Environmental Consulting Cell: 071 602 2369 Fax: 086 602 8821 Tel: 011 041 3689 Email: admin@nsovo.co.za Date of Submission: 28th July 2020	NSOVO ENVIRONMENTAL CONSULTING "From the world we live to the world we seek"

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Environmental Impact Assessment Report for the Proposed Exxaro Dorstfontein West Expansion Project within the Jurisdiction of Emalahleni Local Municipality, Mpumalanga Province		
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Draft Environmental Impact Assessment Report	Munyadziwa Rikhotso _____ Rofhiwa Magodi _____	Masala Mugwagwa _____ Rejoice Aphane _____

EXECUTIVE SUMMARY

Dorstfontein West Mine (Pty) Ltd also known as Dorstfontein Coal Mine (Pty) Ltd (hereafter referred as DCM West) is an underground mine with both 2 and 4 Seams operated by Exxaro Coal Central (Pty) Ltd ("Exxaro"), located within the jurisdiction of Emalahleni Local Municipality in the Mpumalanga Province. DCM West previously mined 2 Seam and is now mining 4 Seam via board and pillar underground mining method on the western portion of their mining rights and is intending to expand the existing discard dump facility and to construct a conveyor belt at the DCM West which is located within the jurisdiction of Emalahleni Local Municipality in the Mpumalanga Province. The Life of mine is projected to be until 2042, while the existing discard dump is coming to the end of its life in 2022. The purpose of this expansion project is to extend the life of the discard dump facility, which is required to accommodate the disposal of the discard and slurry for the next 15 years of the Life of Mine (LOM) and to allow for easier transportation of coal from West to East through the conveyor belt.

The main infrastructure associated with the proposed Dorstfontein West Mine project includes:

- Expansion of the existing discard dump which is coming to the end of its life by 2022; and
- The construction of a conveyor belt and associated service road to convey coal from DCM West to DCM East where the coal will be loaded into trains and thereafter transported to Richards Bay Coal Terminal.

The proposed development triggers the NEMA EIA listed activities, as such, Exxaro is required to undertake an Environmental Impact Assessment (EIA) process and obtain an Integrated environmental authorisation prior to construction of the above-mentioned activities in accordance with the EIA Regulations, 2014 (promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended in April 2017 and National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA).

This is an integrated Environmental Authorisation application and will include the following:

- Environmental Authorisation (EA) for listed activities as contained in Government Notice Regulations (GN R) GN R327 (983), GN R325 (984) and GNR 324 (985); and
- Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA).

Further, the proposed development will trigger water use activities, as such, Exxaro will also need to lodge an Integrated Water Use Licence Application (IWULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) and obtain an Integrated Water Use Licence (IWUL) from the Department of Human Settlement, Water and Sanitation (DHSWS) before the commencement of any listed water use activity. Subsequently, Nsovo Environmental Consulting (Nsovo) has been appointed by Exxaro to undertake the necessary authorisations and licences to comply with the requirement of the legislation.

The Environmental Impact Assessment for the proposed project was undertaken in accordance with the EIA Regulations, in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended. The EIA phase aims to achieve the following objectives:

a) Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
b) Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the scoping report;
c) Identify the location of the development footprint within the approved site as contemplated in the scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
d) Determine the nature, significance, consequence, extent, duration, and probability of the impacts occurring to inform identified preferred alternatives; and the degree to which these impacts can be reversed; may cause irreplaceable loss of resources, and can be avoided, managed or mitigated;
e) Identify an ideal location for the activity within the development footprint of the approved site as contemplated in the scoping report based on the lowest level of environmental sensitivity identified during the assessment;
f) Identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the scoping report through the life of the activity;
g) Identify suitable measures to avoid, manage or mitigate identified impacts; and
h) Identify residual risks that need to be managed and monitored.

In accordance with the requirements of the EIA Regulations, the Final Scoping Report was submitted to the DMRE on the 12th of November 2019 and was accepted on the 04th December 2019. The preparation and submission of the Draft Environmental Impact Assessment Report follow the acceptance. Nsovo has therefore prepared this report, which will be submitted to stakeholders for review and comment for 30 days, following which the Final EIA report will be submitted to DMRE for review and decision making. The conclusions and recommendations of this Draft EIA are the results of the identified impacts by the Environmental Assessment Practitioner's (EAP) professional judgment based on experience and expertise in the field as well as the specialists.

The identified impacts associated with the proposed project and associated infrastructure are expected to include the following:

Biodiversity impact associated with the expansion of the discard dump, and construction of the conveyer belt and associated infrastructure. Potential ecological impacts resulting from the proposed development would stem from a variety of different activities and risk factors associated with the pre-construction, construction, operational and

closure phases of the project. During construction, vegetation clearing for access roads, laydown areas and the discard dump may impact intact vegetation. Increased erosion risk would occur due to the loss of plant cover and soil disturbance during the construction phase. Stripping of vegetation will increase the risk of erosion. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems.

Furthermore, it is anticipated that the loss of indigenous vegetation will occur. This will impact on the remaining primary vegetation of a threatened ecosystem, plant species of conservation concern, unique sensitive habitats including Critical Biodiversity Areas (CBA) and wetlands, as well as, unique or suitable habitat for species of conservation concern to establish or persist. It is also anticipated that during both construction and operational phases, an increase in Alien Invasive Plants will occur within all habitats. In addition, ecological structures and function of habitats will be lost at all wetlands including surface and subsurface hydrological patterns essential for maintaining lower-lying habitats.

The development would contribute to the cumulative fragmentation of the landscape and it would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The highest risk of the proposed development to the local biodiversity and its habitat are as follows:

- Loss of indigenous vegetation
- Loss of exotic vegetation
- Loss of or displacement of fauna
- Loss of ecological function
- Increase in alien invasive vegetation
- Biodiversity degradation

No fatal flaws were identified in terms of biodiversity impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Impact on Wetlands -The proposed study area is within an unchannelled valley bottom wetlands, channelled valley bottom wetlands, hillslope seepage wetlands connected to a watercourse and depressions (pans). Wetlands within the study area serve to improve habitat within and potentially downstream of the study area through the provision of various ecosystem services. Many of these functional benefits, therefore, contribute directly or indirectly to increased biodiversity within the study area, as well as downstream of the study area through provision and maintenance of appropriate habitat and associated ecological processes. To ensure that the water resources within the study area are managed properly and protected, a Water Use License will be lodged with the Department of Human Settlement Water and Sanitation.

The impact assessment identified the destruction of wetland habitat, surface water pollution, including sedimentation as well as increased erosion, altered hydrological regimes, loss of wetland functionality, and decreased downstream water quality as the major impacts during the construction and operational phase. Several general and specific mitigation measures were proposed to reduce negative impacts and incorporate some potentially positive impacts from the proposed development.

No fatal flaws were identified in terms of wetlands impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Impact on surface water – hydrological impacts occur at every underground mining operation bringing about changes to surface landforms, ground water and surface water. Construction impacts associated with surface water would include surface water contamination, siltation of surface waterand runoff and drainage from the discard dump continue to yield polluted water and siltation of water courses.

The proposed discard dump will have negative impacts on surface water resources i.e., river systems, dams, and pans and such may include the following impacts: stormwater control around the subsidence areas (free draining) and stormwater control around the discard dump (seepage/runoff). The construction of the conveyor belt and associated service road would impact on surface water resources as a result of encroachment or possible destruction. Operational phase impacts on surface water include stream peak flow reduction as a result of the discard dump.

No fatal flaws were identified in terms of surface water impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Impacts on Ground Water - During the construction phase for the Discard Dump extension and conveyor belt, the following potential impacts on groundwater may result from the on-project site activities:

- Potential project site contamination of groundwater due to hydrocarbon spillages and leaks from construction vehicles and waste;
- A slight reduction of recharge to groundwater due to the compaction of the ground surface; and
- Clearing of footprints, the building of roads and other construction-related activities.
- Decrease in quality as a result of potential hydrocarbon spillages as well as seepage from the discard dump
- Increased infiltration
- Change in the geo-chemistry

As these activities are relatively small in magnitude this will only pose a project site-specific low risk to groundwater if proper mitigation measures are implemented. No fatal flaws were identified in terms of groundwater impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Traffic impacts -Traffic operating conditions were determined and compared for the baseline, project construction phase, and project operational phase scenarios. By comparing the operating conditions for the different scenarios, it was concluded that the proposed project would have an insignificant traffic impact on the surrounding road network. No traffic problems or congestion are expected as a result of the project activities, provided that the issues discussed are considered. No fatal flaws were identified in terms of traffic impacts. From this perspective, therefore, there is no reason why this development should not proceed

Impacts on Heritage sites and paleontology during the construction phase. The Phase I Archaeological and Cultural-Heritage Impact Assessment study for the proposed DCM West expansion has revealed no archaeological or site of historical significance within the footprint of the proposed development. No burial sites were recorded within the development. No fatal flaws were identified in the heritage impact assessment study for the expansion of the discard dump and construction of the conveyer belt and associated infrastructure. From an archaeological point of view, there is no reason why this development should not proceed.

Impact on Waste during the construction and operation phases. Naturally, the inhabitation of the land will result in the accumulation of various forms of waste in the area. The aesthetic value of the area will decrease if such waste is not collected and disposed of appropriately. Waste material will be generated during the construction phase. Such waste may accumulate from the worker's campsite or litter left around the work area by the construction staff. Other waste substances may accumulate from cement bags, amongst other construction material. The impact of waste is definite and will last for the duration of the construction phase as well as the operational phase, although reduced. It should also be noted that the nature of the proposed activity results in mining waste, which will be deposited in the discard dump, hence the proposed expansion of the existing mine waste discard dump.

No fatal flaws were identified in terms of waste impact. From this perceptive, therefore, there is no reason why this development should not proceed.

Noise impacts associated with the construction and operation phases. There will be an upward shift in the immediate environmental noise levels during the construction phase temporarily and a more permanent basis during the operational phase in the vicinity of the different mine expansion activities. The noise increase at the abutting residential properties will, however, not exceed the prevailing ambient noise levels during the construction, operational, and decommissioning phases as it will be below the threshold value of 7.0dBA. There will be a noise increase at Thubelihle, along the R544 and R547 roads, when coal will be transported along this corridor. According

to the SABS 0103, acceptable noise levels at daytime is 45dBA, and a noise intrusion is disturbing if it exceeds 7dBA or more. The proposed development will not have a significant noise increase as the noise will not exceed the threshold and has been identified as potentially low due to the nature of the proposed development.

No fatal flaws were identified in terms of noise impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Visual impact associated with the proposed developments. The proposed activity will change the visual character of the site particularly considering that the proposed site is located in an area that is sloping; the elevated points of the site can be viewed from the nearby roads. However, it must be noted that there are already existing mines and waste dumps located within the vicinity of the proposed project site. Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. Given the topography of the study area, the impact can be considered definite, long term, local in extent but low significance.

No fatal flaws were identified in terms of visual impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Impacts on Climate change - Local climate conditions do not appear to be of significant concern to the proposed project. On a broader scale, the project will have no direct significant impact on the local and/or global climate change. According to the air quality specialist Climate change is unlikely to have a major direct impact on the mining industry, for which regulations and management strategies are already in place to manage factors such as water usage, water conservation and demand strategies, and environmental issues relating to rehabilitation and the provision of rehabilitation guarantees. While a lack of access to water may affect some mining projects, most mining processes do not generally require potable water. Where high-quality water is required, some mines are already installing water treatment units.

Further, the study indicated that the Industrial Process and Product Use Sector contributed 41 882 Gg CO2e (7.7%) to the gross South African emissions in 2015. The main drivers are the Iron and steel industry and Ferroalloy Production emissions. DCM West's calculated GHG emissions inventory for current operations amounts to 0.0004% and the expansion project's inventory amounts to 0.0054% of South Africa's carbon budget (4,410 Mt CO2e). The current operations and the expansion project are considered to have negligible impacts, as its GHG emissions inventory intensity ratings are less than 0.02%.

No fatal flaws were identified in terms of climate impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Socio-economic impacts during the construction and operation phases of the proposed project. The socio-economic aspect has both positive and negative impacts. The significance of positive socio-economic benefits associated with the proposed development exceeds the significance of the negative socio-economic impacts. For example, the proposed mine expansion will result in sustainable jobs at the mine over the medium and long term. These include skilled, semi-skilled and under-skilled labours, which could consist of locals (in and around the mining area) as well as regional and national communities. The proposed conveyor belt will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads i.e., the R547 and R544.

The negative socioeconomic consequences associated with the project are that the proposed development is in an area characterised by a variety of agricultural activities which include among others: maize and soya beans cultivated fields and grazing fields for livestock i.e. cattle and goats. The proposed conveyor belt and discard dump will impact on the agricultural potential of the area as well as other ecological support services which the local communities depend on. It is therefore imperative that the project should be undertaken in sustainable manner. The construction activities for the proposed project and the associated auxiliary infrastructure should be restricted within the footprint of this infrastructure and associated servitudes. With mitigation, construction activities will be restricted to the mine receiving environment and there will be no negative spill-overs. There is therefore no adverse change in land use in the area.

No fatal flaws were identified in terms of socio-economic impacts. From this perspective, therefore, there is no reason why this development should not proceed.

Cumulative impacts

Cumulative impacts in relation to an activity mean the past, present and reasonably foreseeable future impacts of an activity, considered together with the impacts of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (DEA, 2014 EIA Regulations). Considering the findings of the specialist studies undertaken for the project, the cumulative impacts for the proposed project will be acceptable and the majority of the impacts are rated as being low to medium significance with the implementation of mitigation measures to be included in the Environmental Management Programme (EMPr).

Conclusion

Based on the studies undertaken and input from the specialists it can be concluded that the impacts associated with the construction and operation of the proposed Dorstfontein West Mine project are expected to be Medium to Low

significance with the implementation of adequate mitigation measures. No environmental and social fatal flaws were identified to be associated with the proposed project.

The findings of the specialist studies undertaken as part of the EIA process concluded that:

- The impact associated with the expansion of the discard dump and the construction of the conveyer belt and associated infrastructure are expected to be Medium to Low significance with the implementation of adequate mitigation measures.
- No environmental and social fatal flaws were identified to be associated with the proposed project.
- Two conveyor routes, Route A and Route B have been proposed and were assessed during this EIA phase. The main aim of the conveyor is to transport coal from DCM west to DCM east. The assessment of the impacts of the conveyor belt took into consideration the impacts of the service road associated with the conveyor belt. Further, the No-Go option was also considered and assessed for this proposed project. Based on input from the specialist, assessment of the site, comparative analysis of the two conveyor route alignments, and many other factors highlighted above, both sites are feasible; however, Conveyor Route A is the preferred site.

Recommendations

Based on the nature and extent of the proposed development, the local levels of disturbance predicted v. the expected benefits at a regional and national scale, the findings of the EIA and the understanding of the significance level of potential environmental and social impacts, it is the opinion of the EIA project team that the proposed project can proceed subject to the implementation of the mitigation measures detailed in Chapter 11 of this report and the EMPr.

Moreover, the following conditions must be included in the environmental authorisation to be issued by the DMRE:

- All mitigation measures detailed in this report and the specialist studies must be implemented.
- The EMPr, as contained within **Appendix H,** must be used as a blue print throughout all phases of the project.
- The Design of the discard dump must be in line with the Minimum Liner standards and approved by the Department of Human Settlement Water and Sanitation.
- An integrated Water Use license must be obtained from the Department of Human Settlement Water and Sanitation before commencement.
- An appropriate barrier system should be engineered prior to expansion of the discard dump as a measure to prevent seepage of contaminants into the groundwater regime and freshwater systems and must be appropriately maintained to mitigate impact during all phases of development; and

- Furthermore, a dirty water trench that complies with GN704 should be installed downgradient of the discard facility to capture seepage, which might potentially pollute the wetlands. Excavation of soil must be limited within the demarcated areas as far as practically possible.
- Ensure that all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined no-go areas.
- Soil stripping must be done in consultation with a soil specialist, and careful consideration of the pre-mining soil survey is essential.
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors;
- An appropriate wetland and hillslope monitoring program must be implemented before the commencement of the construction phase;
- Suitable wetland rehabilitation design and implementation must ensure that wetland functionality is restored.
- Wetland mitigation and rehabilitation plan must be prepared to compensate for a minimum loss of 4, 45 healthy hectare wetland equivalents (the final multiplication factor to be determined in consultation with DHSWS).
- All soils, especially wetland soils within the footprint of the discard facility must be appropriately separated and stored. A soil management program must be implemented before construction commencement to secure all wetland soils in situ as these will be utilised for mitigating wetland loss through the wetland mitigation and rehabilitation plan.
- For the conveyor routing, it is highly recommended that any sections crossing a wetland should only be constructed during the winter months where practicable
- A special works program must be implemented, which ensures that a wetland specialist is part of the design and construction team (to minimise impacts on wetland habitat) and that the wetland monitoring program makes provision for increased monitoring intensity for the conveyor route specifically. The monitoring program must focus on wetland crossings, and special measures must be designed and put in place to prevent coal spillages in the vicinity of wetland habitat.
- An independent ECO must be appointed during construction to ensure environmental compliance monitoring and timeous reporting;
- The mine's internal Environmental officers must be conversant with best practices in line with rehabilitation during decommissioning, and an audit is to be conducted during and after rehabilitation.
- Where mining infrastructure is required across natural watercourses, new stormwater infrastructures, such as pipes and culverts, could replace the hydraulic function currently offered by the natural watercourses. This infrastructure should be designed for both hydraulic performance and environmental functionality. A thorough assessment of the suitability of the new stormwater infrastructure must be made at the preliminary design stage.

- A GN 704 audit is to be conducted bi-annually to assist with compliance with the separation of clean and dirty water infrastructure unless otherwise, the frequency of the audit is determined by the existing Water Use Licence.
- If archaeological materials are unearthed, all development within a radius of at least 10m of such indicator should cease, and the area is demarcated by a danger tape. Accordingly, a professional archaeologist or LIHRA officer should be contacted immediately.
- Avoid any disturbance to the No-Go habitats, i.e., the rocky ledges south of the current mining plant.
- Minimize the physical destruction of any remaining primary vegetation, especially in or near wetland areas.
- In general, minimize clearing and operations in habitats with a high sensitivity rating and delineate and maintain a no-go buffer of at least 100m around such habitats.

This Draft EIA Report was compiled according to Appendix 3 (scope of assessment and content of environmental impact assessment report) of EIA Regulations of 2014, as amended. It contains all the information that is necessary for the competent authority to consider, allowing for informed decision making.

The Draft EIA Report will be made available to the Interested and Affected Parties (I&APs) as well as Organs of State for thirty (30) days to allow them to review and comment. All comments received on the draft EIA Report will be included in the Comments and Response Report and incorporated into the final EIA Report for submission to the DMRE for decision making.

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LIST OF ACRONYMS AND ABBREVIATIONS

ARD	Acid Rock Drainage
BGP	Best Practice Guideline
BID	Background Information Document
CBA	Critical Biodiversity Area
CV	Curriculum Vitae
DCM	Dorstfontein Coal Mine
DEFF	Department of Environmental Forestry and Fisheries
DMRE	Department of Mineral Resources and Energy
DHSWS	Department of Human Settlement Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECC	Exxaro Central Coal
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESA	Early Stone Age
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GNR	Government Notice Regulations
HGM	Hydro-Geomorphic
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IWULA	Integrated Water Use Licence Application
IWULA	Integrated Water Use Licence Application
LOM	Life of Mine
LSA	Late Stone Age
MAR	Mean Annual Rainfall
MDARD	Mpumalanga Department of Agriculture and Rural Development

MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MRA	Mining Right Application
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA)
NFEPA	National Fresh Water Ecosystem Priority Areas
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PCD	Pollution Control Dam
PES	Present Ecological System
ROM	Run of Mine
RQO	Resource Quality Objectives
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SAWS	South Africa Weather Service
SOC	State Owned Company
TSP	Total Suspended Particulate
WMA	Water Management Area
WML	Waste Management Licence
WULA	Water Use Licence Application

1 INTRODUCTION

Dorstfontein West Mine (Pty) Ltd also known as Dorstfontein Coal Mine (Pty) Ltd (hereafter referred as DCM West) is an underground mine with both 2 and 4 Seams operated by Exxaro Coal Central (Pty) Ltd ("Exxaro"), located within the jurisdiction of Emalahleni Local Municipality in the Mpumalanga Province. Exxaro Coal Central (Pty) Ltd.'s ("Exxaro) Dorstfontein West Mine previously mined 2 Seam and is now mining 4 Seam via bord and pillar underground mining method on the western portion of their mining rights and is intending to expand the existing discard dump facility and to construct a conveyor belt at the Dorstfontein West Mine (DCM) which is located within the jurisdiction of Emalahleni Local Municipality in the Mpumalanga Province. The Life of mine is projected to be until 2042 while the existing discard dump is coming to the end of its life in 2022. The purpose of this expansion project is to extend the life of the discard dump facility, which is required to accommodate the disposal of the discard and slurry for the next 15 years of the Life of Mine (LOM) and to allow for easier transportation of coal from West to East through the conveyor belt. Subsequently, Exxaro proposes to undertake the following activities:

- Expansion of the existing discard dump which is coming to the end of its life a by 2022; and
- The construction of a conveyor belt and associated service road, from DCM West which will be linked to the conveyor systems at DCM East to ensure that coal is conveyed from DCM West to DCM East where the coal will be loaded into trains and thereafter transported to Richards Bay Coal Terminal.

The proposed development triggers the NEMA EIA listed activities, as such, Exxaro is required to undertake an Environmental Impact Assessment (EIA) process and obtain an Integrated environmental authorisation prior to construction of the above-mentioned activities in accordance with the EIA Regulations, 2014 (promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended in April 2017 and National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA).

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Further, the proposed development will trigger water use activities, as such, Exxaro will also need to lodge an Integrated Water Use Licence Application (IWULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) and obtain an Integrated Water Use Licence (IWUL) from the Department of Human Settlement, Water and Sanitation (DHSWS) before the commencement of any listed water use activity.

Nsovo Environmental Consulting (Nsovo) has been appointed by Exxaro, as the independent environmental consultant, to undertake the required Scoping Study and Environmental Impact Assessment to identify and assess all the potential environmental impacts associated with the proposed projects and propose appropriate mitigation and management measures in an Environmental Management Programme (EMPr). As part of the EIR phase, I&APs will continue to be involved through the public participation process. The project proponent is Exxaro Dorstfontein Coal Mines (Pty) Ltd, whereas the Competent Authority is the Mpumalanga Department of Mineral Resources and Energy (DMRE).

In accordance with the requirements of the EIA Regulations, the Final Scoping Report was submitted to the DMRE on the 12th of November 2019 and was accepted on the 04th December 2019. The preparation and submission of the Draft Environmental Impact Assessment Report follow the acceptance. Nsovo has therefore prepared this report, which will be submitted to stakeholders for review and comment for 30 days, following which the Final EIA report will be submitted to DMRE for review and decision making.

The EIA Phase assesses the identified potentially significant environmental impacts and benefits (direct, indirect, and cumulative impacts) associated with all phases of the project and recommends appropriate mitigation measures. The report aims to provide the relevant authorities with sufficient information to make an informed decision regarding the proposed development.

2 DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nsovo has been appointed by Exxaro as the independent Environmental Assessment Practitioner (EAP) for the proposed project and meets the general requirements as stipulated in regulations 13(3) of the NEMA 2014 EIA Regulations, as amended.

Nsovo therefore:

- Is independent and objective;
- Has the expertise in conducting EIAs;
- Takes into account all relevant factors relating to the application; and
- Will provide full disclosure to the applicant and the relevant environmental authority.

Table 1 below provides details of the EAP and relevant experience. A detailed CV and qualifications are attached as **Appendix E**.

Table 1: Details of the Environmental Assessment Practitioner (EAP)

Name of Company	Nsovo Environmental Consulting
Person Responsible	Munyadziwa Rikhotso
Professional Registration	South African Council for Natural Scientific Professions (SACNASP)
Postal Address	Private Bag x29 Postnet Suite 697 Gallo Manor 2052
Telephone Number	011 041 3689
Fax Number	086 602 8821
Email	Munyadzi@nsovo.co.za
Qualifications & Experience	B.Sc. Honours Geography 16 years of experience
Project Related Expertise	In terms of project related expertise, the Environmental Assessment Practitioner has completed the following projects: • EIA for the proposed Maphutha-Witkop powerline in Limpopo Province. • EIA for the proposed Shongweni substation and Hector - Shongweni 400kV powerline in Kwazulu Natal Province. • EIA for the proposed Inyaninga substation and Inyaninga – Mbewu 400kV powerline in Kwazulu Natal Province. • EIA for the proposed Tubatse strengthening phase 1 – Senakangwedi B integration within the jurisdiction of Greater Tubatse Local Municipality in Limpopo Province. • EMPr, WULA and EA amendment for the proposed Juno Gromis 400kV power line • Basic Assessment for the proposed Decommissioning and Demolition of Verwoedberg Substation and 275kV power. • Basic Assessment for Bloemendal Substation and loop in and out lines.

2.1 DETAILS OF THE APPLICANT

The applicant for this development is Exxaro and their details are included in Table 2 below.

Table 2: Details of the Applicant

Name of Company	Dorstfontein Coal Mines (Pty)Ltd
Name of Mine	Dorstfontein Coal Mines (Pty)Ltd
Physical Address	Exxaro Coal Central Dorstfontein West, Regional Offices Dorstfontein Farm 71IS R547 Ga-Nala (Kriel)
Postal Address	Exxaro Coal Central Dorstfontein West, Regional Offices Dorstfontein Farm 71IS R547 Ga-Nala (Kriel)
Contact Person	Daniel Stapelberg
Telephone Number	011 441 6890
Project Manager	William Seabi
Email	Daniel.Stapelberg@exxaro.com William.Seabi@exxaro.com

2.2 DETAILS OF SPECIALISTS

To adequately identify and assess potential environmental impacts associated with the proposed project, Nsovo has appointed the following specialist sub-consultants (Table 3) to conduct specialist impact assessments.

Table 3 : List of specialists

Specialist Study	Company	Specialist
Biodiversity (flora and fauna);	Vegetation Research and Ecological Consulting	Marianne Strohbach
Soil, land use and land capability	Scientific Aquatic Services	Braveman Mzila
Heritage;	Vhubvo Archeo Heritage Consulting	Munyadziwa Magoma
Wetland	WaterMakers	Willem Lube

Specialist Study	Company	Specialist
Hydropedology	Scientific Aquatic Services	Braveman Mzila
Hydrology	Humba Environmental Consulting	Tinashe Maramba
Traffic	Eco Elemetum	Pieter Jooste
Air quality	Eco Elementum	Henno Engelbrecht
Socio-economic	NGT	Nkosinathi Thomose
Visual impacts	Outline Landscape	Katherin Hamelouw
Hydrogeological	GCS	Pieter Boshoff
Climate Change	EHRCON	Jeandré Neveling
Closure and Rehabilitation	Digby Wells	Anthony Lamb

3 THE LOCATION OF THE DEVELOPMENT FOOTPRINT OF THE ACTIVITY ON THE APPROVED SITE AS CONTEMPLATED IN THE ACCEPTED SCOPING REPORT

This section provides detailed information on the location footprint of the proposed project on the approved site as contemplated in the Scoping Report, including the 21 digit Surveyor General Code of each cadastral land parcel as well as the Farm names.

3.1 LOCALITY OF THE PROPOSED PROJECT

Dorstfontein West Mine is situated in the Mpumalanga Province, 5 km north of Ga-Nala (Kriel), 60 km south of Emalahleni (Witbank), and 145 km east of Johannesburg. The proposed project is located within the existing Dorstfontein West (119MR, 123MR), and Dorstfontein East (51MR) Mining Right area, which covers a total of 4 436, 2709 hectares. The site is in the jurisdiction of the Emalahleni Local Municipality within the Kriel Magisterial District in the Mpumalanga Province of South Africa. Figure 1 below is a locality map that depicts the proposed study area at a scale of 1:50 000. Refer to **Appendix A** for the A3 locality and sensitivity maps.

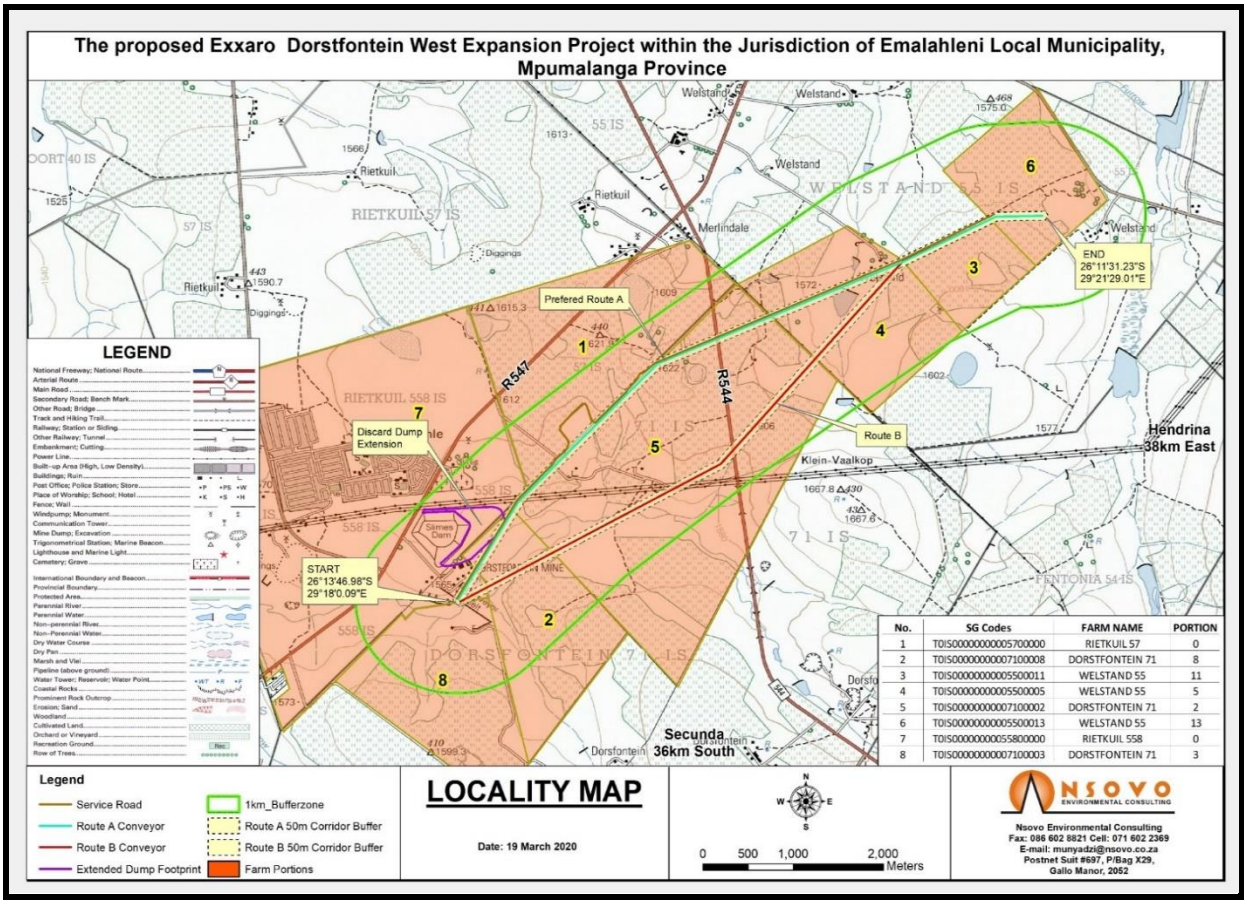


Figure 1: Locality map showing the proposed Dorstfontein West Study Area

3.2 DESCRIPTION OF THE PROPERTY

The Mining Right (MR) area encompasses various farm portions that will be affected by the proposed development. Table 4 below provides the 21 digits surveyor-general code of the affected land parcel as well as the farm names.

Table 4: Details of the properties affected by the proposed project

Farm Name	Portion	Surveyor General 21 Digit Code
Rietkuil 57	Portion 0	T01S00000000005700000
Rietkuil 558	Portion 0	T01S00000000005580000
Dorstfontein 71	Portions 2, 3, 8	T01S00000000007100002 T01S00000000007100003 T01S00000000007100008
Welstand 55	Portions 5, 11, 13	T01S00000000005500005 T01S00000000005500011 T01S00000000005500013

4 A PLAN WHICH LOCATES THE PROPOSED ACTIVITY OR ACTIVITIES APPLIED FOR AS WELL AS ASSOCIATED STRUCTURES AND INFRASTRUCTURE AT APPROPRIATE SCALE

A plan which locates the proposed activities is presented in a map at a scale of 1:50 000, which is attached as **Appendix A** of this EIA report. The proposed activities, as indicated above, include the following:

- The expansion of the existing discard dump to accommodate the additional slurry or waste which is shown in Figures 2 and 3 below and coordinates provided in Table 6; and
- Proposed conveyor belt and service road, to transport coal from DCM West to DCM East, as shown in Figures 2 and 3 below and coordinates provided in Table 5.

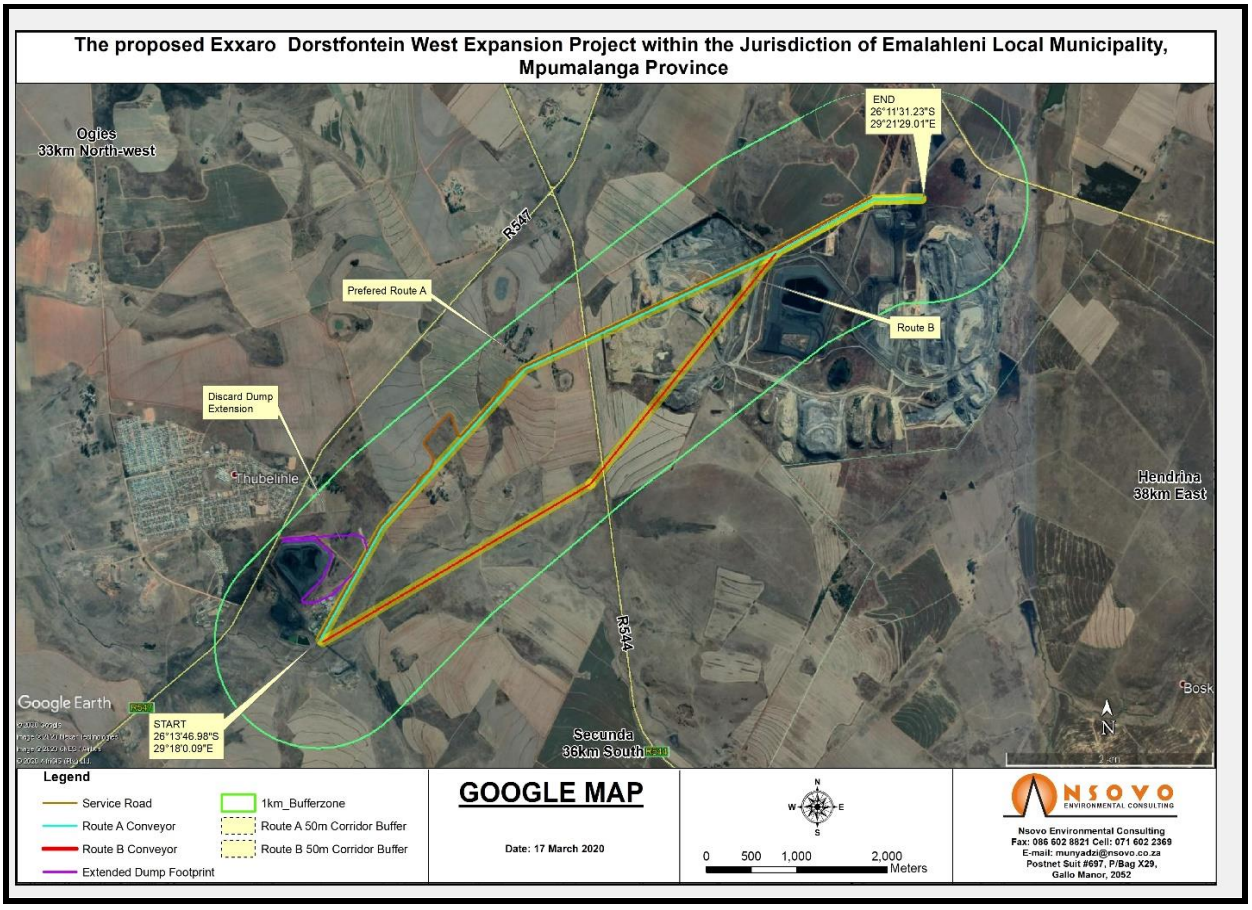


Figure 2: Google map indicating the proposed site

Tables 5 and 6 below provide the coordinates of the proposed linear activity (Conveyor Belt Route A and B) as well as the discard dump, respectively.

Table 5 : The proposed conveyor belt routes and their coordinates

	Route A		Route B	
Coordinates Points	**Latitude**	**Longitude**	**Latitude**	**Longitude**
Start point	26°13'46.98"S	29°18'00.09"E	26°40'01.42"S	28°36'56.33"E
Middle point	26°12'17.09"S	29°19'26.43"E	26°13'11.85"S	29°19'08.55"E
End point	26°11'31.23"S	29°21'29.01"E	26°11'31.23"S	29°21'29.01"E

Table 6: Corner points coordinate for the proposed discard dump extension

Discard dump extension corner points	Latitude	Longitude
Corner 1	26°13'15.67"S	29°17'58.13"E
Corner 2	26°13'15.42"S	29°18'15.05"E
Corner 3	26°13'20.14"S	29°18'16.21"E
Corner 4	26°13'32.60"S	29°18'04.16"E
Corner 5	26°13'34.60"S	29°17'53.17"E

5 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITIES

This section describes the proposed activities, which include the scope of the proposed project, mainly focusing on the listed activities which trigger the EIA process. It also describes the associated structures and infrastructure related to the proposed development.

5.1 BACKGROUND AND THE PROPOSED SCOPE OF WORK

As indicated above, DCM West is an operational coal mine, currently mining 2 and 4 Seams through underground mining methods on the western portion of their Mining Right area and intends to further mine 4 Seam, thus extending the life of mine to 22 years and increasing the Run of Mine (ROM) production to approximately 150 000 tons per month for the next 15 years. Subsequently, an additional discard facility is required to accommodate the disposal of the discard and slurry from the 4 Seam mining. Further, an overland conveyor belt and associated service road are required to transport the beneficiated coal from DCM West to DCM East mine. This application seeks to obtain the necessary authorisation for the proposed activities from the Competent Authority.

Various alternatives for the discard dump and conveyor belt were proposed as part of the scope of work during the Scoping phase, and the alternatives are presented in Table 7 below.

Table 7: Various alternatives proposed during Scoping Phase

Alternatives	
Discard Dump Options	**Conveyor Belt Alternatives**
Discard Dump extension	Conveyor Route A
Discard Dump Option 1	
Discard Dump Option 2	Conveyor Route B
Discard Dump Option 3	

Following a detailed analysis of the alternatives, other alternatives were dismissed, and below are the activities that will be assessed as part of the EIA phase:

- Expansion of the existing discard dump which is coming to the end of its life a by 2022;
- The construction of a conveyor belt and associated service road, from DCM West which will be linked to the conveyor systems at DCM East to ensure that coal is conveyed from DCM West to DCM East where the coal will be loaded into trains and thereafter transported to Richards Bay Terminal; and
- The no-go alternative

The proposed activities are discussed in detail hereunder.

5.1.1 EXPANSION OF THE EXISTING DISCARD DUMP

The proposed project entails the expansion of the existing discard dump, which is coming to the end of its life by 2022. The expansion of the discard dump facility is required to accommodate the disposal of the discard and slurry for the next 15 years of the Life of Mine. The proposed discard dump expansion will necessitate the expansion of the existing access road which will be compliant with a Type 6 gravel road; which comprises of 6 meters wide raised gravel extended with meadow drainage in flat terrain, with additional meters to cater for the 'V' type drainage in rolling terrain. Where necessary, suitable erosion control measures such as the construction of gabions and culverts to control storm-water will be implemented.

5.1.1.1 Barrier design

According to the Waste Disposal Facility Study Report (2017) and the preliminary designs (2019) by Jones & Wagner, the development of the discard dump will entail the removal of topsoil within the footprint and stockpiling for use during the rehabilitation phase. Following the removal of the topsoil, the barrier system will be constructed and will comprise the following layers from excavation level upwards:

- Substrate preparation layer: the substrate will be ripped and re-compacted to 90% of MOD AASHTO density with a moisture content of -2 to +2% of optimum.

- Primary impermeable layer: 2 x 150 mm layers of clay compacted to 98% of Standard Proctor density at a moisture content of +1 to +3% of optimum moisture content in order to have a permeability (k) of less than 1x10-6cm/s.
- Primary geomembrane layer: 1.5 mm HDPE double textured geomembrane layer.
- Protection layer: 200 mm layer of fine sand that will protect the geomembrane against damage from the coarse discard.
- Leachate collection layer and drains: 400 mm layer of coarse discard with HDPE pipe drainage network.

The Department of Human Settlement Water and Sanitation (DHSWS) has recommended a Type-C liner system that meets the regulatory requirements for the discard expansion. The preliminary designs for the proposed discard dump expansion have been designed to meet the minimum engineering guidelines, legislative requirements, and world best practices.

The liner is recommended following the requirements of GN R. 63640 is entitled “Norms and Standards for Disposal of Waste to Landfill,” and the prescribed liner design requirements for different “classes” of landfill sites, based on the type of waste, as classified under GN R. 635. These design requirements are illustrated below, recommended by the DHSWS for the proposed expansion is Type 3, Class C (indicated in a blue arrow in Figures 3 below).

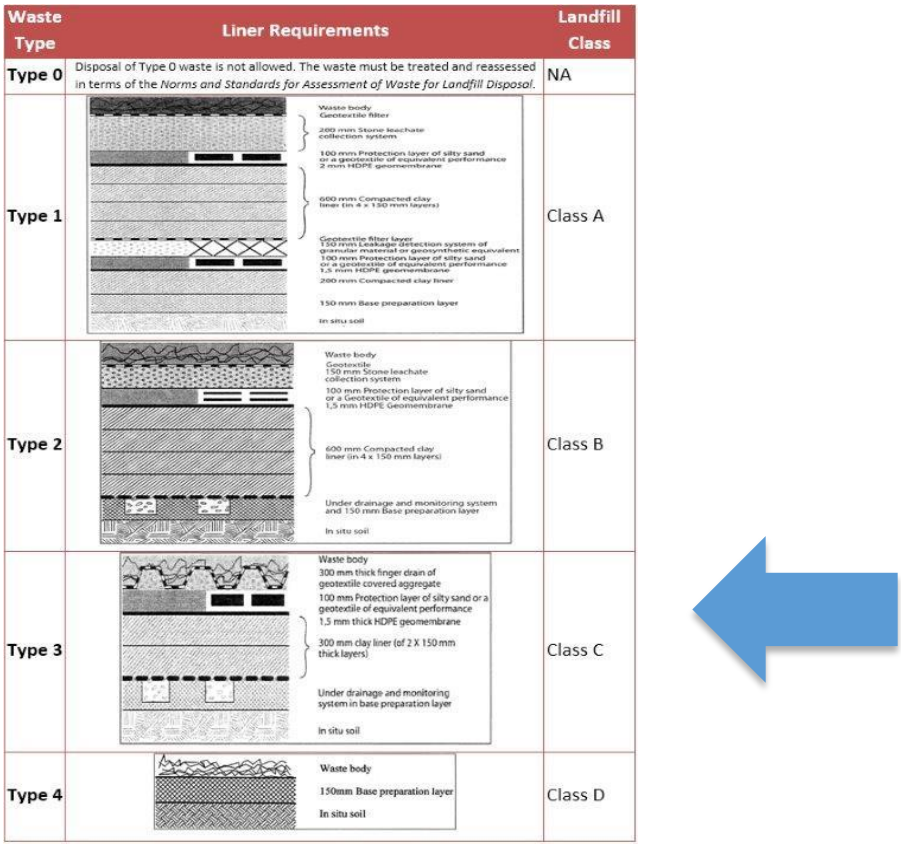


Figure 3: DWS Liner Requirements (DHSWS, Norms and Standards)

5.1.2 CONSTRUCTION OF THE CONVEYOR BELT

The ROM coal from the underground operations will be transported via a conveyor belt to the plant areas from where the discard will be disposed of at the upgraded co-disposal facility. It is proposed that an overland conveyor belt and associated service road be established to transfer ROM or beneficiated coal from DCM West to the plant at DCM East.

The conveyor belt will be constructed following a site walk down and the construction will entail the fabrication, installation modifications, and commissioning of 7.5km overland conveyors to link mining operations from the current Coal Seam 4 Dorstfontein West Mine to their East Mine. The conveyor belt is approximately 2.5m; however, a 5m corridor has been studied. The activities associated with the construction of the conveyor belt include the following:

5.1.2.1 Civil works

These civil works cover the groundworks and service roads along the conveyor route as well as ground works and concrete plinths for the conveyor support (outside wetlands area):

- Excavation needs to be done every 4m for the conveyor support structure on all areas outside the indicated wetlands areas as indicated on the conveyor route drawing with the following specifications:
    - 2m long x 400mm wide x 400mm deep.
    - G5 material to be inserted into the hole and compacted.
    - 1.2m x 300mm x 250mm concrete plinths to be installed on the leveled G5 base.
    - Steel conveyor gantry structure to be installed on the concrete plinths.

Groundworks and piles for the conveyor support (inside wetlands area):

- Pile holes to be done drilled every 6m for the conveyor support structure in the wetlands areas as indicated on the conveyor route drawing with the following specifications:
    - 2 x Diameter 300mm holes to be drilled 3m to 4m deep in the existing soil every 6m inside the wetlands area.
    - 2 x Diameter 300mm concrete piles to be installed in the holes and leveled to 300mm protrusion above ground level.
    - Steel conveyor gantry structure to be installed on the concrete piles.

Groundworks and concrete plinths for the conveyor transfer steel structures (outside wetlands area):

- Excavation need to be done for 2 x conveyor transfer steel support structure on the areas outside the indicated wetlands as indicated on the conveyor route drawing with the following specifications:
    - Excavation holes for the support foundation as per the drawings to be dig to 1m deep.
    - G5 material to be inserted into the holes and compacted.
    - Concrete plinths to be installed on the leveled G5 base.

- Steel conveyor transfer structure to be installed on the concrete plinths.

5.1.2.2 Mechanical works

The mechanical conveyor structure will fit on top of the concrete plinths and piles as per the drawings. The conveyor steel transfer structures will be built on the conveyor route.

5.1.2.3 Service road

Primary access to the mine is through the Regional Road 547 (R547) to Kriel, and this is the same access to the proposed project areas that are within the mine. Secondary access will be other public roads as well as private farm roads negotiated with landowners. However, where there is no access, roads may need to be established. The service road for the construction and maintenance of the overland conveyor (7.6km) will be 2.5m wide using existing farm roads and level the paths with grader along the conveyor where the farm roads are more than 15m away from the conveyor routing. Further, the proposed project will require secondary access that will be developed as part of the project scope, and this will include the construction of a service road along the approved conveyor route that will be approximately 3.9km and 2.5m wide. This single-lane service road (2.5m wide) will be graded and will avoid the wetland areas and utilize the existing farm roads, as indicated on the conveyor routing drawing. No material will be excavated for the road.

5.1.3 REHABILITATION

On completion of construction work, the site will be rehabilitated as per the specifications of the EMPr, approved Method Statements, and will also meet the requirements of the Closure and Rehabilitation Plan. The rehabilitation activities will include:

- Removal of excess building material and waste;
- Repairing any damage caused by construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads; and
- Replacing topsoil and planting indigenous vegetation where necessary.

As highlighted in the Draft Annual Rehabilitation Plan by Kimopax (2019), the Rehabilitation and closure objectives are tailored. The overall rehabilitation objectives for the project are as follows:

- Establishment of the suitable post mining land capability, vegetation and biodiversity (grazing has been defined as the post mining land use and capability);
- Implement progressive rehabilitation measures, where possible and conduct monitoring of rehabilitated areas; and
- Comply with the relevant local and national regulatory requirements.

The rehabilitation cost will be calculated in accordance with the GN1147 and submitted accordingly.

5.1.3.1 Vegetation clearance

Approximately thirty-five (35) hectares are required for the proposed discard dump expansion facility, and only the immediate footprint within the study area will be cleared for construction. Additional clearance will be undertaken for the service road (9750m^2) and minimal clearance for the conveyor plinths. Further, clearance will be undertaken in accordance with the approved Environmental Management Programme (EMPr), permits, licences, Municipal by-laws, as well as Exxaro' s policies and guidelines.

The proposed activities may not commence without Environmental Authorisation from the Competent Authorities as they trigger listed activities under NEMA, EIA Regulations of 2014, as amended. The listed activities are detailed in Table 8 below.

5.2 OTHER PROPOSED STRUCTURES AND INFRASTRUCTURE

As part of the construction phase of the proposed activities, the mine proposes the construction of the pollution control dam, which does not form part of the current scope as it is already authorised. Mention of the Pollution Control Dam (PCD) allows for a complete picture of the proposed activities, and the PCD is briefly described hereunder.

5.2.1 POLLUTION CONTROL DAM

Exxaro proposes to construct the PCD with a capacity of 15 000 cubic meters within their Mining Right area. This PCD will contain wastewater from the discard dump, which will be channelled using the trench. However, this PCD has already been authorised as part of the approved EMPr by the Department of Mineral Resources and Energy (DMRE). Figure 4 below illustrates the location of the PCD.

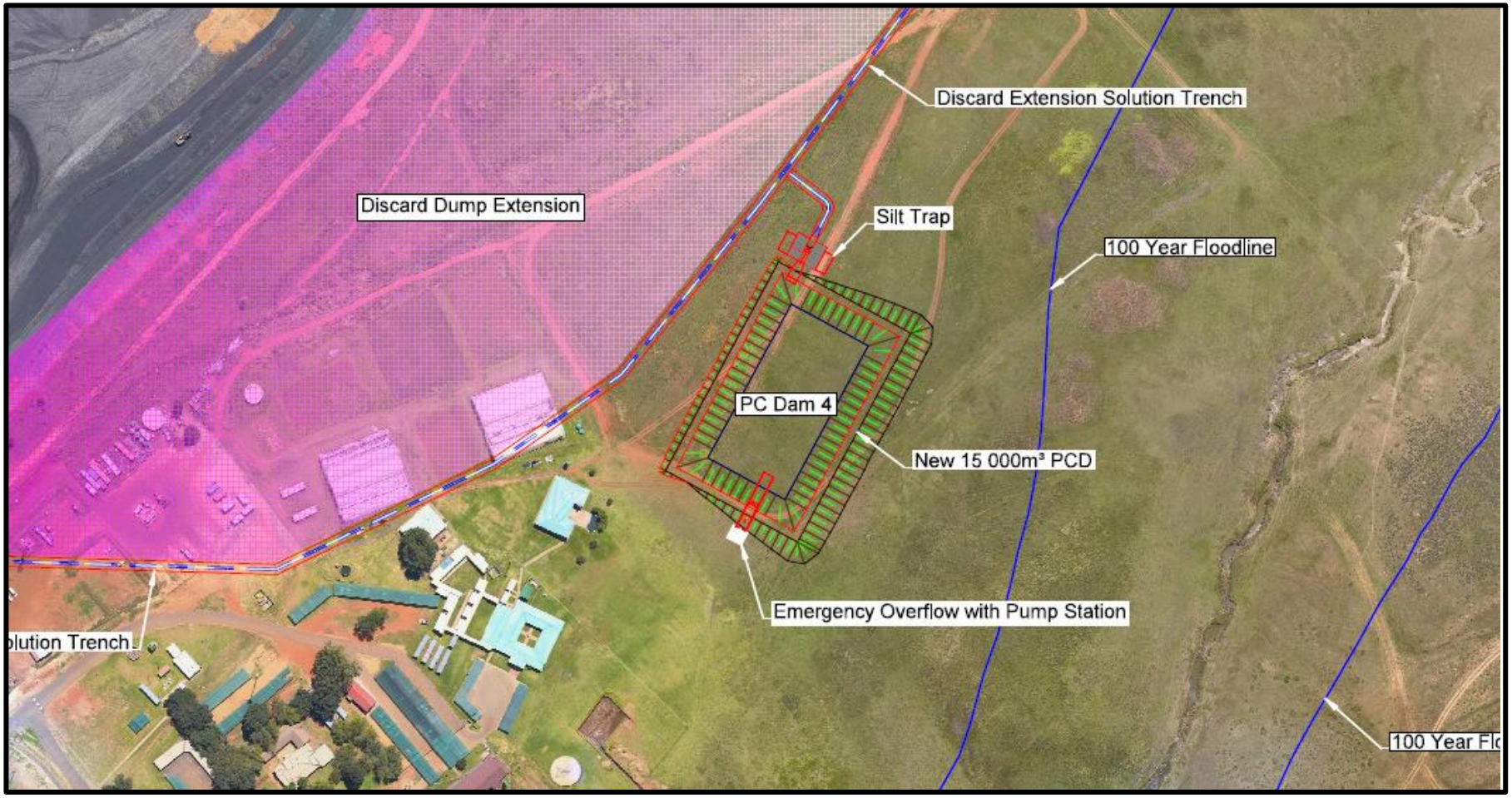


Figure 4: Authorized Pollution Control Dam (PCD) to be constructed within the site

5.3 ALL LISTED AND SPECIFIED ACTIVITIES TRIGGERED AND BEING APPLIED FOR

The proposed development triggers listed activities in terms of 2014 EIA Regulations as amended, National Environmental Management: Waste Act, 2008 (Act 59 of 2008), and National Water Act, 1998 (Act 36 of 1998). The listed activities applicable are listed and briefly described in Table 8 below:

Table 8: Listed activities applicable to the project

Listed activities	Activity/Project description
Applicable Activities Listed Under Environmental Impact Assessment Regulations, 2014 as amended in April 2017) Listing Notice 1 (GNR327)	
GN R. 327 Activity 12: *"The development of–* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *Where such development occurs –* *(a) Within a watercourse* *(c) If no development setback exists within 32 meters of a watercourse, measured from the edge of a watercourse".*	The proposed conveyor belt will have a footprint greater than 100 square meters, and the proposed development will be within watercourses including, wetlands.
GN R. 327 Activity 19: *Infilling or depositing of any material of more than 10 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic meters from: a littoral active zone, a watercourse*	The proposed discard dump facility and conveyor belt will be situated within a wetland.
GN R. 327 Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 1 April 1998 and where such development will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.*	The proposed expansion of a discard dump will require approximately 35 hectares and will be undertaken on agricultural land.

Listed activities	Activity/Project description
GN R. 327 Activity 48: *"The expansion of—* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or* *where such expansion occurs—* *(a) within a watercourse"*	The proposed project entails the expansion of the existing discard dump, where the physical footprint will be expanded by 100 square metres or more. This expansion will be within watercourses including wetlands.
Applicable Activities Listed Under Environmental Impact Assessment Regulations, 2014 as amended in April 2017: Listing Notice 2 (GNR325)	
GN R. 325 Activity 6: *The development of facilities or infrastructure for any process or activity which requires a permit or license or an amended permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.*	The proposed development will require Water Use and Waste Licences in terms of NWA and NEMWA.
GN R. 325 Activity 27: *"The development of a road wider than 4 metres with a reserve less than 13, 5 metres.*	The proposed project entails the development of an access road wider than 4 metres with a reserve less than 13.5 meters within protected areas and Critical Biodiversity Areas (CBA) outside urban areas.
Applicable Activities Listed Under the Environmental Impact Assessment Regulations, 2014 as amended in 2017: Listing Notice 3 (GNR324)	
GN R. 324 Activity 12: *The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purpose undertaken in accordance with a maintenance management plan*	The proposed conveyer belt route crosses a CBA, and the project will require clearance of an area of 300 square meters or more of indigenous vegetation within CBA.

Listed activities	Activity/Project description
F Mpumalanga *ii. within critical biodiversity areas identified in bioregional plans"*	
Activities listed under National Environmental Management: Waste Act, 2008 (NEMWA)	
Government Notice R921 of November 2013: Category B, Activity 7 *The disposal of any quantity of hazardous waste to land*	The proposed discard dump expansion will cater for the disposal of both discard and slurry coal.
Government Notice R 921 of November 2013: NEM:WA Category B, Activity 10 *The construction of facilities for a waste management activity listed in Category B of this schedule (not in isolation to associated activity*	The proposed project entails the expansion of a discard dump facility that will cater for both discard and slurry coal and is expected to cater for the life of mine.
The National Water Act, 1998 (Act 36 of 1998) Activities	
Section 21 (c) *21(c) Impeding or diverting the flow of water in a watercourse; and*	The proposed development is within watercourses including wetlands.
Section 21 (i) *21(i) Altering the Bed, Banks, Course or Characteristics of a Water Course*	The proposed development is within watercourses including wetlands.
Section 21 (g) *Disposing of waste in a manner which may detrimentally impact on a water resource; and*	The expansion of discard dump facility is expected to have negative impacts on water resources.
Section 21 (j) *Removing, discharging or disposing of water found underground.*	The proposed activities will require dewatering of underground mining areas.

6 DESCRIPTION OF THE POLICY AND LEGISLATIVE CONTEXT WITHIN WHICH THE DEVELOPMENT IS LOCATED AND HOW THE PROPOSED DEVELOPMENT COMPLIES WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT

The EIA Regulations of 2014, as amended, under Appendix 2 Section 1(e), requires a description of applicable legislations in the EIA Report. This section lists and describes the acts and legislation relevant to the proposed project and associated infrastructure. A list of the current South African environmental law, which is considered to be pertinent to the proposed development, is described in Table 9 below.

Municipal policies, plans, and by-laws, as well as Exxaro policies and world best practices, were considered during the undertaking of the EIA process. Table 9 below describes legislations that apply to the project; it is not an exhaustive analysis; however, it provides a guideline to the relevant aspects of each legislation.

Table 9: Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	• National Environmental Management: Act 1998, (Act No. 107 of 1998) as amended. • Environmental Impact Assessment Regulations, December 2014 as amended	The overarching principles of sound environmental responsibility as reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) apply to all listed projects. Construction and operation of activities must be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors. The EIA process followed complies with the NEMA and the EIA Regulations of December 2014 as amended. The proposed project involves "listed activities," as defined by NEMA. Listed activities are an activity that may potentially have detrimental impacts on the environment and therefore require an EA from the relevant Competent Authority, in this case, DMRE.
Mining Rights		The Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA) aims to provide for the protection of the health and safety of all employees and other personnel

Aspect	Relevant Legislation	Brief Description
	The Mine Health and Safety Act (Act No. 29 of 1996)	at the mines of South Africa. The main objectives of the act are: • Protection of the health and safety of all persons at the mines; • Requires employers and employees to identify hazards and eliminate, control and minimise the risks relating to health and safety at the mines; • Gives effect to the public international law obligations of the Republic that concern health and safety at all mines; • Provides for employee participation in matters of health and safety through health and safety representatives and the health and safety committees at the mines; • Provides for effective monitoring of health and safety conditions at the mines; • Provides for enforcement of health and safety measures at the mines; • Provides for investigations and inquiries to improve health and safety at mines; and • To promote: o Culture of health and safety in the mining industry; o Training in health and safety in the mining industry; and o Co-operation and consultation on health and safety between the State, employers, employees, and their representatives.
Biodiversity	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The purpose of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems

Aspect	Relevant Legislation	Brief Description
		that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.
Protected Areas	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The purpose of this Act is to provide for the protection, conservation, and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Heritage Resources	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits for this specific project would be administered by the Mpumalanga Heritage Agency or South African Heritage Resources Agency (SAHRA).
Air quality management and control	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	The objective of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of air quality and to prevent air pollution. The Act makes provision for measures to control dust, noise, and offensive odours. Section 32 of The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) deals with dust control measures in respect of dust control. The Minister or MEC may prescribe measures for the control of dust in specified places or areas, either in general or by specified machinery or in specified instances, the steps to be taken to prevent nuisance or other measures aimed at the control of dust. The National Dust Control Regulations (2013) provides for the management and monitoring of dust.
Noise Management and	Noise Control	The assessment of impacts relating to noise pollution

Aspect	Relevant Legislation	Brief Description
Control	Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	management and control, where appropriate, must form part of the EMPr. Applicable laws regarding noise management and control refer to the National Noise Control Regulations issued in terms of the Environment Conservation, 1989 (Act 73 of 1989).
Water Resources Management	National Water Act, 1998 (Act 36 of 1998)	This Act provides for fundamental reform of the law relating to water resources and use. The preamble to the Act recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure the sustainability of the nation's water resources in the interests of all water users. The proposed activities will encroach on watercourses such as the wetlands located within and nearby the study area. Therefore, the necessary licence will be obtained in due course.
Agricultural Resources	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	The Act aims to provide for control over the utilization of natural agricultural resources to promote the conservation of the soil, water resources, and vegetation and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied to achieve the objectives of the Act.
Human	The Constitution of South Africa, 1996 (Act No. 108 of 1996	The Constitution provides for an environmental right (section 24). The State is obliged "to respect, protect, promote and fulfil the social, economic and environmental rights of everyone…" The environmental right states that: "Everyone has the right - a) To an environment that is not harmful to their health or

Aspect	Relevant Legislation	Brief Description
		well-being; and b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - • Prevent pollution and ecological degradation; • Promote conservation; and • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."
Waste	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)	This Act provides fundamental reform of the law regulating waste management to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This Act also ensures the provision of national norms and standards for regulating the management of waste by all spheres of government. Further, it provides for specific waste management measures, licensing and control of waste management activities, remediation of contaminated land; compliance and enforcement; and for other related matters. The proposed project entails the expansion of a discard dump which will cater for coal discards and slurry.

7 A MOTIVATION FOR THE NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT INCLUDING THE NEED AND DESIRABILITY OF THE ACTIVITY IN THE CONTEXT OF THE PREFERRED

DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE AS CONTEMPLATED IN THE ACCEPTED SCOPING REPORT

This section justifies the need and desirability of the proposed project with a focus on its associated benefits and importance to both the locals, the region, and the country at large.

7.1 MOTIVATION FOR THE NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT

Exxaro Coal Central (ECC) operates four mines, namely Forzando North, Forzando South, Dorstfontein West, and East Mines. All mines are underground operations except for DCM East, which is an opencast mine. DCM applied to the DMRE for the inclusion of two Prospecting Rights (Vlakfontein and Rietkuil) for its mining operations at the DCM West Coal Shaft, and these inclusions were granted in January 2013 and executed on the 23rd of July 2013.

After procuring Total Coal assets in 2015, Exxaro undertook a re-valuation of these assets; and one such project is the Seam 4 Lower at Dorstfontein West, where the re-valuation has resulted in a change of the mining layout to include areas previously not scheduled. Through an intensive drilling exercise on these areas, economically viable blocks of Seam 4, Lower Coal have been defined. Access to these newly defined blocks of coal from the existing Dorstfontein West Seam 2 incline to the Seam 4 lower is motivated by subsequent reduction of Reserves at Dorstfontein West Seam 2 mine as a result of the depletion of the Seam 2 Coal Life of Mine reserves.

Further, it has been established that the discard dump at DCM West is coming to the end of its life, and a new dumping facility would be required by 2022.

Consequently, DCM West proposes to undertake the following activities:

- The expansion of the discard dump facility, which has become necessary due to the life of the current discard dump coming to an end in 2022. The discard dump extension would cater for both slurry and discard coal and is expected to cater for the life of mine; and
- The construction of a conveyor belt from DCM West, which will be linked to the conveyor systems at DCM East to ensure that coal is conveyed from West to East where it will be loaded into trains and thereafter transported to Richards Bay Terminal.

Consequently, this project aims to enhance the associated mining infrastructure and further responds to the commodity demand, which is driven by the need for electricity. Further, the proposed expansion of the discard dump and development of the conveyor belt as well as the construction of the already authorised PCD forms part of the

new infrastructure that the mine has planned, and the objective is to accommodate the increasing production. The proposed project will ensure the following:

- Reliable supply of coal for both local and export markets;
- Extend the life of the mine and thus create more stable job opportunities; and
- Improvement of South Africa's socio-economic status.

The socio-economic benefits expected from the proposed project and as highlighted by the socio-economic specialist include the following:

- The proposed mine expansion and prolonged life of the mine will result in sustainable jobs at the mine and will ensure continued employment opportunities over the medium and long term. In the short term, there will be minimal job opportunities during the construction of the proposed infrastructure. These include skilled, semi-skilled, and under-skilled labours, which could consist of locals (in and around the mining area) as well as regional and national communities.
- The proposed conveyor belt and associated service road will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads, i.e., the R547 and R544.
- The proposed development is located in an area characterised by a variety of agricultural activities which include among others maize and soya beans cultivated fields and grazing fields for livestock, i.e., cattle and goats. The proposed conveyor belt and discard dump expansion will impact on these ecological support services. However, these negative impacts are outweighed by the positive impacts.

7.2 BENEFITS OF THE PROJECT

It is recognised that mining activities are an essential component of South Africa's economic development. According to the Chamber of Mines of South Africa's Integrated Annual Review (2015), the mining sector accounted for 7.7% of South Africa's Gross Domestic Product (GDP) directly, and approximately 17% of direct, indirect and induced effects are included. Coal is explicitly a national requirement to meet the demand for electricity supply. Further, coal provides 81% of the power generated within South Africa with imminent future expansions.

South Africa is home to 3.5% of the world's coal reserves; thus, it is likely that despite the environmental challenges, coal will continue to be utilised as a significant part of the energy generation mix. At the national level, the proposed project will increase coal exports through the Port of Richards Bay and also deliver coal to several power stations within the country. At the regional level, the project will contribute to the security of local employment due to the extension of the life of mine. There would also be a less tangible but essential benefit of positioning the Municipalities ahead in terms of job opportunities.

7.3 SUPPORTING STRATEGIES

At the regional level, the project would contribute to the improvement in the socioeconomic status of the adjacent communities and the region at large. At the national level, the project would contribute to implementing South Africa's new energy policy as embodied in the White Paper on Energy (Department of Minerals and Energy, 1998) which highlights that amongst others, coal plays a central role in the socio-economic development of our country, while simultaneously providing the necessary infrastructural economic base for the country to become an attractive host for foreign investments in the energy sector. The priorities to which this project would contribute are laying the groundwork for enhancing supply and electrification.

8 MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE AS CONTEMPLATED IN THE SCOPING REPORT

Based on the findings of several specialist studies, and the EAPs collation of information presented (detailed in Section 9), the following has been recommended:

- Conveyor Route Alternative A is the preferred alternative; and
- Expansion of the Discard dump.

The preferred Conveyor Belt Route A and the discard dump expansion alternatives are recommended as they will have the least impact on the physical and the natural environment. The development footprint within the approved site, as contemplated in the Scoping report, is depicted in Figure 5 below.

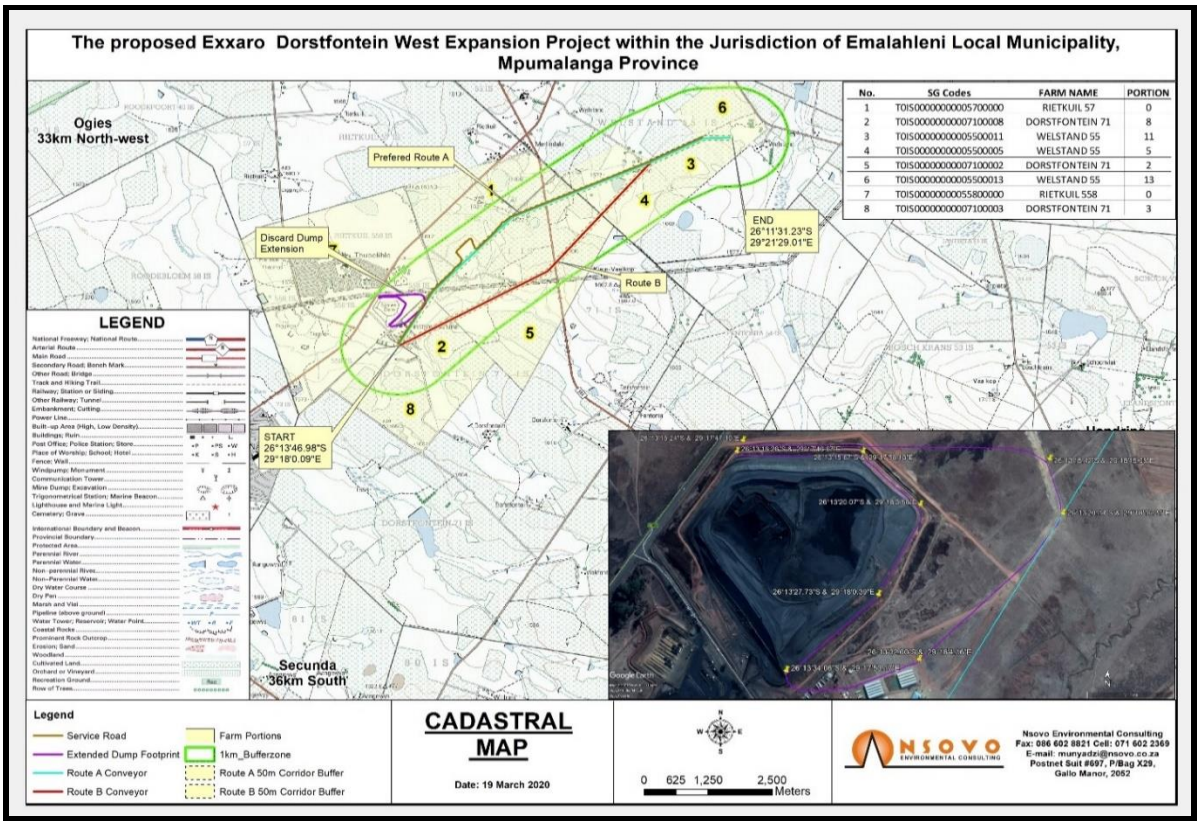


Figure 5: The proposed route alternatives and discard dump

9 MAP DEPICTING THE DEVELOPMENT FOOTPRINT AND FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE AS CONTEMPLATED IN THE ACCEPTED SCOPING REPORT

The identification of alternatives is a crucial component of the EIA process. The identified alternatives are assessed in terms of environmental acceptability, technical as well as economic feasibility during the EIA process, wherein the preferred alternatives are highlighted and presented to the Authorities.

In considering the preferred alternatives, various aspects were considered, and these include the degree of sensitivity of the site, technical viability, and to a certain extent, the economic viability. During the scoping assessment phase, four (4) Discard Dump options (Option 1, 2, 3, and the expansion of the existing discard dump), conveyor belt and associated service road vs. haul road for transfer of coal from DCM West to East, and the no-go alternative was considered for the proposed development. However, Site Alternatives 1, 2, and 3 were considered not viable; therefore they are not being assessed further during this EIA phase. The sites were dismissed on the following basis:

- The alternatives pose the highest risk on the identified sensitive environments; and

- All sites are located directly above the area earmarked for pillar extraction in the near future i.e., the area is prone to subsidence.

Further, consideration to utilise the Regional road for (R544 and R547) transfer of coal from DCM West to the east was made, and as a result of the excessively high traffic impact on an already congested road, made it an unviable option. It was therefore dismissed as an option and is not assessed further during this EIA phase.

9.1 Details of The Development Footprint Alternatives Considered

The proposed project entails the development of the conveyor belt and the expansion of the discard dump. The alternatives associated with the proposed activities are discussed as follows.

Alternatives that have been considered for the proposed activities include the following:

- Alternatives for coal transfer from DCM West to East using conveyer belt which entails two route alignments, (Route A and B);
- Discard dump expansion; and
- No go alternatives.

The location of the discard dump expansion and conveyor belt alternatives are shown in maps attached as **Appendix A** of this report.

9.1.1 Conveyor belt and service road alternatives

This section provides detailed information on the conveyer belt route options considered. It should be noted that a conveyor gravel service road will be constructed alongside (parallel and adjacent) the conveyor belt. The impacts assessment of the project takes into consideration the impacts of the service road associated with the conveyor belt. Conveyor Route A and B have been proposed and assessed as part of this EIA phase. The proposed alignment (Route A and B in blue and red, respectively) is illustrated on the locality map attached as **Appendix A**

The proposed conveyor belt would also require expansion of the existing single-lane service road as depicted in brown colour in **Appendix A**, and it is approximately 2.5m in width and 3.9km in length alongside the alignment. Such consequences would include the following:

- Total clearance of the vegetation for the entire alignment of the service road; and
- Removal of soil, which is highly suitable for arable agriculture situated within the study area.

The conveyor belt would only require the excavation of the foundation footprint to support the carriage every 4m on areas outside the wetlands as far as practically possible. It is anticipated that the conveyor belt would have less environmental impacts as compared to the haul road, which was dismissed during the scoping assessment phase. The impacts of the conveyor would include the following:

- Reduced traffic and associated impacts;
- Reduced greenhouse gas emissions;
- Less removal of sensitive vegetation such as CBA and ECA since the excavation will be done only for the foundation footprint; and
- Increased impact on bird interaction and a distinct visual impact.

9.1.1.1 Conveyer Route A and Associated Service Road

Conveyor Route A is depicted on the map in blue, and it starts at the Dorstfontein West mine and proceed towards the existing discard dumped and crosses the Eskom transmission powerlines northwards in parallel to the R547. The route then bends eastward to cross the R544 secondary road and aligns with Route B to cross an ecological corridor into Dorstfontein East, which is approximately 7.5km.

Alternative Conveyor Route A lies mainly within heavily or moderately modified land with no conservation areas along the alignment; however, the northern portion towards Dorstfontein East lies within an ecological corridor. This route has approximately 35% of sensitive flora coverage, as depicted in the map below. Table 10 below is a summary of the specialist findings relating to Conveyor Route A.

Table 10: Summary of Specialist Findings

Specialist	Description
Hydropedology	This option is located in the up-gradient areas of the catchment of the wetlands. Both proposed conveyor belt and service route options traverse wetlands as well as areas regarded essential for wetland recharge, the only difference being the extent in length of conveyor traversing the wetlands. Route A - Traverses HGM 19 and 18, and interflow soils regarded important for wetland recharge. Route A should be considered since the portion traversing the wetlands and wetland recharge soils is shorter than that of Route B.
Wetland	Two Conveyor Routes A and B have been proposed, neither of which are deemed preferred from a wetland perspective. Route A traverses HGM 18 higher up in the catchment, which contains significant seasonal and large permanent wetland zones. These seasonally and permanent wet areas will make the construction of the route demanding and likely result in a considerable impact on HGM 19.
Terrestrial	Sensitive receptors for both routes include:

Specialist	Description
Biodiversity	• Secondary Grassland on a hillslope seep (approximately 800 m); • Primary Grassland, but disturbed (approximately 40 m); • Seepage Slope Grasslands (two sections approx. 290 m); and • Riparian Vegetation (approx. 155 m wetland area). Conveyor Route A is **preferred** over B, although they are both considered to be challenging from a biodiversity perspective.
Heritage	The topography on which this proposed conveyor belts (Route A and B) and service road will transverse is currently under heavy farming. There is no archaeological material expected since the area is disturbed; however, chance finds remain a possibility. Both Conveyor Routes A and B are considered viable.
Socio-economic	From a socio-economic point of view, the significance of positive socio-economic benefits associated with the proposed development exceeds the significance of negative socio-economic impacts. For example, the proposed mine expansion and prolonged life of the mine will result in sustainable jobs at the mine and short term employment opportunities during construction. These include skilled, semi-skilled, and under-skilled labours which could consist of locals (in and around the mining area) as well as regional and national communities. The proposed conveyor belt will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads, i.e., the R547 and R544. There will always be negative socio-economic consequences associated with the project regardless of the efforts by the project proponent to minimise them. The proposed development is in an area characterised by a variety of agricultural activities which include among others maize and soya beans cultivated fields and grazing fields for livestock, i.e. cattle and goats. The proposed conveyor belt and discard dump expansion will impact on these ecological support services. However, these negative impacts are outweighed by the positive impacts. In terms of conveyor belt route selection, Route A traverses the most agricultural cultivated fields and also poses access restrictions for farmers' cattle to the tributary that traverses the site from the west to east. The selection of Route A would mean that the mine has to make provision for the cattle to access the identified waterbodies or drill boreholes and construct wells that would be used for stock consumption, which will increase the investment on the project. Furthermore, the area has low yield and fractured aquifers, which could also impact on other underground water users in terms of water abstraction by the mine.
Air quality	Construction activities, movement of vehicles, levelling and compacting of surfaces, as well

Specialist	Description
	localised drilling will have implications on ambient air quality. The abovementioned activities would result in fugitive dust emissions containing Total Suspended Particulate (TSP giving rise to nuisance impacts as fallout dust). Also, fugitive dust (containing TSP, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts). It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. Conveyor Route B is the preferred option over Route A due to the predominant wind direction and distance from the sensitive receptors. Route A is much closer to communities.
Noise	The proposed developments will take place in the vicinity of existing mining activities (Dorstfontein West and Dorstfontein East) and the R544 and R 547 roads, respectively. The potential environmental noise impact of the proposed overland conveyor will be insignificant and the conveyor system is therefore preferred.
Traffic	This activity is expected to generate construction traffic. Once construction is completed, the operation of the conveyor belt will reduce traffic on the external road network during its operational phase. By comparing the expected operating conditions during the project's construction and operational phases with the baseline, it can be stated that an insignificant traffic impact is expected for both these project phases. Based on the assessment and the impact rating from the traffic specialist report, the intensity of the traffic impact can be described as "minor" for both the project phases (construction and operation).
Visual	The study area is moderately populated, with a higher population in a township settlement across the R547 road, Thubelihle (north-west) of the site, and the town, Kriel, to the south-west. The residents of the settlements and farming communities surrounding the mine may experience a low degree of visual intrusion. The current presence of the mines in the visual field of the residents will reduce the impact experienced; however, the introduction of the conveyor belt will be a new element of visual intrusion. The proposed Route B will have a lower visual impact on residents than Route A. The Visibility Analysis indicates that residents from Thubelihle and Kriel will be more affected by Route A than B. Agricultural communities will be affected by both new routes.
Soil and land Capability	From a soil, land use and land capability perspective, conveyor route A and associated service road is the preferred options since it will likely have minimal disturbance of arable soils in comparison to conveyor route option B.
Climate Change	The project's GHG emissions will contribute to anthropogenic climate change. Climate change is likely to be accelerated and extended as GHG emissions accumulate in the atmosphere. The

Specialist	Description
	magnitude of the impact can however be reduced, notably by reducing the quantity of GHG emissions.

9.1.1.2 Alternative Route B and associated Service Road

Alternative Route B is depicted on the map in red, and it starts at the DCM West mine shaft and proceeds towards the southern side of the discard. Similar to Route A, it crosses the Eskom transmission powerlines as well as the R544 secondary road and bends northward to align with Route A. The alignment crosses an ecological corridor into DCM East. The corridor is approximately 7.5km.

The southern section of Alternative Route B lies mainly within a Critical Biodiversity Area, while the northern section of both the routes lies within an ecological corridor. This route has approximately 50% of sensitive flora coverage, as depicted in the map below — further soils of high agricultural potential cover 90% of the site.

The Table 11 below shows a summary of the specialist findings relating to Conveyer Belt and Service Road Option B. This route also runs in the south-east of the R547 but is more than 1km from the R547, also crosses over the R544 and then joins the same alignment as Route A towards the DCM East Mine.

Table 11: Summary of Specialist Findings

Specialist	Description
Hydropedology	Route B traverses two hillslope seeps and valley bottom twice, and this is regarded to have the highest impact from the hydropedological point of view since valley bottom soils are highly susceptible to compaction than soils at the crest and mid slopes. Compaction may potentially affect the subsurface flow, particularly at the A/B soil interface and subsequently affecting the hydropedological driver component. Further, Route B is in the valley bottom areas and traverses HGM 2, 13, 16, and 23; as such, it is least preferred from a hydropedology point of view.
Wetland	Route B traverses the valley-bottom wetland (HGM 2) with high Hydrological and Functional Importance twice, diagonally for more than a kilometer in total, which would likely result in significant negative long-term impacts. Crossing the wetlands diagonally is also not desired, as such linear development typically results in unnatural and concentrated flow paths, which increases the risk of erosion and structure failure.
Terrestrial Biodiversity	Sensitive receptors for this route include: • Floodplain Grassland, species of conservation concern (four sections approx. 830 m); • Riparian Vegetation along the channelled valley bottom wetland, species of

Specialist	Description
	conservation concern (two sections approx. 270 m); • Secondary Grassland on a hillslope seep (two sections approx. 1412 m); and • Primary Grassland (approx. 275 m).
Heritage	This alternative also traverses on active farms, and there is no chance that any material can be found in this area. Both routes are viable.
Socio-economic	Conveyor Route B is the preferred route as it will have less impacts on agricultural-cultivated fields (it traverses the least agricultural-cultivated fields as compared to Route A). This route will not pose access restrictions for local farmer's cattle to the tributary that traverses the site from west to east, as is the case with Route A for the conveyor belt.
Air quality	The air quality impact assessment undertaken for the project includes a meteorological overview of the area. Nonetheless, activities of vehicles on access roads, levelling and compacting of surfaces, as well as localised drilling will have implications on ambient air quality. The above- mentioned activities would result in fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust). Also, fugitive dust [containing TSP, as well as PM_{10} and $PM_{2.5}$ (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts)]. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. Route B is the preferred option due to the predominant wind direction and distance from the sensitive receptors.
Noise	The proposed developments will take place within the vicinity of existing mining activities (DCM West and DCM East) and the R544 and R 547 roads, respectively. The potential environmental noise impact of the proposed discard facility extension will be insignificant, and the conveyor system is the preferred option.
Traffic	The construction phase of the proposed development is expected to generate construction traffic. Once construction is completed, this conveyor belt is not expected to generate traffic on the external road network during its operational phase. The impact will be similar for both alternatives. By comparing the expected operating conditions during the project's construction and operational phases with the baseline, it can be stated that an insignificant traffic impact is expected for both these project phases. Based on the assessment and the impact rating from the traffic specialist report, the intensity of the traffic impact can be described as "minor" for both the project phases (construction and operation).
Visual	Route B is regarded as the most preferred conveyor belt alternative. Its alignment follows along a line that is further away from the main transportation route, the R547. The Visual

Specialist	Description
	Absorption Capacity of Route B is significantly higher than Route A, which would be more visible from the road. The Visible Analysis for Route B indicates that this route will be less visible to residents of nearby Thubelihle and Kriel.
Soil and land Capability	Both conveyor belt routes (although Conveyor Route A has a higher impact) are located within soils suitable for crop production. These soils are considered to contribute to the provincial and national agricultural production systems, and it is anticipated that they will be permanently destroyed as a result of the proposed activities. From a soil, land use and land capability perspective, Conveyor Route A and associated service road are the preferred options since it will likely have a minimal disturbance of arable soils in comparison to Conveyor Route option B. However, movement of farm equipment will also be affected by the conveyor belt, as it will create a barrier in accessing agricultural.
Climate Change	The project's GHG emissions will contribute to anthropogenic climate change. Climate change is likely to be accelerated and extended as GHG emissions accumulate in the atmosphere. The magnitude of the impact can however be reduced, notably by reducing the quantity of GHG emissions.

9.1.2 DISCARD DUMP FACILITY EXPANSION

This section provides detailed information about the expansion of the existing discard dump and no-go alternatives which are discussed as follows:

Figure 6 below presents the location of the discard dump extension through coordinates, while Table 12 is a summary of the specialist findings relating to the discard dump extension. The extension of the existing discard dump will cut into a hillslope seepage area directly above a valley-bottom wetland and associated habitats, and it will also extend into a section of highly sensitive primary vegetation with a known population of a species (of which the exact identification still needs to be confirmed).

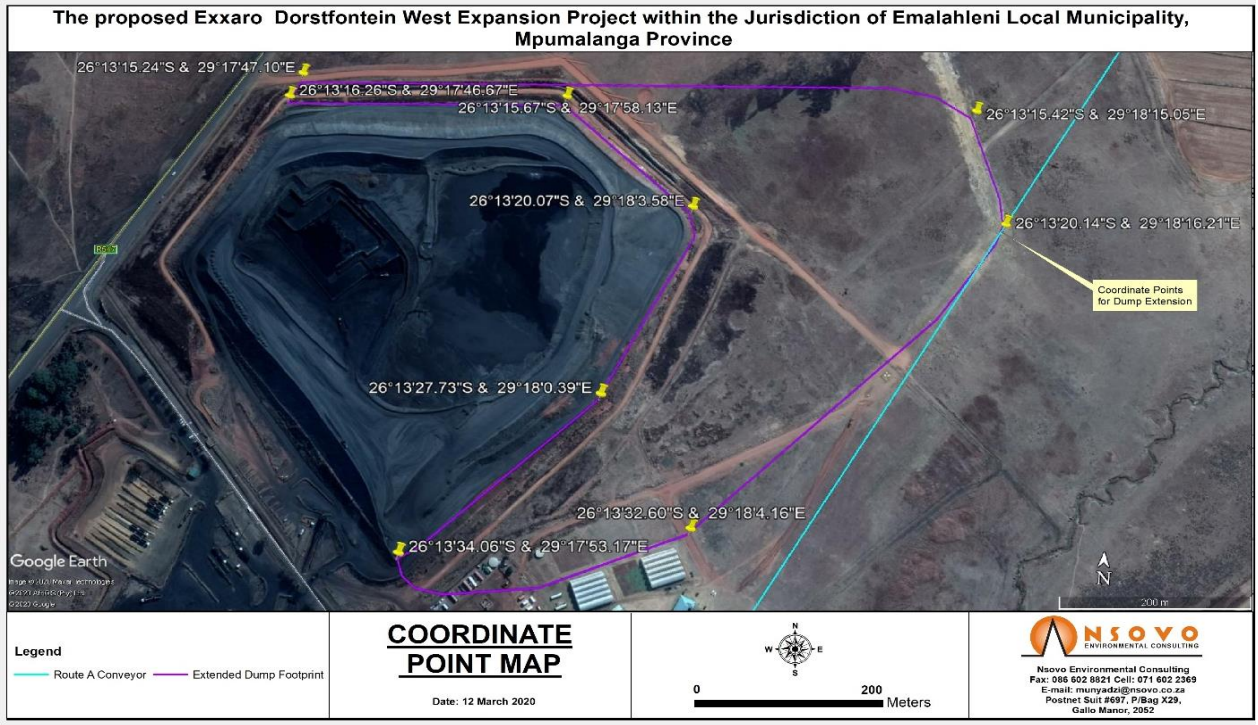


Figure 6: Map showing discard dump extension coordinates points

Table 12: Summary of the Specialist Findings

Specialist input	Expansion of discard dump
Hydropedology	Although the expansion of the existing discard dump will impact a larger footprint of the wetland, impacts resulting from the existing discard dump are already directly or indirectly affecting wetlands (Valley bottom 2 and hillslope seep 19). Given the impact assessment, impacts arising from the expansion would be relatively lower compared to the options dismissed during the Scoping.
Wetland	Thirty-eight (38) separate hydro-geomorphic units (HGM), comprising four HGM types, namely unchannelled valley bottom wetlands, channelled valley bottom wetlands hillslope seepage wetlands connected to a watercourse and depressions (pans), were delineated and classified within the study area and 500m surrounding the study area. Most of the wetlands likely to be impacted were regarded as largely degraded; however, it is especially the recharge and interflow soils, and associated hydropedological flow paths that could likely interact with the discard dumps that are of concern. These interacting hydropedological flow paths associated with the local hill slopes will likely mobilise sulphites, pirites, and various metals from the discard facility and be transported to the valley-bottom wetlands via hillslope seepage processes. The extension of a discard facility will cause a reduction of recharge areas and or impact significantly on interflow soils and or

Specialist input	Expansion of discard dump
	destroy responsive soils within effected wetland areas themselves, which would result in significant changes to the hydrological regime of the local hillslope hydropedology.
Heritage	No obvious heritage features were identified within the immediate footprint of the discard dump; however, the necessary measures must be followed in the event of chance finds during construction.
Air quality	The movement of vehicles on access roads, levelling and compacting of surfaces, as well as localised drilling and blasting, will have implications on ambient air quality. The above-mentioned activities will result in fugitive dust emissions containing Total Suspended Particulate (TSP), giving rise to nuisance impacts as fallout dust. Also, fugitive dust containing TSP, as well as PM_{10} and $PM_{2.5}$ (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts). It is expected that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions.
Noise	The proposed activities will take place in the vicinity of the existing mining activities (Dorstfontein West and Dorstfontein East) as well as the R544 and R547 roads. The potential environmental noise impact of the proposed Discard Dump Expansion and overland conveyor road will be insignificant.
Traffic	The proposed activity will not generate traffic on the external road network. The implementation of this facility is also expected to generate construction traffic. By comparing the expected operating conditions during the project's construction and operational phases with the baseline, it can be stated that an insignificant traffic impact is expected for both these project phases.
Visual	The extension of the existing dump will have the least visual impact on viewers within the surrounding areas.
Soil and land capability	From a soil and land capability perspective, the proposed expansion of the existing discard dump will impact soil of high cultivation agricultural value as well as disturbed wetland soils that are not regarded as important for cultivation. Soils that are considered suitable for cultivated agriculture cover a substantial portion of the study area. However, sufficient land for viable for commercial agricultural production will still be available. Therefore, the impact of the proposed activities considered high, as the proposed expansion activities will permanently destroy the soils unless stripping and stockpiling of topsoil is carefully planned and undertaken. Therefore, it is highly recommended that stripping and stockpiling guidelines are strictly applied, as these soils are likely to lose their natural physical and

Specialist input	Expansion of discard dump
	chemical properties if not properly managed.
Hydrology	The catchment characteristics of the DCM West sub-catchment will be altered by the proposed extension/construction of a new discard dump. The discard dump has been classified as "dirty" in terms of the DWA Best Practice Guideline (BGP). Every effort must be made to separate clean and dirty areas by containing runoff from "dirty" areas. Surface water runoff from the discard dump area should be collected and contained to ensure the following objectives are met: • Minimisation of contaminated areas and reuse of dirty water (where possible); • Minimisation of seepage from the discard facility; and • Prevention of overflows and minimization of seepage losses from storage facilities (pollution control dams) Prevention of further deterioration of water quality. Contaminated surface water emanating from the discard dump would be captured as close as possible. The return water dam would also cause an increase in hydrologically ineffective areas. Consequently, the calculated flood peak flow values and MAR would decrease. Further, the Mean Annual Runoff (MAR) of the sub-catchments that the proposed discard dump would affect would be significantly distorted as a result of the discard dump.
Biodiversity	The impacts associated with the discard dump extension include loss of indigenous vegetation (loss of portions of remaining primary vegetation of a Vulnerable Ecosystem), removal of Exotic Vegetation Cover, loss of available faunal habits, and associated resources and increase in alien invasive vegetation. The expansion of the existing discard dump will cut into a hillslope seepage area directly above a valley-bottom wetland and associated habitats, while it will also extend into a section of highly sensitive primary vegetation with a known population of a Disa species (of which the exact identification still needs to be confirmed).
Climate change	The project's GHG emissions will contribute to anthropogenic climate change. Climate change is likely to be accelerated and extended as GHG emissions accumulate in the atmosphere. Potential climate risks identified, based on the climate threat, include increased temperature, reduced rainfall, extreme events, and wind impacts and will have a direct and indirect impact on DCM West's current operations and expansion project.

Specialist input	Expansion of discard dump
	Potential climate risks that have been assessed as highly significant include water scarcity and drought that can constrain exploration, processing and site rehabilitation; floods, cyclones and storms that may cause damage to infrastructure and facilities and floods, cyclones, and storms that may cause reduced accessibility due to flooding of roads.
Socio-economic	Conveyor Route B is the preferred route as it will have less impacts on agricultural-cultivated fields (it traverse the least agricultural-cultivated fields as compared to Route A). This route will not pose access restrictions for local farmer's cattle to the tributary that traverses the site from west to east, as is the case with Route A for the conveyor belt.

9.1.2.1 No-go alternative

In terms of GN R.326 of the NEMA, consideration must be given to the option not to act, in which an alternative is usually considered when the proposed development is envisaged to have significant adverse environmental impacts that mitigation measures cannot ameliorate effectively. There would be no economic benefits, i.e., extended employment for local communities. Should the no-go option be adopted, the proposed mine expansion shall not materialise. As such, the life of the mine shall not be prolonged, and this would result in the loss of sustainable jobs at the mine and reduce employment opportunities over the medium and long term. Based on the information provided in the Mining Works Programme, the proposed project will undoubtedly require both skilled and unskilled labour which is expected to yield positive spinoffs for the locals, the province, and the country at large. However, this could be hindered if the no-go option is adopted. The mine is already a socioeconomic anchor within the immediate communities and more so for the country.

The proposed project's planned infrastructure, excluding the actual mine investment, will further stimulate the local economy, given that total expenditure of R120 000 000.00 is budgeted for the proposed project's infrastructure. Should the no-go option be adopted, this considerable investment will be forfeited, which will negatively affect the local economy as well as the Emalahleni's Gross Geographic Production (GGP). Furthermore, the provision of coal products to existing power stations to secure South Africa's power supply would not be met; should this be the option to Eskom in the future. Also, the no-go alternative would result in lost foreign revenues from the planned export coal product.

9.2 DETAILS OF THE PUBLIC PARTICIPATION PROCESS UNDERTAKEN IN TERMS OF REGULATION 41 OF THE REGULATIONS

The NEMA EIA Regulations require that during the EIA process, the Organs of State, together with Interested and Affected Parties (I&APs), be informed of the application and allowed to comment on the application.

Public Participation Process (PPP) is any process that involves the public in problem-solving and decision-making; it forms an integral part of the EIA process. The PPP provides I&APs with an opportunity to provide comments and raise issues of concern or to make suggestions that may result in enhanced benefits for the project.

The primary purpose of the PPP report is as follows:

- To outline the PPP that was undertaken;
- To synthesise the comments and issues raised by the key stakeholders, I&APs; and
- To ensure that the EIA process fully address the issues and concerns raised.

Chapter 6, Regulation 39 through 44, of the 2014 EIA Regulations stipulates how the PPP should be conducted as well as the minimum requirements for a compliant process. These requirements include but not limited to:
Fixing a notice board at or on the fence of-

(i) The site where the activity to which the application relates is or is to be undertaken; and
(ii) A place conspicuous to the public at the boundary of the site.

- Giving written notice to-
- The occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
- The landowners, occupiers or persons in control of the land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
- The municipal councillor of the ward in which the site and alternative site is situated and any organisation of rate payers that represent the community in the area;
- The municipality which has jurisdiction in the area;
- Any organ of state having jurisdiction in respect of any aspect of the activity; and
- Any other party as required by the competent authority.

Placing an advertisement in-

- One of the local Newspaper within or around the proposed site.

9.2.1 PUBLIC PARTICIPATION PRINCIPLES

The principle of Public Participation holds that those who are affected by a decision have the right to be involved in the decision-making process (i.e., the public's contribution will influence the decision). One of the primary objectives

of conducting the PPP is to provide Interested and Affected Parties (I&AP) with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants.
- Seek to facilitate the involvement of those potentially affected.
- Involves participants in defining how they participate.
- Is as inclusive and transparent as possible, it must be conducted in line with the requirements of Regulation 39 through 44 of the EIA Regulations as amended.

9.2.2 APPROACH AND METHODOLOGY

The public participation approach adopted in this process is in line with the process contemplated in Regulation 39 through 44 of the EIA Regulations as amended, in terms of NEMA, which provides that I&APs must be notified about the proposed project.

9.2.2.1 Pre-application Consultation

Pre-application meetings were undertaken with the competent authorities responsible for the authorising the project as follows:

- Department of Mineral Resources and Energy – the meeting was conducted on the 17th of January, 13th of September and 30th of October 2019 and minutes of the meetings are attached as **Appendix D7-1**.
- Department of Human Settlement Water and Sanitation - a site visit was undertaken on the 23rd January 2020 and the minutes are attached as **Appendix D7-2**. Other meetings were held to advice on the Water Use Licence Application which is underway.

9.2.2.2 Identification of Interested and Affected Parties

Interested and Affected Parties (I&APs) identified include pre-identified stakeholders (government department), landowners and the general public. Notification and request for comments will be submitted to the following key stakeholders:

- Mpumalanga Department of Agriculture and Rural Development and Land Administration
- Mpumalanga Department of Human Settlement Water and Sanitation;
- Mpumalanga Department of Transport and Public Works;
- Mpumalanga Heritage Resources Agency;
- South African Heritage Resource Agency;
- Mpumalanga Department of Tourism and Parks Agency;
- Wildlife and Environmental Society of South Africa;

- Emalahleni Local Municipality;
- Eskom SOC Limited – Transmission; and
- Nkangala District Municipality.

The notifications together with Background Information Documents (BID) were sent to stakeholders by registered mail. Proof of registered mail is attached as **Appendices D3 and D6,** respectively.

9.2.2.3 Public participation database

In accordance with the requirements of the EIA Regulations under Section 24 (5) of NEMA, Regulation 42 of GN R. 326 (as amended), a register of I&APs must be kept by the Public Participation Practitioner. In fulfilment of this requirement, such a register has been compiled, and details of I&APs including, their comments are being updated throughout the project cycle. The database is attached as **Appendix D5.**

9.2.2.4 Site notices

During the Scoping phase, A2 size notices were fixed at different conspicuous locations within and around the proposed project study area on the 23rd, 24th ,and 28th May 2019 in Thubelihle, Kriel, DCM West Mine entrance, and Kriel Library. Photographic evidence of the site notices is attached as **Appendix D1.**

9.2.2.5 Distribution of notices to surrounding landowners / occupiers

Notification letters were posted via registered mail to stakeholders on the 31st May 2019 (Refer to **Appendix D3** for proof of postage), while site notices in English and isiZulu were hand-delivered to landowners/occupiers on the 23rd, 24th and 28th May 2019. These notifications were informing stakeholders and the public of the project as well as allowing them an opportunity to register as I&AP and also to comment or raise any issues pertaining to the proposed project.

9.2.2.6 Placement of an advertisement in the local newspaper

An advertisement was placed on The Ridge and Witbank newspapers on Tuesday the 28th and 31st May 2019, respectively. The advertisement was aimed at further informing the I&APs of the proposed activity. A 30-day period was allowed for the public to register as I&APs, submit their comments, issues and concerns. The proof of newspaper advertisement is attached as **Appendix D2.**

9.2.2.7 Placement of the reports for review comments

The Draft Scoping Reports were placed for review and comment at Kriel Public library and Exxaro Dorstfontein West Coal Mine on the 05th of August 2019 for 30 days.

The Draft EIA Reports will also be placed at the Dorstfontein West Coal Mine and Kriel community library for review and comment for 30 days, i.e., from 29th of July 2020 to the 01st of September 2020. In line with the COVID-19 Regulations published on 5th June 2020 and in an effort to encourage people to stay at home, the reports will be made available on the Nsovo website www.nsovo.co.za and a link can be sent to respective I&Aps on request.

9.2.2.8 Public Meetings

As part of the public participation process, public and focus group meetings were conducted accordingly during the Scoping phase as shown in Table 13 below. However, in line with the requirements of the COVID-19 Regulations, the public engagement will take a different approach. It is proposed that in the interest of the health and safety of our communities, all engagements including meetings be virtual. Therefore when necessary zoom meetings will be scheduled accordingly. The schedule will be placed at conspicuous places and advertised on the local paper.

Table 13: Public meetings conducted during the Scoping Phase

Meeting	Venue	Date	Time
Public meeting	Kriel Public Library	20th August 2019	10:00am – 12:00pm
	Vlakfontein – Impilo Primary School		14:00pm – 1600pm
	Mbonani Primary School	21st August 2019	14:00pm – 1600pm
Focus group meeting with farmers	Dorstfontein Coal Mine		10:00am – 12:00pm
	Kobus Pieterse Farm	02nd September 2019	12:00pm - 12:30pm
	Gerhard de Wet Farm		13:30pm – 14:30pm

9.3 A SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES AND AN INDICATION OF THE MANNER IN WHICH THE ISSUES WERE INCORPORATED OR THE REASONS FOR NOT INCLUDING THEM

The main issues raised as part of the PPP are detailed below, while other comments, issues, and concerns raised together with the responses provided by the Environmental Assessment Practitioner (EAP) will be presented as **Appendix D4**.

9.3.1 JOB OPPORTUNITIES

One of the primary reasons for the proposed expansion is to increase the current life of mine to sustain jobs; thus, sustaining the livelihoods of the locals. As highlighted in the motivation for as long as the mine operates, they have a mandate to empower and uplift the communities within which they operate either through job opportunities, training, Community Social Investments, etc. and thus far, the mine has fulfilled this mandate.

In terms of job opportunities as a direct result of the proposed expansion, more jobs will be sustained, while few are created during both the construction and operational phases. However, it must be noted that there are other indirect opportunities created as a result of the proposed project at a regional and national level.

9.3.2 SUBSIDENCE AND GROUNDWATER IMPACTS AS A RESULT OF PILLAR EXTRACTION

The Scoping Report indicated that subsidence is a highly likely impact that will occur as a result of pillar extraction mining. As raised by the landowners this impact will have a direct impact on their livelihoods and will also pose considerable discomfort. The landowners have raised property value as a major issue and indicated their willingness to sell their properties should this take place. They were also concerned about the timing of pillar extraction and when this is expected to take place.

In response, the applicant committed to resolving the land issues with the landowners before the commencement of the pillar extraction activities. They further indicated that it is still very early in the process as pillar extraction will not be taking place in the next five years. With specific regard to the impact of pillar extraction on groundwater, a detailed Geohydrological study has been undertaken and the potential impacts identified, and associated measures recommended. The report indicated that the aquifer within the weathered zone is generally low-yielding (range 100 – 2000 l/h) because of its insignificant thickness. Few farmers, therefore, tap this aquifer by boreholes. Wells or trenches dug into the upper aquifer are often sufficient to secure a constant water supply of excellent quality. Further investigation regarding the impact of pillar extraction on groundwater availability during and post mine is underway and land issues related issues still need attention. Subsequently, the proposal to undertake pillar extraction as indicated in the Scoping Report is withdrawn from this application. As part of this project, the pillar extraction proposal is therefore withdrawn.

9.4 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES FOCUSING ON THE GEOGRAPHICAL, PHYSICAL, BIOLOGICAL, SOCIAL, HERITAGE AND CULTURAL ASPECTS

This section outlines parts of the socio-economic and biophysical environment that could be affected by the proposed development. Using the project description, and knowledge of the existing environment, potential interactions between the project and the environment are identified below. The potential effects of the project on the human environment, socio-economic conditions, physical and cultural resources are included.

9.4.1 SOCIO-ECONOMIC DESCRIPTION

This section presents the socio-economic aspects focusing on the Province and Municipalities within which the proposed study area is located.

9.4.1.1 Provincial Description of the Proposed Project

Mpumalanga Province is located in the north-eastern part of South Africa. The province borders two of South Africa's neighbouring countries viz. Mozambique and Swaziland; and other South African provinces, namely; Gauteng, Limpopo, KwaZulu-Natal, and Free State Provinces (Figure 7 below). Mpumalanga is characterised by the high plateau grasslands of the Middleveld, which rolls eastwards for hundreds of kilometres. In the north-east, it rises towards mountain peaks and terminates in an immense escarpment (www.municipalities.co.za).

Mpumalanga province covers an area of 76 495km² and has a population of approximately 4 335 965 (IDP, 2017). The capital city of Mpumalanga is Mbombela (previously Nelspruit), and other major cities and towns include Emalahleni (previously Witbank), Standerton, eMkhondo (previously Piet Retief), Malelane, Ermelo, Barberton, and Sabie. The province is divided into three district municipalities, namely, Gert Sibande, Ehlanzeni, and Nkangala Districts. These three districts are further subdivided into 17 Local Municipalities, of which the proposed development falls within the Emalahleni Local Municipality of the Nkangala District Municipality.

Mpumalanga is rich in coal reserves and home to South Africa's major coal-fired power stations with Emalahleni, the biggest coal producer in Africa, and also the site of the country's second oil-from-coal plant after Sasolburg (www.municipalities.co.za). Further, the best-performing sectors in the province include mining, manufacturing, and services.

Figure 7: Map of South Africa showing the provinces (Source: www.odm.org.za).

9.4.1.2 District Municipality within which the study area is located

The proposed development will be undertaken within the Nkangala District Municipality, which is a Category C municipality in the Mpumalanga Province with a total area comprises of six local municipalities (Figure 8), i.e., Victor Khanye, Emalahleni, Steve Tshwete, Emakhazeni, Thembisile Hani, and Dr. JS Moroka (www.municipalities.co.za). The District's headquarters are in Middelburg. Nkangala District is at the economic hub of Mpumalanga and is rich in minerals and natural resources. A strength of the District is the Maputo Corridor, which brings increased potential for economic growth and tourism development. The proximity to Gauteng opens opportunities to a larger market, which is of benefit to the district's agricultural and manufacturing sectors. The main economic sectors within the District include mining, manufacturing, energy, and agriculture.

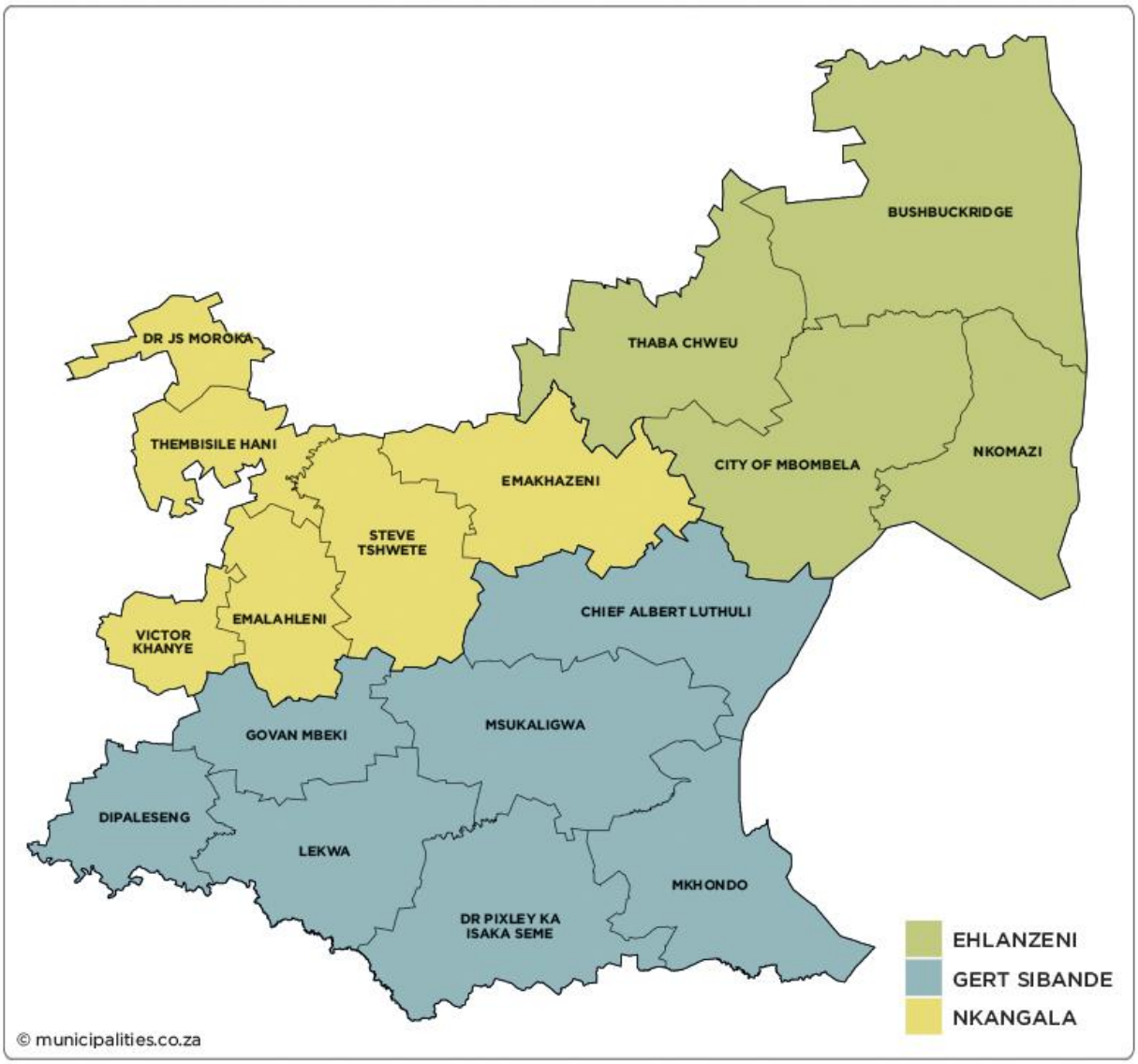


Figure 8: Photograph shows the map of District Municipalities in Mpumalanga

9.4.1.3 Local Municipality within which the proposed study area is located

The proposed development is located within the Emalahleni Local Municipality, which is a Category B municipality with a total area of 2 678km², within the Nkangala District Municipality. The Emalahleni Municipality forms part of the western regions of the province and borders onto the Gauteng Province. Thembisile Hani and Victor Khanye, and City of Tshwane Metro in Gauteng border the municipality to the north and west. It is situated close to the City of Ekurhuleni, City of Johannesburg and City of Tshwane Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways. The southern areas of the Emalahleni Municipality form part of the region referred to as the Energy Mecca of South Africa, due to its rich deposits of coal reserves and power stations. Emalahleni and Middelburg (situated in the adjacent Steve Tshwete Municipality) are the highest order settlements in the Nkangala District. These towns offer the full spectrum of business and social activities, and both towns have large industrial areas. The towns fulfil the function of service centres to the smaller towns and settlements, as well as farms in the district. The main economic sectors include mining, power generation, steel, vanadium, and chrome.

9.4.2 CLIMATIC CONDITION OF THE PROPOSED AREA

The study area is in the Highveld climatic region of South Africa, which is a summer rainfall area. Temperature classifications for the region are hot in summer and mild to warm in winter, with significant diurnal fluctuations. Climate Data was obtained from the South African Weather Service (SAWS) and databases of WR2005.

The local climate can be described as semi-arid high-veld conditions, with warm summers and moderate dry winters. Average daily summer temperatures of approximately 27°C are experienced, while peak temperatures of up to 36°C do occur. Average daily winter temperatures are approximately 4°C, with minimum temperatures reaching around -4°C. The annual average maximum temperature varies between 22ºC and 34ºC at Middelburg and Emalahleni. Minimum temperatures fluctuate between -3ºC and 15ºC, as depicted in the graph below. The number of days when heavy frost occurs is, however, limited, and freezing of wet soils, frost heave, and permafrost does not occur (SAWS, 2017).

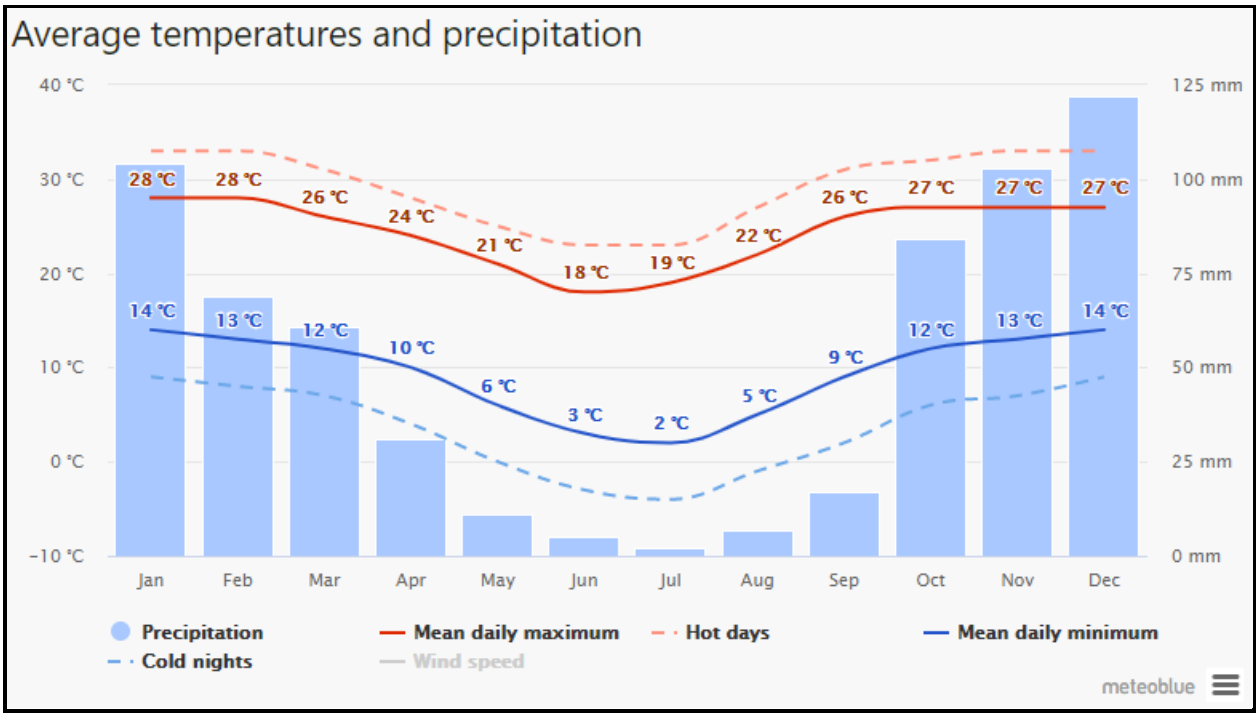


Figure 9: Ga-Nala (Kriel) Average Temperature and Precipitation for the Period 1989 – 2019 (Climate Change, 2020).

Relative humidity ranges from a minimum of 34% to a maximum of 94%, with dry atmospheric conditions dominating. The average annual rainfall of 700 mm is considerably less than the average annual A-pan evaporation of 1 600 mm. This results in the project area experiencing a negative water balance in relation to rainfall and evaporation. Evaporation, off open surfaces of water (lake evaporation), though less than A-pan values, will be significant (calculated at 1500 mm per annum), and plant-life in local natural grasslands will be dormant for long periods during the year.

Rainfall occurs predominantly in summer and autumn, while the least amount of rain falls in the months of winter and spring. Summer temperatures are typically warmer, resulting in convection, with water vapour, evaporation, and condensation completing the atmospheric water cycle processes. Precipitation in the form of showers and thundershowers are the products of condensation of atmospheric water vapour. Annual average rainfall varies from 680 mm at Middelburg to 378 mm at Emalahleni. Figure 10 below illustrates the average monthly rainfall for the Period 1989 – 2019 within the study area.

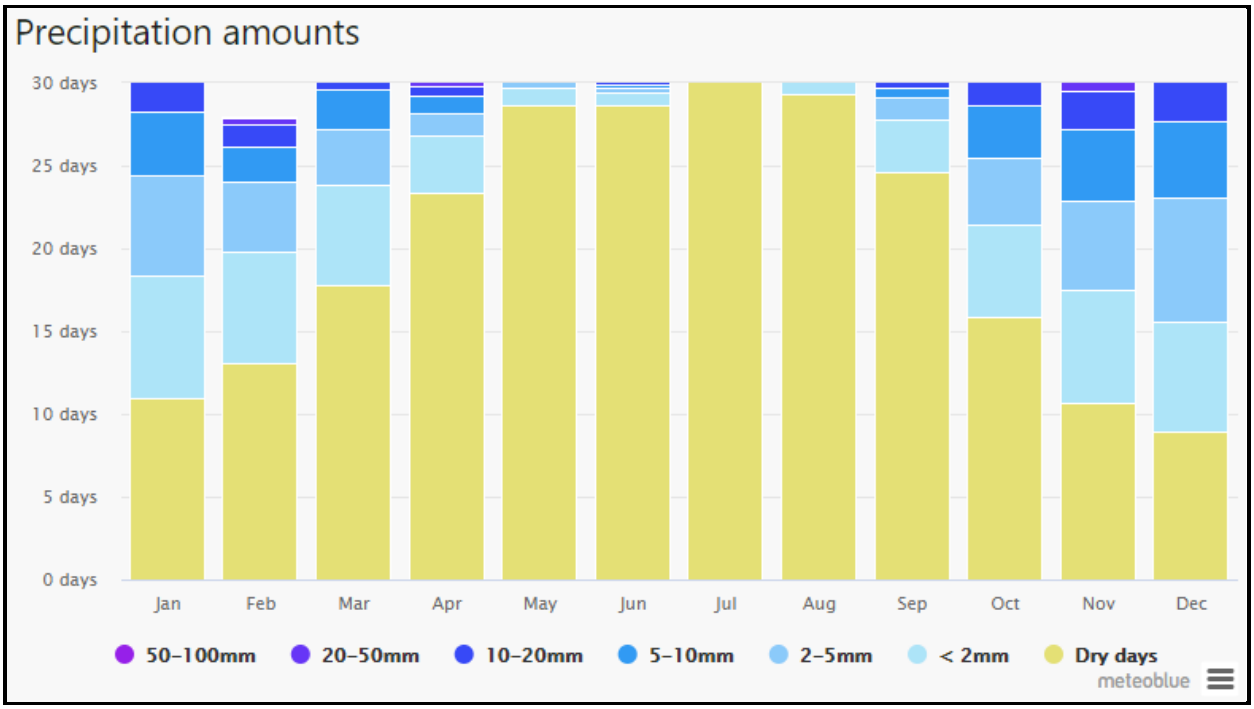


Figure 10: Ga-Nala (Kriel) Average Monthly Rainfall for the Period 1989 – 2019

The graphs above depict historic climate figures, however, the climate change study highlighted that Mpumalanga might plausibly experience a climate future that is significantly hotter and drier compared to the present-day climate. Under low mitigation, temperature increases as large as 2 °C by 2035 may occur, with associated drastic decreases in rainfall. Such a climate regime will also be associated with an increase in the frequency of occurrence of heat-wave days and high fire danger days.

Furthermore, based on the above narrative, a warmer future with increased rainfall can be expected. The main difference in this scenario is that rainfall totals increase under climate change, rather than to decrease. Such an increase may imply the more frequent occurrence of land-falling tropical lows over the Lowveld regions, with potentially significant impacts on tourism and infrastructure. Under such a scenario drought will not be such a major problem, but the increased occurrence of pests and pathogens may well pose an alternative set of challenges.

9.4.3 CLIMATE CHANGE

The scientific opinion suggests that the continued emission due to human activities of greenhouse gases, principally carbon dioxide and methane, may bring about significant and long-term changes to the functioning of the earth's atmosphere. Of great uncertainty still are the possible impacts and damage attributable to such climate change, although indications are that their scale could be significant. According to the White Paper on Energy, South Africa is responsible for 1,6% of global greenhouse gas emissions and the country's energy sector is the single largest source

of greenhouse gas emissions in Africa, being dependent on coal for more than 75% of the country's primary energy needs during 1997. This level of emissions is also mainly as a result of the high level of coal use by the electricity generation and synthetic fuels industries, and the high level of industrialisation producing high energy content products. To fulfill the national energy policy of making clean, affordable, and appropriate energy available to all sectors of the population, a balanced least-cost mix of energy supply is promoted. Coal will, therefore, dominate other energy sources in South Africa for many years to come. Although the country is faced with obligations to reduce its greenhouse gas emissions, international governance of this problem is an evolving area.

The Air Quality Specialist report highlighted that coal mining releases methane, a potent greenhouse gas. Methane is the naturally occurring product of the decay of organic matter as coal deposits are formed with increasing depths of burial, rising temperatures, and increasing pressure over geological time. A portion of the methane produced is absorbed by the coal and later released from the coal seam (and surrounding disturbed strata) during the mining process. Methane accounts for 10.55% of greenhouse gas emissions created through human activity. According to the Intergovernmental Panel on Climate Change, methane has a global warming potential 21 times greater than that of carbon dioxide over a 100-year timeline.

Further, the process of mining can release pockets of methane, and these gases may pose a threat to coal miners, as well as being a source of air pollution. This is due to the relaxation of pressure and fracturing of the strata during mining activity, which gives rise to safety concerns for the coal miners if not managed properly. The build-up of pressure in the strata can lead to explosions during (or after) the mining process if prevention methods, such as "methane draining," are not taken.

Climate change is unlikely to have a major direct impact on the mining industry, for which regulations and management strategies are already in place to manage factors such as water usage, water conservation, and demand strategies, and environmental issues relating to rehabilitation and the provision of rehabilitation guarantees. While a lack of access to water may affect some mining projects, most mining processes do not generally require potable water. Where high-quality water is required, some mines are already installing water treatment units.

According to the hydropedology specialist, although the effects of climate change dynamics were noted, it is acknowledged that the proposed activities and associated impacts might exacerbate the anticipated reduction in water inputs and the resultant hydrological function of the remaining wetlands beyond the extent of the proposed mining project.

9.4.4 GEOLOGY WITHIN THE STUDY AREA

The project area is situated on the Witbank coalfield, which forms part of the Karoo basin extensively covering the central regions of South Africa. The Karoo Super Group overlies the basement rocks within the Karoo Basin. The basement of the Karoo Super Group is the Dwyka tillites that are regularly deposited over the basin except for paleo-topographical highs. The Dwyka tillites are overlain by the Vryheid formation, which includes the coal seams. The Vryheid formation consists of various sequences of sandstones, shales, and siltstones with the various coal seams located within them. In terms of the area's structural geology, during the Jurassic period, a large number of dolerite dykes and sills intruded into the Karoo formation, acting as important geological structures diverting and impending groundwater movements (DWA, 2009). A dolerite intrusion is indicated in the south of the mining area (1:250,000 Geological map for the study area (2628 Eastrand; Department of Mines – Geological Survey). Further, there are porhyritic rhyolite intrusions with interbedded mudstone and siltstone in the northeastern and eastern sections of the study area. Refer to Figure 11 below for a geological map of the study area.

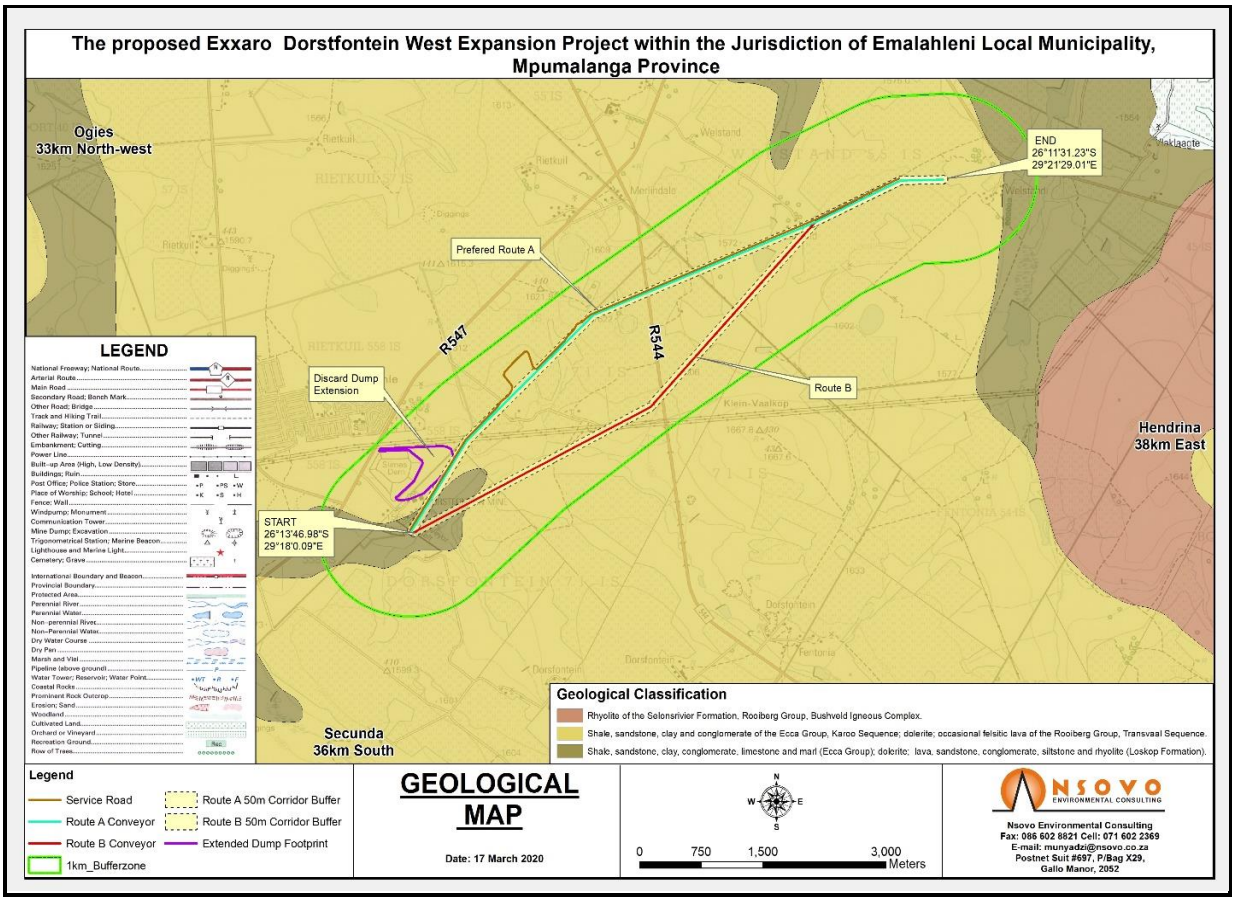


Figure 11: Geological map of the study area

Further details highlighted in the hydrogeological report by GCS (2019) indicate that the structural nature of the coal seam and the overburden formation has resulted in sub- outcropping occurring in the western portions of the farm

Dorstfontein. The seams targeted at DCM West are the No. 2 and No. 4. The No. 4 Seam is divided into an Upper and Lower Seam. Both seams are widely developed, but it is the No. 4 Lower Seam that is the prime economic target of this coalfield. Dolerite sills and dykes are also common in the Witbank field. Granite outcrops close to the box cut. The No. 2 coal seam occurs at about 20 – 30m below the No. 4 coal seam and is also laterally continuous. The thickness of the No. 2 seam varies between approximately 1m and 3m. Locally the No. 2 coals seam is divided into an upper and lower seam with a parting thickness of up to 0.7m, based on available data.

From available information, the No. 4 Lower Seam is laterally continuous and is economically the most important of the No. 4 Seam. The No. 4 Lower Seam varies from 1.4m to 5.5m in thickness where it is laterally continuous, but locally in the west and north-east, it may be up to 8m thick. It consists mainly of dull coal. The average thickness of the No. 4 Lower Seam is 4m. Shale intercalations are common in the upper part of the seam, which consists mainly of dull coal (Snyman, 1998).

The floor elevations of the No. 4 Coal Seam do not indicate any general dipping trend. The coal seam is undulating with anticline elevation at approximately 1590 mamsl and syncline altitude at around 1510 mamsl. However, the coal seam in the area of the western expansion project shows a specific dipping trend of angle about 0.5 in a south-westerly direction. The sulfur level in coal varies between 0.8% and 1.4%, with an average of just above 1%. Generally, the sulfur particles are microscopic (approximately 50 microns). About 50% of the sulfur is pyretic, and 50% is organic, which results in a reduction in the sulfur content after beneficiation has taken place.

9.4.5 TOPOGRAPHY OF THE STUDY AREA

The catchment consists of moderately hilly to flat areas. The DCM West is bordered by a small stream in the south, flowing in a westerly direction, away from the mine. Rainfall that infiltrates the weathered rock soon reaches an impermeable layer of shale underlying the weathered zone. The movement of groundwater on top of this shale is lateral and in the direction of the surface slope. This water reappears on the surface at fountains where a barrier, such as a dolerite dyke, paleo-topographic highs in the bedrock, obstructs the flow paths or where the surface topography cuts into the groundwater level at streams. It is suggested that less than 60% of the water recharged to the weathered zone eventually emanates in streams. The Geohydrological report by GCS highlighted that a linear correlation was observed between groundwater levels and surface topography elevations. A good correlation of groundwater levels in the Dorstfontein area was found (R2 = 85%), and the correlation of groundwater levels versus surface topography is good and suggests that the groundwater levels for the area generally follow topography.

9.4.6 HYDROLOGY

The study area is situated in Quaternary catchments B11B, B11C, and B11D in the Upper Olifants Water Management Area (WMA), which is situated in the north-eastern part of South Africa, in the Mpumalanga Province.

The Olifants River originates east of the mine flows in a northerly direction. The Steenkoolspruit is located south and west of the mine. These two rivers converge north of the mine, from which point the river is called the Olifants River. Refer to Figure 12 for the hydrological map.

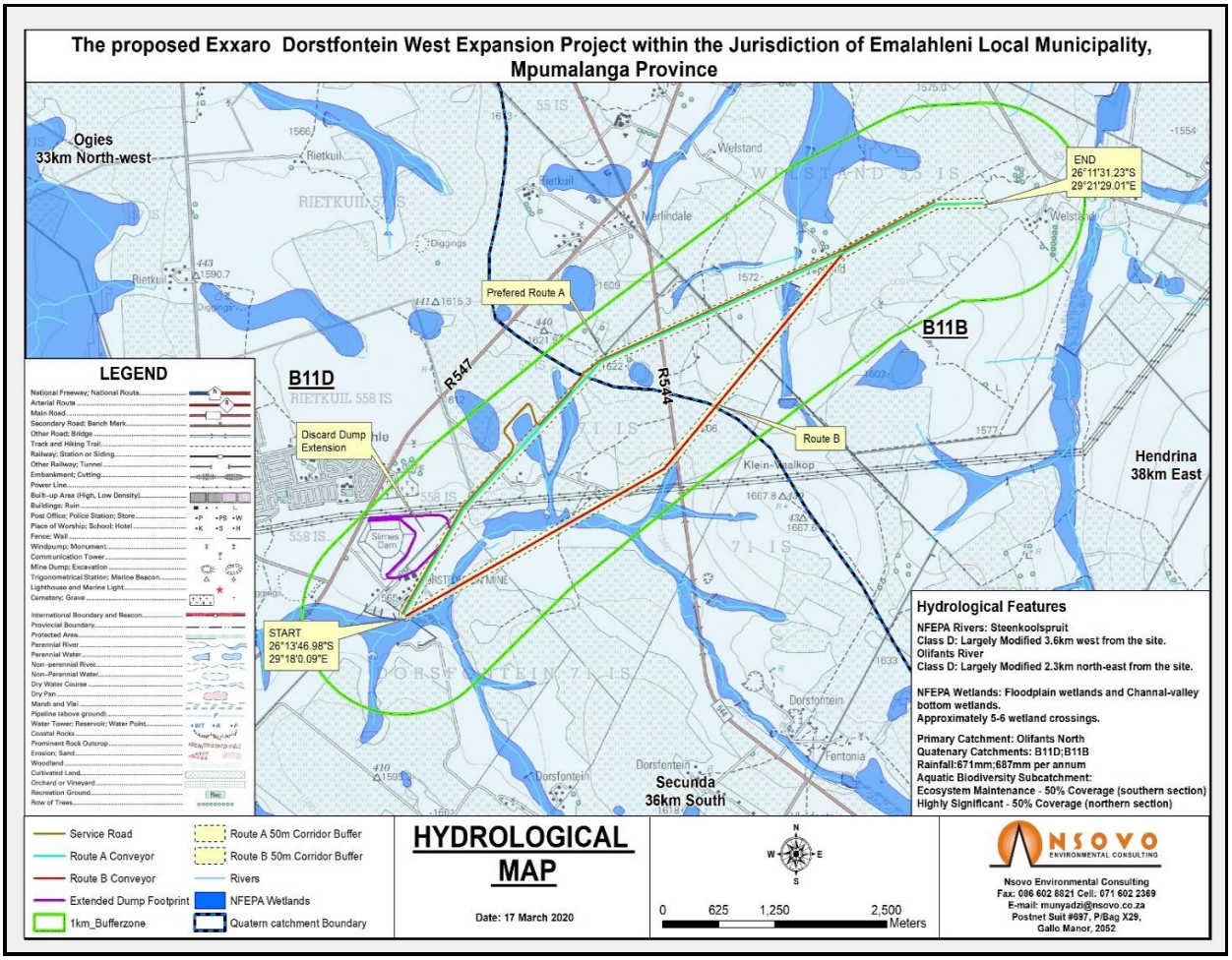


Figure 12: Hydrological map of the proposed location

An unnamed tributary of the Steenkoolspruit flows in a westerly direction across the farm Dorstfontein towards the Steenkoolspruit, which flows to a confluence with the Olifants approximately 33 km north of DCM West complex area. The Olifants River continues north through Witbank Dam, through the Loskop dam before flowing in an easterly direction through Limpopo and into Mozambique. An unnamed tributary to the Steenkoolspruit traverses the site from east to west just south of the pollution control dams (PCDs). The existing conveyor system passes over the tributary on an elevated platform and runoff from the site all ends up in the Steenkoolspruit.

On the eastern portion of the mining area, the unnamed tributary of the Olifants River flows north across the farms and is situated in the quaternary catchment B11B. There are two tributaries of the unnamed tributary that flow east across the Farm Fentonia. The Steenkoolspruit catchment (B11D) has a Mean Annual Runoff (MAR) of 26.41 million

cubic meters (mcm) for the catchment (551 km2), and this equates to 47 930 m3/km2. The project area covers an area of 0.5 km2 of the B11D, which accounts for a reduction of MAR of 0.09%.

9.4.6.1 THE DESCRIPTION OF THE CATCHMENT AREA

The catchment area was determined from the surveyor-general 1:50,000 map contours and ortho photos and delineated for the site (Figure 13) and the catchment size listed in the table below.

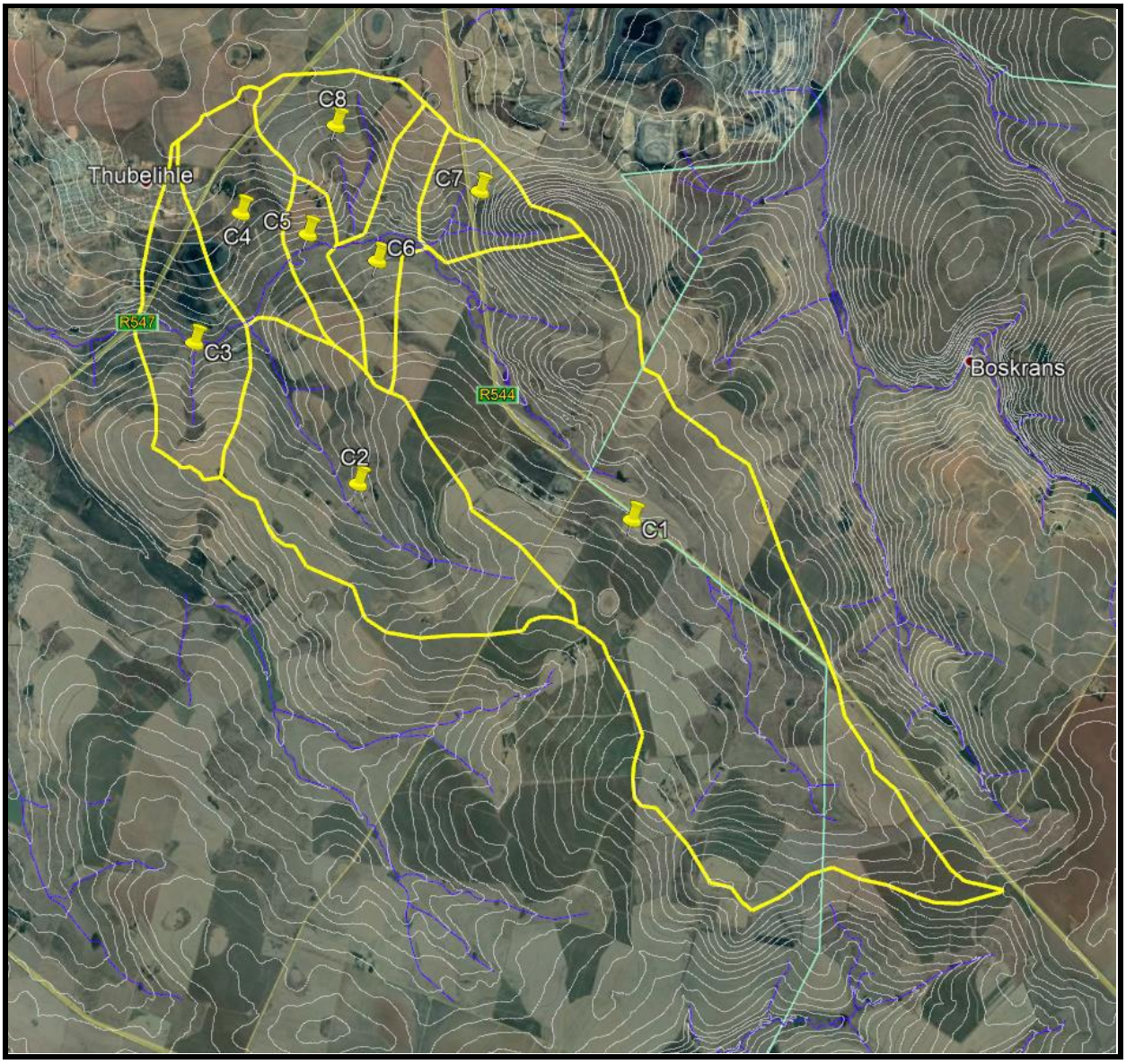


Figure 13: Catchment area as delineated by the hydrologist (Humba, 2019)

The associated sizes of each catchment and its characteristics are detailed in the Table 14 below:

Table 14: Catchment Characteristics

The catchment characteristics are listed in the table below. **Catchment Site**	**Catchment area (km2)**	**Longest water course, L (km)**	**Height difference along 10-85 slope (m)**	**Average slope Sav (m/m)**	**Time of concentration, Tc (hours)**	**% Slope**	**MAP (mm)**	**Run-off factor C**
Catchment 1	19.484528	10.343	70.039	0.0090288	2.455129242	0.90%	680	0.311
Catchment 2	7.03346	5.193	68.199	0.0175105	1.119224295	1.75%	680	0.311
Catchment 3	2.696483	2.295	49.289	0.0286356	0.493865573	2.86%	680	0.311
Catchment 4	2.371512	2.996	58.606	0.0260819	0.628581488	2.61%	680	0.311
Catchment 5	0.892523	1.735	32.931	0.0253072	0.417567321	2.53%	680	0.311
Catchment 6	1.558621	1.838	33.238	0.0241117	0.444736864	2.41%	680	0.311
Catchment 7	1.422585	1.389	35.437	0.0340168	0.313973987	3.40%	680	0.311
Catchment 8	2.053274	1.986	49.023	0.0329124	0.418770008	3.29%	680	0.324

9.4.6.2 Wetlands

According to the Wetland specialist report, thirty-eight separate hydro-geomorphic units (HGM), comprising four HGM types, namely unchannelled valley bottom wetlands, channelled valley bottom wetlands, hillslope seepage wetlands connected to a watercourse and depressions (pans), were delineated and classified within the study area and 500m surrounding the study area. These wetlands serve to improve habitat within and potentially downstream of the study area through the provision of various ecosystem services. Many of these functional benefits, therefore, contribute directly or indirectly to increased biodiversity within the study area as well as downstream of the study area through provision and maintenance of appropriate habitat and associated ecological processes.

The valley bottom wetlands, HGM 1, HGM 2, HGM 3, and HGM 4 were regarded as having a high Hydrological and Functional Importance as a result of the relatively intact nature and various important ecosystem services they provide. Direct human benefits were associated with the provision of natural resources as well as grazing opportunities afforded by most wetlands within the study area. Collectively, the valley bottom systems, along with their supporting hillslope seepages, play an essential role in contributing to good water quality and quantity to the downstream environment, more specifically the Olifants River. Figure 14 below shows the wetlands within the study area as delineated by WaterMakers in 2019.

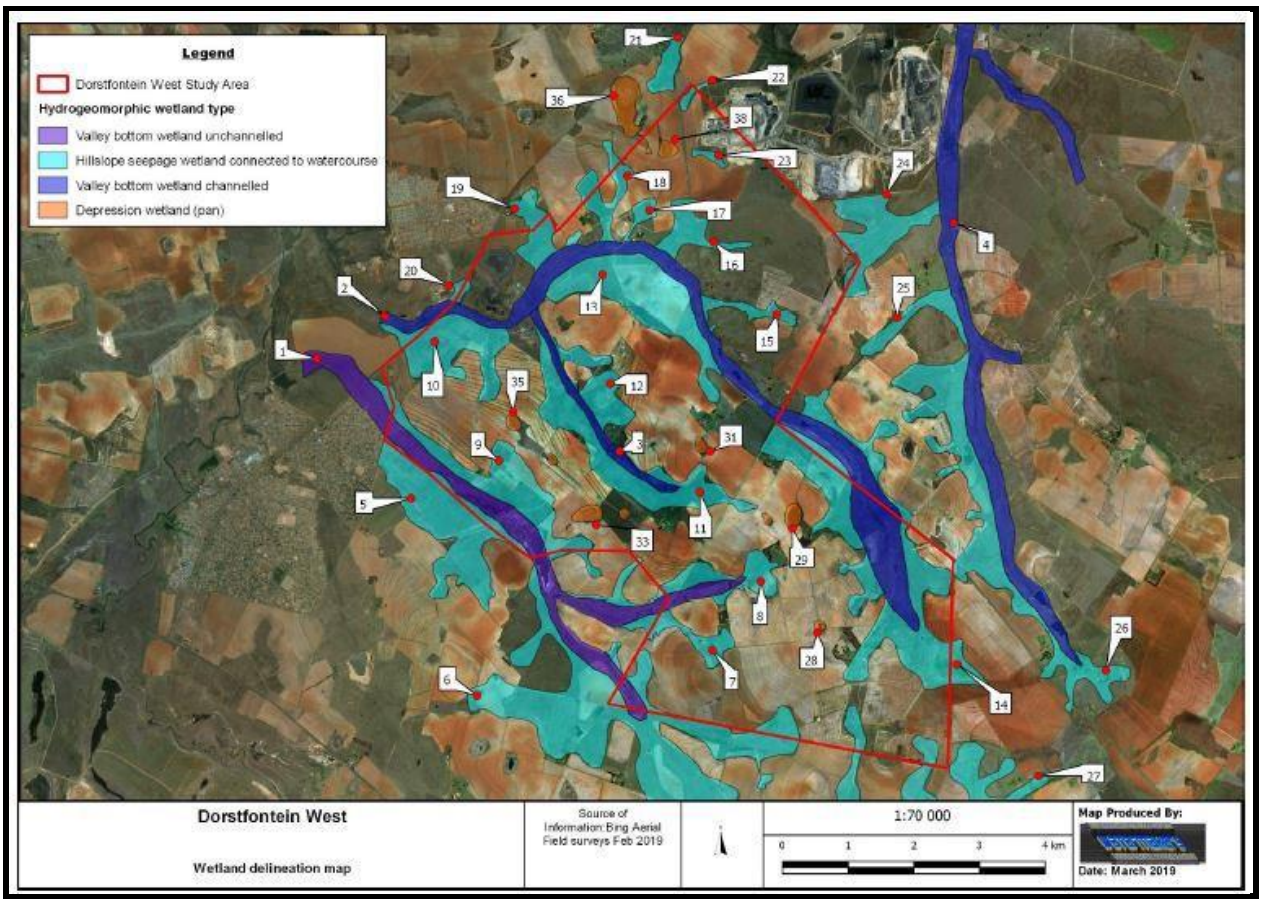


Figure 14: Wetlands within the study area as delineated by WaterMakers, 2019

According to the Kimopax Water Liability Draft Report (2018), due to the location of the mine within a regional coal mining hub, surface water resources have been largely degraded, with many rivers and streams exhibiting poor water qualities. The Present Ecological State (PES) of the Upper of Olifants River is classified as being moderately modified (Class C). DCM West is located within the Highveld/Witbank coalfields that are the already strained Upper Olifants River catchment, resulting in closure-related focus needing to be placed on limiting further future contribution to the contamination of local groundwater and surface water resources. Further, the mine has a role to play in meeting the Olifants Water Quality Objectives. The Olifants WMA, in terms of section 13(1) (a) and (b) of the National Water Act (Act 36 of 1998) (NWA), developed their classes and Resource Quality Objectives (RQOs). These RQOs of water resources for the Olifants catchment area detailed in the Government Gazette, No 39943 of 22 April 2016. The RQOs are defined for each prioritized resource unit, and there are no stipulated RQOs for the B11D quaternary catchment.

It is noted that DCM West has an existing surface water and groundwater monitoring characterized by monthly surface water quality monitoring at specific locations. Quarterly Water Quality Monitoring. Reports are submitted to

the mine by Aquatico Laboratories. During the 1st quarter of 2019, of the eleven (11) surface water monitoring localities (three wastewater and nine resource localities) located in the 2 seam area, five (5) were sampled in every month. Currently DCM West buys water from Kriel Municipality for domestic purposes and uses it to make-up water if needed in the coal beneficiation plant.

9.4.7 HYDROGEOLOGY

According to the Hydrogeological specialist study attached as **Appendix C12**, the conceptual hydrogeological model of the area is based on the generally accepted model for the Mpumalanga coalfields. Three principal aquifers are identified: the weathered aquifer, the fractured Karoo aquifer, and the fractured pre-Karoo aquifer (Hodgson and Krantz, 1998). The Karoo rocks are not known for the development of aquifers, but occasional high-yielding boreholes may be present. The aquifers that occur in the area can, therefore, be classified as minor aquifers (low yielding), but of high importance (Parsons, 1995).

These types of groundwater systems are common to the groundwater regime that characterises a Karoo environment. The systems do not necessarily occur in isolation of one another, more often than not, forming a composite groundwater regime that is comprised of one, some, or all of the systems. Good hydraulic connectivity often exists between the two top aquifers, and they have consequently been treated as a single unit in the modelling of groundwater flow.

Intrusion-related systems are also often characterised by discrete and erratic development. The weathered aquifer is perched and occurs at depths of 0 – 15 meters below ground level (mbgl). The lower 5 to 10 meters of the perched aquifer is saturated due to the impervious nature of the competent, horizontally stratified lithologies of the underlying Vryheid Formation, which occur at depths of 5 – 15 mbgl. The saturated depth of this aquifer is dependent on rainfall recharge. Thus, the influx of water into a bord and pillar mining operation is also expected to vary seasonally. Highly variable recharge occurs over the area, but generally, values are between 1 and 3% of the Mean Annual Precipitation (MAP) based on work by Kirchner *et al.* (1991) and Bredenkamp (1995) in other parts of the country.

9.4.7.1 Shallow weathered aquifer

Rainfall that infiltrates the weathered rock of the shallow aquifer soon reaches an impermeable layer of shale underlying the weathered zone. The movement of groundwater on top of this shale is lateral and in the direction of the surface slope. This water reappears on the surface at fountains where the flow paths are obstructed by a barrier, such as a dolerite dyke, paleo-topographic highs in the bedrock, or where the surface topography cuts into the groundwater level at streams.

The aquifer within the weathered zone is generally low-yielding (range 100 – 2000 l/h) because of its insignificant thickness. Few farmers, therefore, tap this aquifer by boreholes. Wells or trenches dug into the upper aquifer are often sufficient to secure a constant water supply of excellent quality.

9.4.7.2 Fractured Karoo rock aquifer

The pores within the Ecca sediments are too well cemented to allow any significant permeation of water. All groundwater movement is, therefore, along secondary structures, such as fractures, cracks, and joints in the sediments. These structures are better developed in competent rocks such as sandstone, hence the better water-yielding properties of the latter rock type.

Of all the un-weathered sediments in the Ecca Group, the coal seams often have elevated hydraulic conductivity. Packer testing of the No. 2 seam and underlying Dwyka tillite (WRC Report No 291/1/98) has low hydraulic conductivity distribution. Due to its low hydraulic conductivity, the Dwyka tillite may form a hydraulic barrier between the overlying mining activities and the basal floor. In terms of water quality, the fractured Karoo aquifer always contains higher salt loads than the upper weathered aquifer. These higher concentrations are attributed to the longer contact time between the water and the rock. The occasional high chloride and sodium levels are attributed to boreholes in the vicinity of areas where salts naturally accumulate on the surface, such as pans.

Previous reports indicate that the groundwater in the DCM West mining area occurs in two central aquifer systems, namely an upper aquifer within the weathered zone of the sandstone and dolerite, and a deeper aquifer system in localised fracture zones associated with faults and dykes. The plant, coal slurry, and existing discard dump are located on basement granites, which do not carry much groundwater. The water of the area is associated with a north-south dyke fault zone, and the shallow perched weathered zone aquifer, both of which yield very little water.

Rest water levels in and around the mining area vary from a depth of about 1 m below the surface along the lower-lying areas adjacent to the two spruits running through the mining area to about 15 m below surface in the more elevated areas between the spruits. Perched conditions occur adjacent to spruits and on localised zones of the shallow outcrop, but the perched aquifer is not connected to the mining area, with groundwater flow directions generally to the north, north-west, and west away from the mining area. The 2009 hydro census results indicated typical yields of 1 m3/hr - 2 m3/hr, with higher yields along dolerite dykes and related fracture zones.

9.4.7.3 Hydro-census

The Hydrogeological study prepared by GCS indicated that a hydro census was conducted within a 5 km radius of the proposed mining activities where a total of 26 boreholes were visited in 2014. Further, during February 2019, they conducted another hydro census within a 10 km radius of the proposed mining activities. A total of 22 boreholes were visited during February 2019.

Information pertaining to water use of the 22 boreholes identified in 2019 is listed below:

- Twelve (12) boreholes were used for domestic, stock watering and irrigation purposes;
- Four (4) boreholes (three (3) owned by Exxaro and one (1) privately owned) are used for monitoring purposes;
- One (1) borehole was not in use;
- Two (2) boreholes were destroyed; and
- The use of three (3) boreholes was unknown.

9.4.7.4 Groundwater Use

Many of the privately-owned boreholes which were investigated within the immediate study area were either equipped or being pumped, which prevented the measurement of static water levels (they are used daily for domestic water supply to farmers, communities, and drinking water for livestock). In many of the instances, water is used for single or several households for domestic use as a water supply for farm workers and in two cases for small communities of 50 – 100 people. Three springs were found as part of the hydrocensus. All three springs are on privately owned land and are used for livestock.

At DCM West, the potential decant points were identified that are located at the box cut and the lowest topographical point of the underground mine. The calculations show the time-to-decant ranges between 35 and 185 years. Decant volume calculations show discharge rates of approximately between 210 and 1270 m3/d. Once the mining has ceased, Acid Rock Drainage (ARD) is still likely to form given the unsaturated conditions in the facility and contact of water and oxygen through natural processes including rainfall.

Further as highlighted in the Kimopax Report, main sources of water contamination include the following:

- The discard dump forms the resultant deep seepage;
- The underground mine working decants of contaminated water;
- Seepage below the pollution control dam, although these have been lined and have a seepage cut off trench at the downstream potential damage to liners;
- Coal stockpile areas; and
- The seepage water was also confirmed where the monitoring of the adjacent river streams had shown the impacts of this constant seepage.

9.4.8 Sites of Archaeological and Cultural Significance

The history of the area dates back some thousands of years before the establishment of any local towns. This started with the Early Stone Age (ESA) (from 2.5 million to 250 000 years ago), the Middle Stone Age (MSA) (the period from

250 000 to 22 000 years ago) and the Late Stone Age (LSA) (from 22 000 years ago to 200 years ago). Evidence for the MSA has been excavated at the Bushman Rock Shelter near Ohrigstad. The oldest layers date back to 40 000 years BP and the youngest to 27 000BP (Esterhuysen and Smith 2007). Evidence of LSA is widespread in Mpumalanga and includes four in Emalahleni, two in Lydenburg, 76 in White River and the southern Kruger National Park, 250 in Nelspruit, and eight in Ermelo (Smith and Zubieta 2007). The most well-known Early Iron Age site in Mpumalanga and South Africa is the Lydenburg head site, which provided two occupation dates, namely AD 600 and AD 900 - AD 1100 (Evers 1981, Whitelaw 1996).

The Phase I Archaeological and Cultural-Heritage Impact Assessment study (Appendix C4) for the proposed DCM West expansion has revealed no archaeological or site of historical significance within the footprint of the proposed development (Figure 15 and 16). However, the findings must also be understood within the context of the proposed development.

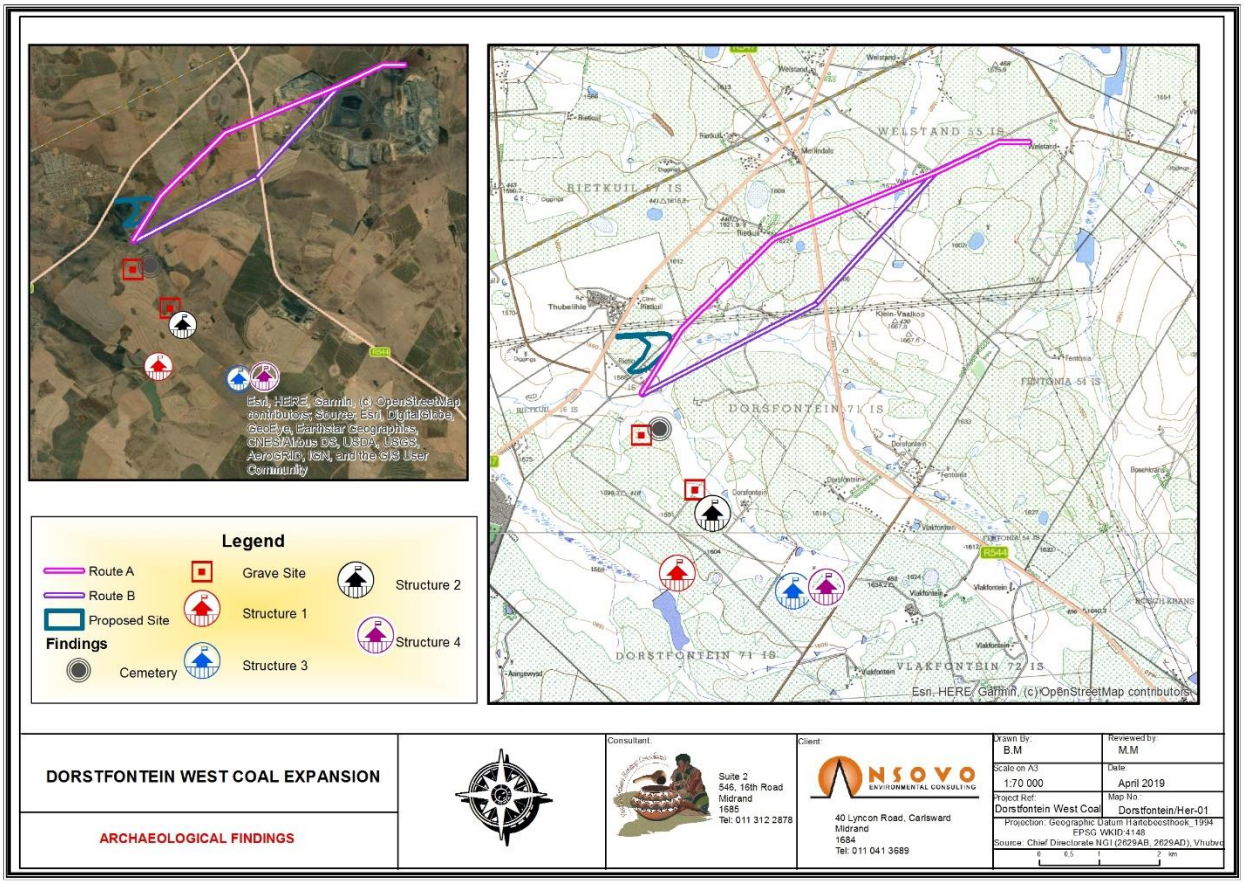


Figure 15: Archaeological findings in relations to the proposed development alternatives (Vhubvo Archaeo-Heritage Consultant Cc., 2019).

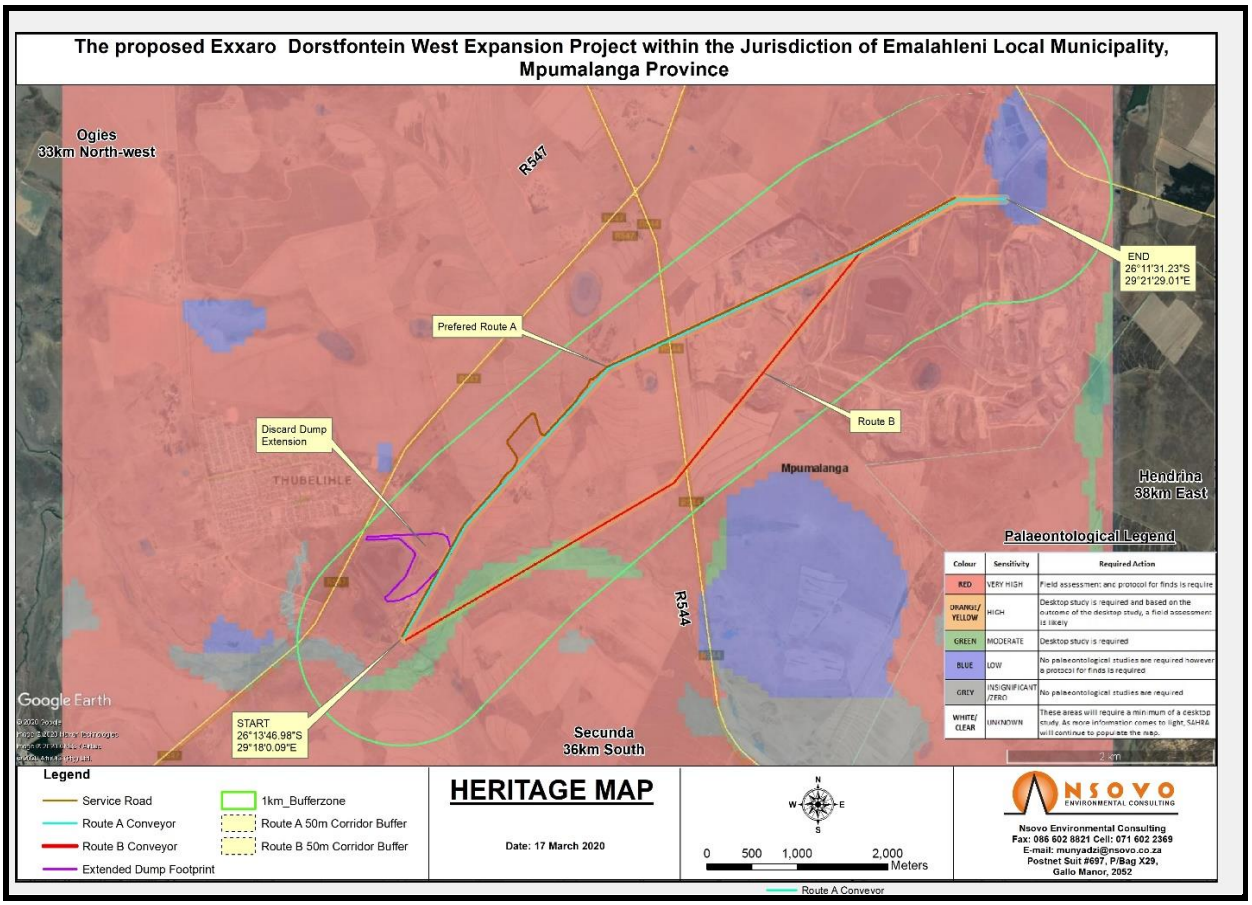


Figure 16: Heritage map associated with the proposed site

9.4.9 AIR QUALITY AND POLLUTION

According to the Air Quality Impact Assessment Specialist Study (Appendix C4), it is assumed that the primary sources of impact are dust generated from road transport on the mine discard dumps and wind-blown dust from exposed surfaces. A secondary source is the materials handling to load and offload the conveyor systems. However, there are few sources of air pollutants within the immediate proposed area. The motor vehicles driving on the R547 result in elevated ambient concentrations of particulates and Nitrogen Oxides (NO2) at times. Sources identified near the study area and proposed project area are listed below:

- Vehicle Exhaust Gases;
- Veld Fires;
- Loading and Offloading Raw Materials;
- Wind Erosion as a result of ROM Material and Topsoil Stockpiles Dust; and
- Other fugitive dust sources such as wind erosion of exposed areas.

9.4.10 VEGETATION STRUCTURE AND COMPOSITION

The proposed study area falls within the following type of vegetation:

Dry Grasslands:

- Eragrostis species dominated Primary Grasslands, classified on the Mpumalanga Biodiversity Sector Plan (MBSP) as 'Other Natural Areas' as well as CBA areas. They were found mostly on gently undulating landscapes, with signs of slope seepage common throughout.
- *Eragrostis lehmanniana* dominated Secondary Grasslands, classified on the MBSP as 'Moderately Modified – Old Lands.' From historical satellite imagery, it was apparent that these grasslands, mostly on gently sloping areas, had been cultivated or ploughed many years ago. The species composition also suggested that grazing was sown onto these lands after cultivation stopped.
- *Cheilanthes viridis* – Diospyros species Rocky Ledges. These were designated by the MBSP as the CBA area and had a unique species composition due to the many niches created by the rocky boulders. Within the study area, they were located either side of the stream south of the current DCMW ore washing plant.

Moist Grasslands which are dominated by species typical for seasonally wet soils:

- *Eragrostis plana* Floodplain Grasslands, found mainly on the relatively flat floodplains adjacent to riparian areas or in channelled valley floor wetlands. Although degraded, these were designated by the MBSP as the CBA area and had a critical ecosystem functionality.
- •*Imperata cylindrica* Seepage Slope Grasslands, found on moderately sloped seasonal seepage areas, often associated with either a stream or artificial inundated areas, as well as around small pans between cultivated fields. Most of these areas were somewhat degraded and heavily invaded by alien species, yet they retain a critical ecosystem function.

According to Nel *et al*. (2011), the study area falls within the Mesic Highveld Grassland Group 4 wetland vegetation group. According to Macfarlane et al. (2014), the Mesic Highveld Grassland Group 4 wetland vegetation group is regarded as being Critically Endangered (Macfarlane *et al*., 2014).

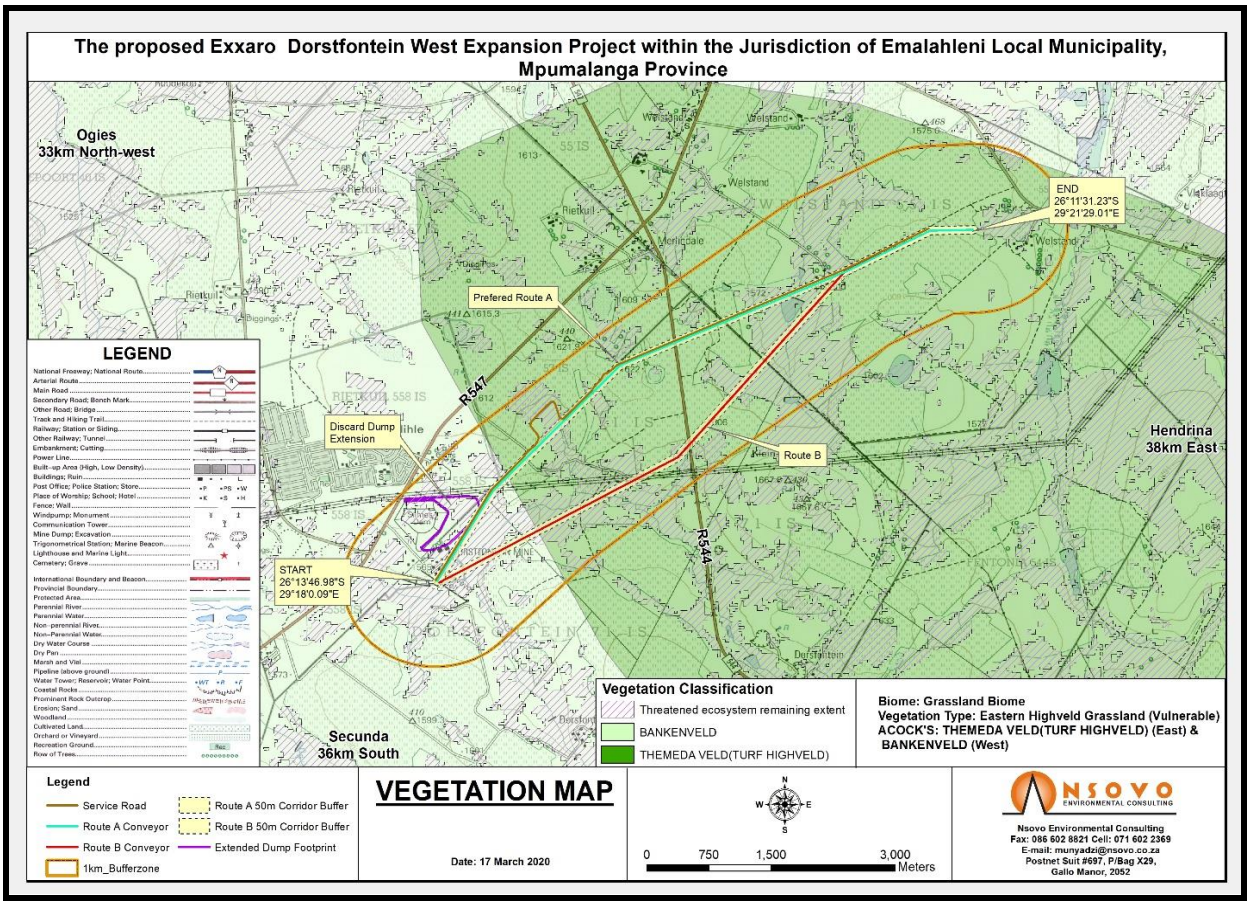


Figure 17: Vegetation Map of the proposed study site

9.4.11 SOIL AND LAND CAPABILITY

According to the soil and land capability specialist (Scientific Aquatic Services, 2020), the study area collectively comprises approximately 36.19% of arable soils, classified as Hutton (Hu) Bloemdal (Bd), Bainsvlei (Bv), Lichtenburg (Lc), Avalon (Av) and Glencoe (Gc). The occurring arable soils are suitable for cultivation due to their structureless and loose characteristics (sandy loam), thus allowing favorable conditions for the majority of cultivated crops by providing effective root growth, adequate moisture, and nutrient retention to support optimum growth and production. Approximately 22.87% of the study area is comprised of shallow soils such as Dresden (Dr) and Arcadia (Ar). These soils are considered to have low arable potential land capability, attributed to their shallow nature, which mainly restricts root growth and moisture retention, thus creating conditions unfavorable for cultivation.

The report further highlights that soils associated with wetlands (i.e., Rensburg (Rs), Katspruit (Ka), Longlands (Lo), Westleigh (We), and Wasbank (Ws)) constitute approximately 39.90% of the total investigated areas. These soils are generally limited to supporting plants that are tolerant to prolonged wet conditions (i.e., hydrophytes). Soils associated with wetlands are typically of low agricultural potential due to various limiting factors such as high clay

content and waterlogging conditions. The spatial distribution of the dominant soil forms within the study area is presented in Figure 18 below.

Both conveyor belt routes (although Conveyor Route A has a higher impact) are located within soils suitable for crop production. These soils are considered to contribute to the provincial and national agricultural production systems, and it is anticipated that they will be permanently destroyed as a result of the proposed activities. From a soil, land use and land capability perspective, Conveyor Route A and associated service road are the preferred options since it will likely have a minimal disturbance of arable soils in comparison to Conveyor Route option B. However, movement of farm equipment will also be affected by the conveyor belt, as it will create a barrier in accessing agricultural.

The proposed discard expansion is expected to directly impact on the land capability of the prevailing soils, as will be permanently removed (i.e., removal of overburden for discard dump), and after rehabilitation, the soils will not be able to regain the original land capability even with mitigation.

Table 15: Land Capability classes for soil forms identified within the study area (Scientific Aquatic Services, 2019)

Soil Form	Code	Diagnostic Horizon Sequence	Land Capability	Areal Extent (ha)	Percentage (%)
Hutton	Hu	Orthic A/Red Apedal/ Unspecified	Arable (Class II)	95.10	2.58
Avalon	Av	Orthic A/Yellow-Brown Apedal/ Soft Plinthic	Arable (Class IV)	1237.80	33.61
Bloemdal	Bd	Orthic A/Red Apedal/Gleyic			
Bainslvie	Bv	Orthic A/ Red Apedal/ Soft Plinthic			
Lichtenburg	Lc	Orthic A/Red Apedal B/ Hard plinthic			
Sepane	Se	Orthic A/ Pedocutanic /Gleyic			
Glencoe	Gc	Orthic A/ Yellow-Brown Apedal/ Hard Plinthic			
Katspruit	Ka	Orthic A/ Gley	Grazing (Class V)	1439.60 Gleyic	39.90
Longlands	Lo	Orthic A/ Albic / soft Plinthic			
Rensburg	Rs	Vertic/ Gley			
Wasbank	Wa	Orthic A/ Albic / Hard Plinthic			
Westleigh	We	Orthic A/ Soft Plinthic/			
Dresden	Dr	Orthic A/ Hard Plinthic	Grazing (Class VI)	842.45	22.87
Arcadia	Ar	Vertic A/ Lithic			
Witbank	Wb	Unspecified	Wildlife (Class VIII)	72.12	1.96
TOTAL				**3683.17**	**100.00**

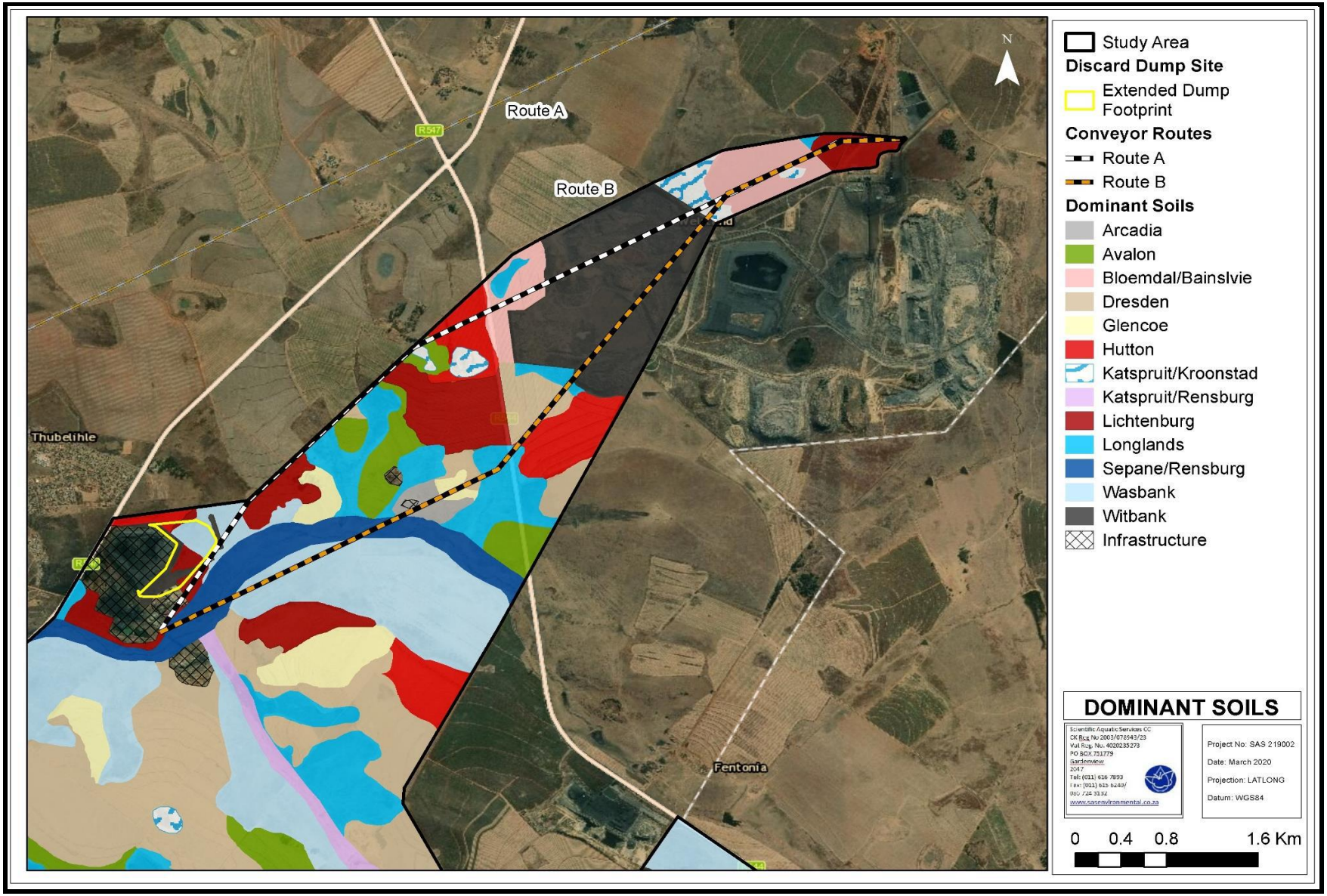


Figure 18: Agricultural potential within and around the study area (Scientific Aquatic Services, 2019)

9.4.12 SENSORY ASPECTS

9.4.12.1 Noise

In terms of the Noise Regulations, a noise disturbance is created when the prevailing ambient noise level is exceeded by 7.0dBA or more. Noise is part of our daily exposure to different sources, which is part of daily living and some of these physical attributes, which may, at times, be part of the ambient levels that people get used to without noticing the higher levels. Two aspects are important when considering the potential impacts of a project:

- The increase in the noise levels, and;
- The overall noise levels which will be created by the rail yard activities.

There will be an upward shift in the immediate environmental noise levels during the construction phase temporarily and on a more permanent basis during the operational phase in the vicinity of the different mine expansion activities. The noise increase at the abutting residential properties will, however, not exceed the prevailing ambient noise levels during the construction, operational, and decommissioning phases as it will be below the threshold value of 7.0dBA. There will be a noise increase at Thubelihle, along the R544 and R547 roads, when coal will be transported along this corridor.

9.4.12.2 Visual Aspects

Visual appreciation or dislike is subjective, and thus, what is aesthetically pleasing to some can be displeasing to others. The visual analysis of a landscape the impact of new developments and structures tends to be complicated, and it is evident from previous experience that when dealing with the reaction to landscape changes, a large diversity of opinion exists. In this regard, it is imperative that the applicant be sensitive from a visual impact perspective, to the requirements of the local people, notably rural communities, and farmers. Many topographical features influence this environment, and these features will need to be utilized when selecting an alignment to minimize visual impacts and intrusions.

The study area consists of large areas of agricultural land used for commercial purposes. There are few human settlements, like small towns and farming communities, and the landscape is degraded around these settlements. Mining is one of the key land uses and contributes significantly to the visual degradation of parts of the study area. Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed project. The visual receptors included in this study are:

- Residents;
- Tourists; and
- Motorists.

The study area is moderately populated, with a lower population in the farming communities and a higher population in the towns. The residents close to the mine are in Kriel and Thubehihle and may experience a lesser degree of visual intrusion. The entire study area is considered to have low tourism potential, mostly because of the environmental degradation caused by the mining developments and human settlements. There is also no major thoroughfare to prominent tourist destinations.

9.5 THE IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF IMPACTS

The identified impacts and risks associated with the proposed project, including nature, significance, consequences, extent, duration, and probability is presented in section 10.2 below.

9.6 THE METHODOLOGY USED IN DETERMINING AND RANKING IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

The assessment of impacts is largely based on the Department of Environmental Affairs and Tourism's (1998) Guideline Document: Environmental Impact Assessment Regulations. The assessment will consider the impacts arising from the proposed activities of the project both before and after the implementation of appropriate mitigation measures.

The impacts are assessed according to the criteria outlined in this section. The identified issues are ranked according to the extent, duration, magnitude (intensity), and probability. From these criteria, a significance rating is obtained, the method and formula are described below. Where possible, mitigation recommendations have been made and are presented in tabular form.

The criteria given in Table 16 below have been used to conduct the evaluation. The nature of each impact is assessed and described in relation to the extent, duration, intensity, significance, and probability of occurrence attached to it. This was assessed in detail as part of this EIA phase.

Table 16: Methodology used in determining the significance of potential environmental impacts

Status of Impact The impacts are assessed as either having a: negative effect (i.e. at a `cost' to the environment), positive effect (i.e. a `benefit' to the environment), or Neutral effect on the environment.
Extent of the Impact (**1**) Site (site only), (**2**) Local (site boundary and immediate surrounds),

(**3**) Regional (within the City of Johannesburg),
(**4**) National, or
(**5**) International.

Duration of the Impact
The length that the impact will last for is described as either:
(**1**) immediate (<1 year)
(**2**) short term (1-5 years),
(**3**) medium term (5-15 years),
(**4**) long term (ceases after the operational life span of the project),
(**5**) Permanent.

Magnitude of the Impact
The intensity or severity of the impacts is indicated as either:
(**0**) none,
(**2**) Minor,
(**4**) Low,
(**6**) Moderate (environmental functions altered but continue),
(**8**) High (environmental functions temporarily cease), or
(**10**) Very high / Unsure (environmental functions permanently cease).

Probability of Occurrence
The likelihood of the impact actually occurring is indicated as either:
(**0**) None (the impact will not occur),
(**1**) improbable (probability very low due to design or experience)
(**2**) low probability (unlikely to occur),
(**3**) medium probability (distinct probability that the impact will occur),
(**4**) high probability (most likely to occur), or
(5) Definite.

Significance of the Impact
Based on the information contained in the points above, the potential impacts are assigned a significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and magnitude (**M**) and multiplying this sum by the probability (**P**) of the impact.
S=(E+D+M)P

The significance ratings are given below
(**<30**) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
(**30-60**) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
(**>60**) high (i.e. where the impact must have an influence on the decision process to develop in the area).

9.7 POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND ON THE COMMUNITY THAT MAY BE AFFECTED FOCUSING ON GEOGRAPHICAL, PHYSICAL, BIOLOGICAL, SOCIAL, ECONOMIC, HERITAGE AND CULTURAL ASPECTS

The proposed activities and alternatives will have both positive and negative impacts on the environment and on the community.

9.7.1 POSITIVE AND NEGATIVE IMPACTS OF THE DISCARD DUMP

The Table17 below shows the negative and positive impacts associated with the discard dump extension as follows:

Table 17: Positive and negative impacts of discard dump extension

Discard dump extension	
Negative impacts	**Positive impacts**
• The extension of the existing discard dump will impact on soil of high arable agricultural value as well as disturbed and wetland soils, which are not regarded as important for cultivation.	• Accommodate the disposal of the discard and slurry for the next 15 years of Life of Mine (LOM), reducing the environmental contamination. • Allow for compliance with the requirements of the legislation with regards to waste management. • Allow for consolidation of discard and slurry disposal in a single area. • Ease of operational and post-closure management of impacts.
• The expansion of the existing discard dump will cut into a hillslope seepage area directly above a valley-bottom wetland and associated habitats.	
• The discard dump extension will result in loss of indigenous vegetation (loss of portions of remaining primary vegetation of a Vulnerable Ecosystem), removal of Exotic Vegetation Cover, loss of available faunal habits, and associated resources and increase in alien invasive vegetation.	
• If not managed, it will have detrimental impacts on the water resources.	

9.7.2 POSITIVE AND NEGATIVE IMPACTS OF THE CONVEYOR AND SERVICE ROAD

The Table 18 below highlights the summary of the advantages and disadvantages of the route alternatives considered as follows:

Table 18: Comparative Analysis of the Conveyor Route and Service Road Alternatives

Comparison of Route Alternatives	
Conveyor Belt and Service Road - Route A	**Conveyor Belt and Service Road- Route B**

• Route A traverses a Secondary Grassland on a hillslope seep for approximately 800m.
• It will likely have a minimal disturbance of arable soils in comparison to conveyor route option B.
• It will traverse Primary Grassland for 40m which is a shorter distance compared to Route B.
• It traverses HGM 18 higher up in the catchment which contain significant seasonal and large permanent wetland zones.
• This route will affect Riparian Vegetation and Seepage Slope Grasslands for approximately 155m and 290m, respectively.
• Route A would have a higher visual, noise, air quality, and socioeconomic impact as it is in close proximity to the communities.
• From a hydrology perspective, Route A has fewer (2) crossings as compared to Route B.
	• Route B traverse Secondary Grassland on a hillslope seep for 1,412m.
	• It will have high impacts on valuable soils capable of supporting cultivated commercial agricultural production due to:
	  ○ Occurrence of arable agricultural soils;
	  ○ Adequate rainfall (600 to 800 mm);
	  ○ Gently sloping topography (at most); and
	  ○ Availability of irrigation options, such as centre pivots.
	• Primary Grassland within Route B corridor will be affected for 275m.
	• It traverses the valley-bottom wetland (HGM 2) with high Hydrological and Functional Importance twice diagonally for more than a kilometre in total, which would likely result in large negative long-term impacts.
	• Riparian Vegetation along the channelled valley bottom wetland with species of conservation concern will be affected for 270 m.
	• It would have reduced visual, noise, air quality and socio-economic impacts.
	• Route B is not preferred as it has more (4) crossings as compared to A.

The Table 19 below presents the positive and negative impacts associated with the proposed conveyor belt on the environment and community.

Table 19: Positive and negative impacts of the Conveyor Belt and associated service road

Conveyor belt – Preferred Route A and B	
Negative	**Positive**
Increased impact on bird interaction due to the conveyor.	The proposed conveyor belt and associated service road will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads, i.e., the R547 and R544.
The proposed alignments (Route A and B) will traverse agricultural and arable land.	No direct impact on the identified heritage features
	Increased road safety as a direct result of the reduced number and frequency of trucks on the regional roads.
	Reduced gas emissions as a result of reduced traffic.

9.7.3 POSITIVE AND NEGATIVE IMPACTS OF THE NO-GO ALTERNATIVE

The Table 20 below presents the positive and negative impacts associated with No-Go Alternative on the environment and community.

Table 20: The positive and negative impact of the No-Go Alternatives were also considered.

Negative	Positive
The identified benefits will not be realised i.e. the sustained jobs.	Agricultural activities within the affected properties will not be interrupted.
The road will continue to deteriorate as a result of the high volumes of trucks transporting coal from West to East.	The flora and fauna will remain intact.
Increased gas emissions as a result of high truck volumes.	
High safety risk to the communities across the mine as well as other road users.	
Unmanaged waste as a result of the over capacitated discard dump.	
Impacts on water resources, including wetlands as a	

Negative	Positive
result of unmanaged waste from the discard.	

9.8 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND LEVEL OF RESIDUAL RISK

The proposed activities such as discard dump extension, development of the conveyor belt, and associated service road will have impacts on both the environment and community. However, the possible mitigation measures were proposed by the EAP and specialist and are indicated in Section 14 below. The EMPr attached as **Appendix H** also highlights the measures put in place to manage the potential impacts.

The attached EMPr is an amended EMPr which takes into consideration the proposed activities as well as already authorised activities.

9.9 IF NO ALTERNATIVE DEVELOPMENT FOOTPRINTS FOR THE ACTIVITY WERE INVESTIGATED, THE MOTIVATION FOR NOT CONSIDERING SUCH

The EIA Regulations require that alternatives be considered, and alternatives would include technical, locality, structural, scheduling, etc. In this instance, various alternatives were considered for the proposed discard dump as well as the conveyor belt. As indicated above, other alternatives were dismissed as a result of non-viability, and only a few were assessed as part of the EIA phase, and this includes Conveyor Route A and B.

Worthy to note that the alternatives have been thoroughly investigated and assessed with input from the specialists, which culminated in the preferred alternatives, i.e., the proposed Conveyor Route A and associated service road and the Discard expansion.

9.10 A CONCLUDING STATEMENT INDICATING THE LOCATION OF THE PREFERRED ALTERNATIVE DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE CONTEMPLATED IN THE ACCEPTED SCOPING REPORT.

Based on the findings of several specialist studies, and the EAPs collation of information presented, the following has been recommended:

- Conveyor Route Alternative A is the preferred alternative; and
- Expansion of the Discard dump.

The preferred Conveyor route corridor and discard dump extension are recommended as they will have the least impact on the physical and the natural environment. The development footprint within the approved site is presented in the Figure 19 below, and it includes the following:

- The discard dump footprint which is about **35 hectares** and indicated in purple; and
- The Conveyor belt route A and associated service road with a **50m corridor**.

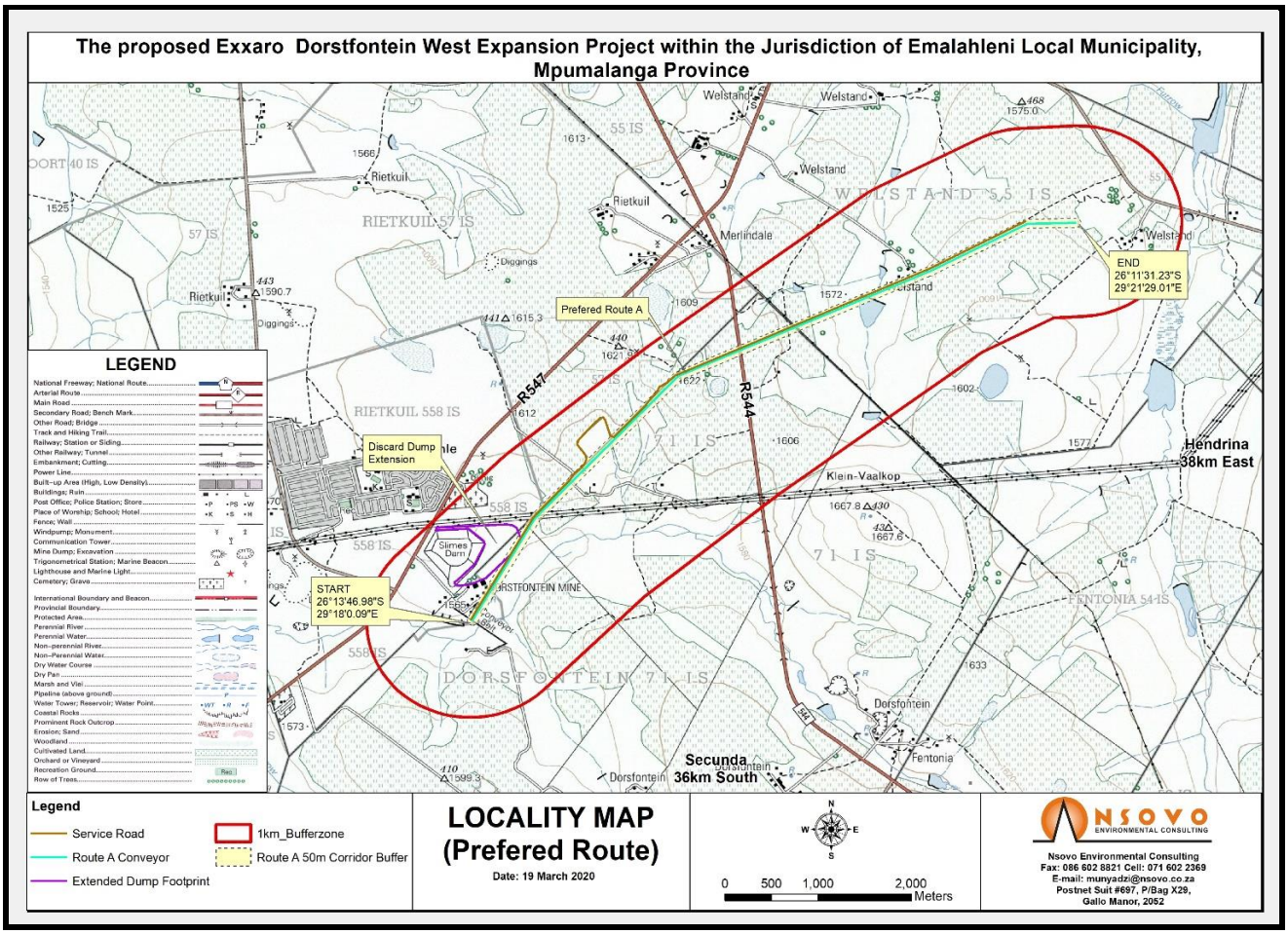


Figure 19: The development footprint within the approved site

10 A FULL DECRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS THE ACTIVITY AND ASSOCIATED STRUCTURES AND INFRASTRUCTURE WILL IMPOSE ON THE PREFERED DEVELOPMENT FOOTPRINT ON THE APPROVED SITE AS CONTEMPLATED IN THE ACCEPTED SCOPING REPORT THROUGH THE LIFE OF THE ACTIVITY

10.1 DESCRIPTION OF ALL ENVIRONMENTAL ISSUES AND RISKS THAT WERE IDENTIFIED DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

This section describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified, have been assessed based on the EAP's opinion as well as consultation with specialist studies. Refer to the Table 21 below, for the potential impacts identified.

Table 21: Environmental issues and risk identified during environmental impact assessment

Issue	Nature	Description
Employment	Positive-No mitigation required	The proposed project will result in the extension of the existing contracts with opportunities to the skilled and semi-skilled personnel in the local community during the construction as well as operational phases. This impact will be positive and provincial in extent.
Air Pollution	Neutral	Potential air pollutants during construction may be dust emanating from site preparation and excavations during construction. Given the nature and magnitude of the proposed project, it is anticipated that before mitigation, the impact will be local in extent, and short term. Mitigation measures such as dust suppression can reduce the impact to become site-specific.
Visual Impact	Negative	The visual impact of an object in the landscape decreases quickly as the distance between the observer and the object increases. The visual impact at 1km is approximately a quarter of the impact viewed from 500m, and the visual impact at 2km is one-eighth of the impact viewed from 500m. Therefore, objects appear insignificant in any landscape beyond 5km. The visibility of the proposed infrastructure would be a function of several factors, including landform, vegetation, views and visibility, genius loci (or sense of place), visual quality, existing and future land use, landscape character and scale. The proposed activity will change the visual character of the site particularly considering that the proposed site is located in an area that is sloping; the elevated points of the site can be viewed from the nearby roads, however, it must be noted that there are already existing mines and waste dumps located within the vicinity of the proposed project site. Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. Given the topography of the study area the impact can be considered definite, long term, local in extent but low significance.

Issue	Nature	Description
Biodiversity	Negative	Potential ecological impacts resulting from the proposed development would stem from a variety of different activities and risk factors associated with the preconstruction, construction, operational and closure phases of the project. During construction, vegetation clearing for access roads, laydown areas and the discard dump may impact intact vegetation. Increased erosion risk would occur due to the loss of plant cover and soil disturbance during the construction phase. Stripping of vegetation will increase the risk of erosion. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems. Further, it is anticipated that loss of indigenous vegetation will occur. This will impact the remaining primary vegetation of a threatened ecosystem, plant species of conservation concern, unique sensitive habitats including CBA areas and wetlands as well as unique or suitable habitat for species of conservation concern to establish or persist. It is also anticipated that during both construction and operational phases, increase in Alien Invasive Plants will occur within all habitats. In addition, ecological structures and function of habitats will be lost at all wetland including surface and subsurface hydrological patterns essential for maintaining lower-lying habitats. The development would contribute to the cumulative fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The highest risk of the proposed development to the local biodiversity and its habitat are as follows: • Loss of indigenous vegetation • Loss of exotic vegetation • Loss of or displacement of fauna • Loss of ecological function • Increase in alien invasive vegetation • Biodiversity degradation

Issue	Nature	Description
Noise	Negative	In South Africa, the assessment of noise levels in the environment is governed by the South African Bureau of Standards (SABS) noise standard 0103 – 'The measurement and rating of environmental noise with respect to annoyance and to speech communication' (SABS 1994). Additional SABS standards cover the measurement of noise over different distances from the source (SABS 0357 – 'The calculation of sound propagation by the Concave method'), and standards for different sectors (e.g. industry). There will be an upwards shift in the immediate environmental noise levels during the construction phase on a temporary basis and a more permanent basis during the operational phase in the vicinity of the different mine expansion activities. The noise increase at the abutting residential properties will however not exceed the prevailing ambient noise levels during the construction, operational and decommissioning phases as it will be below the threshold value of 7.0dBA. According to the SABS 0103 acceptable noise levels at day time is 45dBA, and a noise intrusion is disturbing if it exceeds 7dBA or more. The proposed development will not have significant noise increase as the noise will not exceed the threshold and has been identified as potentially low due to the nature of the proposed development.
Waste	Negative	Naturally, the inhabitation of the land will result in the accumulation of various forms of waste in the area. The aesthetic value of the area would decrease if such waste is not collected and disposed of appropriately. Waste material will be generated during the construction phase. Such waste may accumulate from the workers campsite or from litter left around the work area by the construction staff. Other waste substances may accumulate from cement bags amongst other construction material. The impact of waste is definite and will last for the duration of the construction phase as well as the operational phase, although reduced. It should also be noted that nature of the proposed activity results in mining waste which will be deposited in the discard dump, hence the proposed expansion of the existing mine waste discard dump.
Soil	Negative	The proposed development will contribute to the loss of topsoil as a result of erosion and possible contamination of

Issue	Nature	Description
		soil due to the excavation activities. Soil compaction caused by heavy vehicles and machinery surrounding the discard dump areas will also aggravate erosion. Construction activities will change the land use from the arable and grazing land capability to mining, causing unsuitable conditions for any further commercial farming. The proposed development will also contribute to the loss of arable land. The disturbance of high potential arable soils is unavoidable, and it is unlikely that the natural landscape setting will be restored post-closure to its pre-mining land capability. However, it can be rehabilitated to a freely draining landscape setting, using the stockpiled soil material so that it mimics the natural landscape setting, and the area can be relatively productive beyond the life of mine. Other impacts on soils will include: • Change of soil surface and sub-surface hydrology, depleting or reducing replenishment of moisture of lower-lying habitats depending on hillslope seeps; • Change in soil chemistry of all lower- lying habitats affected by acid leachate, causing die-off of indigenous plants and loss of resources to fauna; and • Degradation of soil moisture reserves as well as water resources in more sensitive habitats, such as riparian areas.
Heritage	Negative	The Phase I Archaeological and Cultural-Heritage Impact Assessment study for the proposed DCM West expansion has revealed that there are no archaeological or sites of historical significance within the footprint of the proposed development.
Wetlands	Negative	The proposed study area is within an unchannelled valley bottom wetlands, channelled valley bottom wetlands hillslope seepage wetlands connected to a watercourse and depressions (pans). Wetlands within the study area serve to improve habitat within and potentially downstream of the study area through the provision of various ecosystem services. Many of these functional benefits therefore contribute directly or indirectly to increased biodiversity within the study area as well as downstream of the study area through provision and maintenance of appropriate habitat and associated ecological processes. In order to ensure that the water resources within the study

Issue	Nature	Description
		area are managed properly and protected, a Water Use Licence will be lodged with the Department of Human Settlement Water and Sanitation. The impact assessment identified the destruction of wetland habitat, surface water pollution including sedimentation as well as increased erosion, altered hydrological regimes, loss of wetland functionality and decreased downstream water quality as the major impacts during the construction and operational phase. Several general and specific mitigation measures were proposed in order to reduce negative impacts and incorporate some potentially positive impacts from the proposed development.
Surface Water	Negative	Subsidence and hydrology impacts occur at every underground mining operation bringing about changes to surface landforms, ground water and surface water. Construction impacts associated with surface water would include: • Surface Water Contamination • Siltation of surface water • Runoff and drainage from the discard dump continue to yield polluted water and siltation of water courses. The proposed discard dump will have negative impacts on surface water resources i.e., river systems, dams and pans and such may include the following impacts • Storm water control around the discard dump (seepage/runoff) The construction of the conveyor belt and associated service would impact on surface as a result of encroachment or possible destruction. Operational phase impacts on surface water include • Stream peak flow reduction as a result of the discard dump.
Groundwater	Negative	During the construction phase for the Discard Dump extension and conveyor belt, the following potential impacts on

Issue	Nature	Description
Pollution		groundwater may result from the on-project site activities: • Potential project site contamination of groundwater due to hydrocarbon spillages and leaks from construction vehicles and waste; • Slight reduction of recharge to groundwater due to the compaction of the ground surface; and • Clearing of footprints, building of roads and other construction related activities. • Decrease in quality as a result of potential hydrocarbon spillages as well as seepage from the discard dump • Increased infiltration • Loss of storage underground • Change in the geo-chemistry • Monitoring changes (BH's) As these activities are relatively small in magnitude this will only pose a project site specific low risk to groundwater if proper mitigation measures are implemented.
Socio-economic Environment	Negative/Positive	The socio-economic aspect has both positive and negative impacts. The significance of positive socio-economic benefits associated with the proposed development exceed the significance of negative socio-economic impacts. For example, the proposed mine expansion and prolonged life of the mine will result in sustainable jobs at the mine and will increase employment opportunities over the medium and long term. These include skilled, semi-skilled and under skilled labours which could consist of locals (in and around the mining area) as well as regional and national communities. The proposed conveyor belt will undoubtedly result in reduced traffic volumes on the road from trucks transporting coal from DCM West to DCM East as well as from vehicles and trucks on roads i.e., the R547 and R544. The negative socio-economic consequences associated with the project include that, for example, the proposed development is in an area characterised by a variety of agricultural activities which include among others: maize and soya beans cultivated fields and grazing fields for livestock i.e. cattle and goats. The proposed conveyor belt and

Issue	Nature	Description
		discard dump will impact on the agricultural potential of the area as well as other ecological support services which the local communities depend on.
Topography	Neutral	The topography of the study area is undulating and the proposed conveyor belt and associated road as well as the discard dump will not have significant impact on the topography.
Tourism	Neutral	The entire study area is considered to have low tourism potential, mostly because of the environmental degradation caused by the mining developments and human settlements. There is also no major thoroughfare to prominent tourist destinations. The temporary exposure to possible unsightly views of the construction camps and the associated activity will be minimal and localised. The proposed new developments will only have an impact on tourists near the mine, which will be mostly along the main transportation routes. The severity of the visual impact of the mining activities on tourists will be low.
Traffic	Neutral	Traffic operating conditions were determined and compared for the baseline, project construction phase, and project operational phase scenarios. By comparing the operating conditions for the different scenarios, it was concluded that the proposed project would have an insignificant traffic impact on the surrounding road network. No traffic problems or congestion are expected as a result of the project activities, provided that the issues discussed in Section 7 of the Traffic Impact Report are considered and summarised below. • All legal authorisations and permits must be obtained for the transportation of abnormal loads and hazardous materials on public roads; • Measures should be taken to ensure that all health and safety requirements regarding transportation activities are complied with. This may include dust covers for hauling vehicles and dust control on all gravel roads; • It is proposed that flagmen and temporary warning signs be placed at all access points where heavy vehicles will access public roads during construction, and • Controls should be in place to ensure that vehicles exiting the site are not overloaded. Traffic impact significance scores of 18 and 24 are calculated for the construction and operational phases of the

Issue	Nature	Description
		proposed project, respectively, which implies that the project can be authorized from a traffic engineering viewpoint.
Geology	Negative	The proposed conveyor belt and associated road as well as the discard dump will not have significant impact on the geology.
Climate Change	Negative	Local climate conditions do not appear to be of a significant concern to the proposed project. In a broader scale the project will have no direct significant impact on the local and/or global climate change. According to the air quality specialist Climate change is unlikely to have a major direct impact on the mining industry, for which regulations and management strategies are already in place to manage factors such as water usage, water conservation and demand strategies and environmental issues relating to rehabilitation and the provision of rehabilitation guarantees. While a lack of access to water may affect some mining projects, most mining processes do not generally require potable water. Where high-quality water is required, some mines are already installing water treatment units. Changes in the frequency and intensity of storm events have the potential to impact on mining operations (e.g. tailing dams, sediment and erosion control); however, these impacts can normally be addressed as part of the mine's storm water management plan. Potential climate risk identified by the Climate Change specialist are summarised below **Variable** — **Potential Climate Risk** 1. Increased temperature • Increased temperature, heatwaves and wildfires can pose a health risk to employees. • Increased temperature and heatwaves can influence productivity. • Increased temperature and heatwaves may present a risk of spontaneous combustion of stockpiles. • Wildfires may damage infrastructure and facilities.

Issue	Nature	Description	
		2. Reduced rainfall	• Water scarcity and drought can constrain exploration, processing and site rehabilitation. • Water scarcity and drought can lead to water conflicts with communities. • Water scarcity and draught may further exacerbate water quality. • Drought may result in increased dust generation and increased water requirements for dust suppression.
		3. Extreme events	• Floods, cyclones and storms may cause damage to infrastructure and facilities. • Floods, cyclones and storms may cause discharge of contaminated water into surrounding areas. • Floods, cyclones and storms may cause reduced accessibility due to flooding of roads.
		4. Wind impacts	• High wind speeds and gusts may damage infrastructure. • High wind speed and gusts may result in increased dust generation.

10.2 AN ASSESSMENT OF THE SIGNIFICANCE OF EACH ISSUE AND RISK AND AN INDICATION OF THE EXTENT TO WHICH THE ISSUE AND RISK COULD BE AVOIDED OR ADDRESSED BY THE ADOPTION OF MITIGATION MEASURES

The assessment of the significance of each issue and risk identified during the impact assessment is presented in Section 11.2 below. The section also includes the mitigation measures proposed by the EAP and specialist to be adopted to manage the impacts and risks.

11 AN ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK INCLUDING THE FOLLOWING:

11.1 CUMULATIVE IMPACTS

Cumulative impacts in relation to an activity mean the past, present and reasonably foreseeable future impacts of an activity, considered together with the impacts of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (DEA, 2014 EIA Regulations). The cumulative impact can be defined as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts, and the change in the environment which results from the incremental impact of the project when added to other closely related past, present, or reasonably foreseeable future projects, and can result from individually minor, but collectively significant, projects taking place over some time.

This section describes the potential impacts of the project that are cumulative. There are three separate levels of cumulative impacts considered, and this includes project site localised cumulative impacts; regional cumulative impacts, and global cumulative impacts. This section provides cumulative impacts ratings associated with the proposed project, which include the waste generation, traffic, socio-economic, visual impacts, air quality, and climate change. It also outlines the mitigation measures of each rated cumulative impacts as follows:

11.1.1 WASTE GENERATION

During the construction phase of the discard dump, conveyor belt, and service road, there will be a variety of waste material produced within the study area. The waste generation impact rating and the proposed mitigation measures are provided in table below as follows:

Issue	Corrective	Impact rating criteria	Significance

	measures	Nature	Extent	Duration	Magnitude	Probability	
General Waste	No	Negative	2 (Local)	3 (Medium)	8 (High)	5 (Definite)	65 (High)
	Yes	Negative	1 (Site)	3 (Medium)	4 (Low)	5 (Definite)	40 (Medium)
Corrective Actions	• No waste will be buried on site or incorporated into the foundation trenches; • The work force must be encouraged to sort waste into recyclable and non-recyclable waste; Separation of waste per category i.e., hazardous and general waste and scrap metal. • No burning of waste will be allowed on site; and • Waste must be regularly removed from site and disposed of at a registered waste disposal facility.						

11.1.2 VISUAL IMPACT

The proposed activity will change the visual character of the area, particularly considering that the proposed site is located next to regional roads (R547 and R544). Given the undulating topography of the site and the proximity to these routes, the impact can be considered definite and long term. The cumulative impact will be higher than anticipated due to existing mines. The visual cumulative impacts and mitigation measures within the proposed study area are provided as follows:

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual	No	Negative	2 (Local)	4 (Long term)	6 (Moderate)	5 (Definite)	60 (High)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	5 (Definite)	50 (Medium)
Corrective Actions	• Keep the construction sites and camps neat, clean and organized in order to portray a tidy appearance; and • Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height.						

11.1.3 TRAFFIC IMPACT

During the construction phase, increased heavy vehicle traffic should be expected. Without management, such increased traffic loads may negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users, and uncontrolled movement of construction vehicles may result in unnecessary impacts on the environment through vegetation and habitat destruction. The traffic impacts ratings and mitigation measures associated with the proposed project presented in the table below as follows:

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Traffic	No	Negative	3 (Regional)	2 (Short Term)	8 (High)	3 (Medium)	39 (Medium)
	Yes	Negative	2 (Local)	2 (Short Term)	6 (Moderate)	2 (Low)	20 (Low)
Corrective Actions	• The delivery of construction material and equipment should be limited to hours outside peak traffic times (including weekends) prevailing on the surrounding roads; • Access roads must be clearly marked; and • Delivery vehicles must comply with all traffic laws and bylaws.						

11.1.4 SOIL AND LAND CAPABILITY

According to the soil and land capability specialist, the surrounding areas within which the proposed mining-related activities are to occur are dominated by high potential agricultural soils (i.e., Hutton/ Lichtenburg) and good rainfall for food production. The study area is primarily dominated by cultivated agrarian land use, with maize and soya bean production being the current cultivated crops. The conversion of land use from cultivated dryland agriculture to mining will raise food security concerns, as these soils are considered to contribute significantly to provincial and national agricultural productivity by state entities such as Department of Agricultural Forestry and Fisheries (DAFF), if used for crop cultivation and are essentially also well-suited for other less intensive land uses such as grazing, forestry, etc. Emphasis is, however, directed to their agricultural crop productivity due to the scarcity of such soil resources on a national scale where they coincide with areas of good or adequate rainfall. This is largely attributed to the deep nature and proper drainage of the dominant soils. For this reason, the proposed mining project is anticipated to contribute to the cumulative loss of arable land.

Based on the current mining layout, the disturbance of high potential arable soils is unavoidable, and it is unlikely that the natural landscape setting will be restored post-closure to its pre-mining land capability. However, it can be rehabilitated to a freely draining landscape setting, using the stockpiled soil material so that it mimics the natural landscape setting, and the area can be relatively productive beyond the life of mine. Impacts of land-use change will be most felt during the life of mine (LOM), and post-mining if mitigation measures are not carefully implemented during all phases of development. Although avoidance of high potential agricultural soils is impractical, the impacts thereof can be minimised and rehabilitated to a certain degree.

The physical properties of soils in the rehabilitated area are likely to be significantly changed and potentially contaminated to some degree and not suitable for arable agriculture and/ or gazing unless strict adherence to the proposed mitigation measures is undertaken. This could impact on land capability and agricultural potential post-development.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Soil and Land capability	No	Negative	2 (Local)	5 (Long-Term)	8 (High)	4 (High)	60 (Medium)
	Yes	Negative	2 (Local)	5 (Long-Term)	6 (Moderate)	3 (Medium)	39 (Medium)
Corrective Actions	• Excavation of soil should be limited within the demarcated areas as far as practically possible. • Ensure that all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined no-go areas. • The A and B-horizons should be stripped separately and replaced in the same sequence on top of the spoil material.						

11.1.5 AIR QUALITY

Cumulative impacts refer to the incremental effect of several projects that may have an individually minor but collectively significant impact on air quality. These are the cumulative impacts that result from mining operations near the project site. Project site localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers. These include mainly dust deposition. From this air impact assessment conducted for the proposed project the modelling indicates the cumulative pollution plume emanating from this site as a combination of activities. It shows that the impacts will be mainly localised around and in the vicinity of the operations.

Regional cumulative impacts

Regional cumulative impacts include the project's contribution to impacts that are caused by mining operations throughout the region. Each mining operation in itself may not represent a substantial impact, however, the cumulative effect on air quality in the region may warrant consideration. The coal mining sector in South Africa is growing steadily as the requirement for electricity also grows; therefore this project will also contribute to the larger regional impact that will be experienced.

Global cumulative impacts

The only impact of the project that is potentially global is the generation of potential greenhouse gas emissions. However, the level of emissions from the project represents a very minor and insignificant contribution at this scale.

Therefore, the overall impact on the air quality as a result of the project would not be cumulatively considerable and would be less than significant if the sound implementation of mitigation measures identified reducing emissions are implemented. If emissions are kept below the relevant threshold levels by ensuring the management and mitigation measures prescribed are adhered to, there are no significant cumulative impacts expected as the air quality impacts would be limited to the site level.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Air Quality	No	Negative	3 (Regional)	5 (Permanent)	6 (Moderate)	3 (Medium)	42 (Medium)
	Yes	Negative	2 (Local)	4 (Long Term)	4 (Low)	2 (Low)	20 (Low)
Corrective Actions	• Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. • Plants with roots that bind the soil, and vegetation cover should be used that breaks the impact of falling raindrops, thus preventing wind and water erosion. • Hard surfaced haul roads or standing areas to be washed down and swept to remove accumulated dust. • Dust suppression of roads being used during rehabilitation should be enforced. • It is recommended that the rehabilitation by vegetating should begin during the operational phase already as the objective is to minimise the erosion. • Leaving the surface of the soil in a coarse condition reduces wind erosion and ultimately reduces dust levels. • Additional mitigation measures include keeping the soil moist using sprays or water tanks, using wind breaks.						

11.1.6 CLIMATE CHANGE

The climate change analysis focused on the emissions inventory and climate change significance for the DCM West's current operations and expansion project the following observations can be made:

- A total GHG emission rate of 16 186.89 tCO2e was calculated for the current operations. Scope 1 GHG emissions amounted to 1 648.61 tCO2e (10.18%) and Scope 2 GHG emissions equaled 14 538.27 tCO2e (89.82%).
- The expansion project's total GHG emission rate was calculated at 239 127.80 tCO2e for the LOM. Scope 1 GHG emissions amounted to 70 126.87 tCO2e (29.33%). Scope 2 GHG emissions equaled 169 000.93 tCO2e (70.67%).

From the **climate change significance analysis** for DCM West's current operations and expansion project the following observations can be made:

- DCM West's calculated GHG emissions inventory for current operations amounts to 0.0004% of South Africa's carbon budget (4,410 Mt CO2e). The magnitude of GHG emissions from the current operations is considered minor, as GHG emissions are less than 0.02% of the South Africa's carbon budget.
- The expansion project's calculated GHG emissions inventory amounts to 0.0054% of South Africa's carbon budget (4,410 Mt CO2e). The magnitude of GHG emissions from the expansion project is considered minor, as GHG emissions are less than 0.02% of the South Africa's carbon budget.
- The impact of GHG emissions from current coal mining and beneficiation operations was rated medium with or without mitigation measures.
- The impact of GHG emissions from the expansion project was rated medium with or without mitigation measures.

Mitigation will not alter the impacts of GHG emissions in terms of the extent, duration, or probability of the project impact. The magnitude of the impact can, however, be reduced notably by reducing the quantity of GHG emissions.

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Calculated GHG emissions inventory for current operations amounts to 0.0004% of South Africa's carbon budget (4,410 Mt CO_2e). The impact of GHG emissions from current coal mining and beneficiation operations was rated medium with or without mitigation measures.							
Current Operations – GHG Emissions							
Current coal mining and beneficiation operations.	No	Negative	5 (International)	5 (Permanent)	2 (Minor)	5 (Definite)	60 (Medium)
	Yes	Negative	5 (International)	5 (Permanent)	2 (Minor)	5 (Definite)	60 (Medium)
Mitigation Measures							
Mitigation will not alter the impacts of GHG emissions in terms of the extent, duration, or probability of the project impact. The magnitude of the impact can, however, be reduced, notably by reducing the quantity of GHG emissions. • Optimisation of operational activities and logistics. • Implementation of a fuel management strategy. • Reduction in the amount of waste disposed to landfill and reuse of waste. • Procurement of generators, which use biodiesel.							

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Exploring alternative energy possibilities. • Regular monitoring of fuel and energy. • Identification of significant energy consuming equipment and opportunities where technical efficiencies can be applied. • Annual GHGs emissions inventory review. • Implementation of technology for the oxidation of ventilation air methane.							

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The expansion project's calculated GHG emissions inventory amounts to 0.0054% of South Africa's carbon budget (4,410 Mt CO2e). The impact of GHG emissions from the expansion project was rated medium with or without mitigation measures.							
Expansion Project – GHG Emissions							
Expansion project coal mining and beneficiation operations.	No	Negative	5 (International)	5 (Permanent)	2 (Minor)	5 (Definite)	60 (Medium)
	Yes	Negative	5 (International)	5 (Permanent)	2 (Minor)	5 (Definite)	60 (Medium)
Mitigation Measures							
Mitigation will not alter the impacts of GHG emissions in terms of the extent, duration, or probability of the project impact. The magnitude of the impact can, however, be reduced, notably by reducing the quantity of GHG emissions. • Optimisation of operational activities and logistics. • Implementation of a fuel management strategy, which encourages more efficient use of plant and vehicles, planning, logistics, driver education and maintenance. • Reduction in the amount of waste disposed to landfill and reuse of waste, which will subsequently reduce the number of vehicle movements and fuel usage. • Procurement of generators, which use biodiesel.							

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Exploring alternative energy possibilities. • Regular monitoring of fuel and energy. • Identification of significant energy consuming equipment and recognising opportunities where technical efficiencies in plant and equipment can be applied. • Annual GHGs emissions inventory review. • Implementation of a technology for the oxidation of ventilation air methane.							

11.2 THE NATURE, SIGNIFICANCE, EXTENT, DURATION, PROBABILITY, CONSEQUENCES OF THE IMPACT AND RISK AS WELL AS THE DEGREE TO WHICH THE IMPACT AND RISK CAN BE MITIGATED

The following section presents the impacts and the significance as rated by the specialists as well as the EAP. The Tables below highlight the significance of the identified impacts for both the construction and operational phases of the project. **In some cases, the decommissioning, rehabilitation and closure phases were also assessed.**

The ratings are assessed with and without mitigation and colour coded as follows to indicate the significance:

High
Medium
Low

11.2.1 HYDROPEDOLOGY IMPACT ASSESSMENT

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The proposed activities will impact portions of the wetlands associated with the study area and their associated wetland drivers. Loss of wetland recharge from surface runoff, due to mining, is anticipated to occur. However, the contribution of surface runoff is anticipated to be event-driven (Important during a rainfall event), which therefore does not account for a significant contribution of water for the majority of the year, although on an annual scale surface runoff is considered an important driver of these wetlands. The hydropedological impacts were rated medium during site preparation without mitigation measures and medium with the implementation of the appropriate mitigation measures. During the operation of the proposed conveyor route, the impacts were rated medium and low without and with mitigation measures, respectively. Further, during the operation of the discard dump, the impacts were rated medium.							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
CONSTRUCTION PHASE IMPACTS							
Site preparation prior to the commencement of the proposed development.	No	Negative	1 (Site)	2 (Short term)	6 (moderate)	5 (definite)	45 (Medium)
	Yes	Negative	1 (Site)	2 (Short term)	6 (moderate)	4 (high)	36 (Medium)
Mitigation Measures							
• All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is absolutely essential; • Retain as much indigenous vegetation as possible; • Exposed soils to be protected by means of a suitable covering; and • Existing roads should be used as far as practically to gain access to site and crossing the wetlands in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles.							
Excavation activities as part of the conveyor plinth installation.	No	Negative	1 (Site)	3 (Medium Term)	6 (Moderate)	4 (High)	40 (Medium)
	Yes	Negative	1 (Site)	2 (Short Term)	6 (Moderate)	4 (High)	36 (Medium)
Mitigation Measures							
• If possible, vegetation clearing should be done in a phased manner to limit bare/exposed soils which are prone to erosion. • Exposed soils to be protected by suitable covering.							
Excavation activities as part of the site preparation.	No	Negative	1 (Site)	2 (Short term)	6 (Moderate)	5 (Definite)	45 (Medium)
	Yes	Negative	1 (Site)	2 (Short term)	6 (Moderate)	4 (High)	36 (Medium)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• The discard dump must be lined with impermeable clay material to limit mobility of contaminants into the wetlands and groundwater regime, Class C type as recommended by DHSWS.							
OPERATIONAL PHASE IMPACTS							
During the operation of the proposed conveyor route, the impacts are rated medium and low with and without mitigation measures, respectively. Further, during the operation of the discard dump, the impacts were rated medium.							
Operation of the Conveyor route.	No	Negative	1 (Site)	2 (Short Term)	6 (Moderate)	3 (Medium)	27 (Low)
	Yes	Negative	1 (Site)	2 (Short Term)	4 (Low)	2 (Low)	14 (Low)
Mitigation Measures							
• Avoid installation of the conveyor within wetlands and interflow soils as far as practically possible; • Should it not be feasible, Route A should strongly be considered.							
Operation of the Discard dump.	No	Negative	1 (Site)	3 (Medium Term)	6 (Moderate)	4 (High)	40 (Medium)
	Yes	Negative	1 (Site)	2 (Short Term)	6 (Moderate)	4 (High)	36 (Medium)
Mitigation Measures							
• The discard dump must be lined with impermeable clay material to limit mobility of contaminants into the wetlands and groundwater regime, Class C type as recommended by DHSWS; and • A dirty water trench similar to the existing one and that complies with GN704 must be installed downgradient of the discard facility to capture seepage, which might potentially pollute the wetlands.							

11.2.2 SOCIO-ECONOMIC IMPACT ASSESSMENT

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impacts during the pre-construction phase							
Spin-off businesses to support proposed project.	**No**	Positive	2 (Local)	3 (Medium)	2 (Minor)	5(Definite)	35 (Medium)
	Yes	Positive	2 (Local)	3 (Medium)	4 (Low)	5 (Definite)	45 (Medium)
Mitigation Measures							
• There could be initiatives developed to contribute towards educating and developing necessary skills for the locals to take advantage of opportunities associated with the proposed construction of the proposed project. • Local businesses could be where feasible incubated and developed to be able to take opportunities in the construction and operation of the proposed project, which is highly technical.							
Employment expectations and an influx of migrant labour.	**No**	Neutral	4 (National)	3 (Medium)	6 (Moderate)	4 (High)	52 (Medium)
	Yes	Positive	4 (National)	3 (Medium)	2 (Minor)	4 (High)	36 (Medium)
Mitigation Measures							
• There could be initiatives developed to contribute towards educating and developing necessary skills for the locals to take advantage of opportunities associated with the proposed construction of the proposed project. • Local businesses could be where feasible incubated and developed to be able to take opportunities in the construction and operation of the proposed project which is highly technical. • When appointing subcontractors, Exxaro should give preference to appropriate subcontractors/SMMEs located in the surrounding communities, then in the municipal area, and then only to contractors located elsewhere or outside the province.							
Impacts during the construction phase							
Job creation	**No**	Positive	2 (Local)	1 (Immediate)	6 (Moderate)	4 (High)	36 (Medium)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
	Yes	Positive	2 (Local)	2 (Short)	8 (High)	4 (High)	48 (Medium)
Mitigation Measures							
• Employment of skilled, semi-skilled and unskilled labours in the construction of proposed project within the receiving environment and ELM. • Skills development initiative to prepare locals to have necessary skills to take up employment opportunities with the proposed project in line with the mine Social Labour Plan and the associated Employment Equity and Skills Development Plans. • Exxaro must promote the creation of employment opportunities for women and youth. The positions reserved for the youth and women may only be filled with persons outside of these categories if it can be demonstrated that no suitable persons can be employed from these categories.							
Development of tenders and contract opportunities for local businesses.	**No**	Positive	3 (Regional)	3 (Medium)	2 (Minor)	2 (Low)	16 (Low)
	Yes	Positive	3 (Regional)	3 (Medium)	2 (Minor)	4 (High)	32 (Medium)
Mitigation Measures							
• If possible, the local businesses should be incubated and developed to be able to take opportunities in the construction of the proposed project. This should be aligned with the mine Social Labour Plan and associated Employment Equity and Skills Development Plans. • It is recommended that Exxaro consult with local business forums.							
Change in local land use in the affected area for the proposed project.	**No**	Negative	2 (Local)	2 (Short)	8 (High)	3 (Medium)	36 (Medium)
	Yes	Positive	1 (Site)	1 (Immediate)	2 (Minor)	1 (Low)	4 (Low)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Construction activities for the proposed project and the associated auxiliary infrastructure should be restricted within the footprint of this infrastructure and associated servitudes. • With mitigation construction activities will be restricted to the mine receiving environment and there will be no negative spill-overs. There is therefore no adverse change in land use in the area.							
Traffic impacts	**No**	Negative	2 (Local)	2 (Short)	2 (Minor)	3 (Medium)	18 (Low)
	Yes	Positive	2 (Local)	4 (Long)	2 (Minor)	3 (Medium)	24 (Low)
Mitigation Measures							
• Improvement in local road conditions and reduction of the number of trucks used to load and transport coal with the construction of the proposed project, such as the development traffic lights, and speed humps aimed at mitigating risk of uncontrolled traffic during off-peak hours of the construction phase. • Traffic management systems should be developed to manage traffic during peak hours and off-peak hours especially for construction trucks during the construction phase of the proposed project. • Inform communities of planned construction activities that would affect vehicle/ pedestrian traffic.							
Increase in occupational health and safety risks.	**No**	Negative	1 (Site)	2 (Short)	6 (Moderate)	5 (Definite)	54 (Medium)
	Yes	Positive	1 (Site)	1 (Immediate)	2 (Minor)	1 (Low)	4 (Low)
Mitigation measures							
• The mine should consider installing appropriate traffic management systems north of existing Discard Dump and near the Thubelihle cemetery should it be necessary • Construction related vehicles should be restricted to daylight hours and the workweek if at all possible. Thus, it is recommended that trucks should not be operated after sunset or over weekends. • Safe travelling speeds must be determined, and measures implemented to ensure that these restrictions are enforced.							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Increase in pressure for water demand and allocation to support the construction of the proposed project.	No	Negative	2 (Local)	3 (Medium)	10 (Very High)	4 (High)	60 (Medium)
	Yes	Neutral	1 (Site)	2 (Short)	6 (Moderate)	3 (Medium)	27 (Low)
Mitigation measures							
• Various water schemes that are in place in ELM and Mpumalanga Province in general should be considered and in partnership with the responsible authorities and other water intake stakeholders in the area, the mine should ensure that it applies for the relevant for water use and abstraction permits. • The mine should also ensure that it establishes the necessary water recycle measures such as water recycling and storm water management systems as there is a possibility of contamination of water bodies during construction of the proposed project.							
Increase in negative public sentiments about the proposed project.	**No**	Negative	2 (Local)	3 (Medium)	8 (High)	4 (High)	52 Medium
	Yes	Positive	2 (Local)	2 (Short)	2 (Minor)	2 (Low)	12 Low
Mitigation measures							
• To improve project public participation and communication strategies in order to strengthen multi-stakeholder engagement and participation in the planning and implementation of the proposed project. • Exxaro should inform and consult with its Stakeholders during all stages of the proposed project.							

11.2.3 HYDROGEOLOGICAL IMPACT ASSESSMENT

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The groundwater impacts were rated low during site preparation without and with the implementation of the appropriate mitigation measures. During operation of the proposed conveyor route, the impacts were rated low without and with mitigation measures respectively. During the operational and post closure phases of the							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
discard dump the impacts are rated medium.							
Construction phase							
Site preparation prior to the commencement of proposed development.	No	Negative	1 (Site)	2 (Short term)	4 (Low)	3 (Medium)	21 Low
	Yes	Negative	1 (Site)	2 (Short term)	2 (Minor)	2 (Low)	10 Low
Mitigation measures							
• Limit the vegetation clearance and topsoil stripping to the smallest area possible; • Waste needs to be discarded; • Spills cleaned up immediately according to standard operating procedures; and • If applicable, the appropriate authorities should be notified in the event of a spill.							
Operational phase							
Operation of the Conveyor route.	No	Negative	1 (Site)	4 (Long term)	4 (Low)	2 (Low)	18 (Low)
	Yes	Negative	1 (Site)	4 (Long term)	2 (Minor)	1 (Improbable)	7 (Low)
Mitigation measures							
• Spills must be cleaned up immediately according to standard operating procedures; and • If applicable, the appropriate authorities should be notified in the event of a spill.							
Water quality - Discard Dump Extension.	No	Negative	2 (Local)	4 (Long term)	8 (High)	4 (High)	56 (Medium)
	Yes	Negative	2 (Local)	4 (Long term)	6 (Moderate)	4 (High)	48 (Medium)
Mitigation measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Clean water and rainwater need to be diverted away from the discard dump as much as possible to reduce seepage to groundwater.							
Water quality - Waste handling	No	Negative	2 (Local)	4 (Long term)	2 (Minor)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	2 (Minor)	2 (Low)	16 (Low)
Mitigation measures							
• Waste needs to be appropriately disposed and spills cleaned up immediately accordingly. • All spills must be recorded and reported in accordance with the requirements of the Regulations.							
Decommissioning and Post-Closure phases							
Water quality - Decant of groundwater	No	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 (Medium)
	Yes	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 (Medium)
Mitigation measures							
• Water influx into the mine should also be kept to the absolute minimum possible. • In this regard the fracturing of the overlying strata due to blasting or surface subsidence should be avoided at all cost, so as to prevent increased infiltration of surface water into the mine workings. • Treating of decanting mine water to acceptable water quality levels can be achieved by the installation of a treatment plant. • Financial provision is made on an annual basis to provide for treatment of decant at unscheduled and scheduled closure of the mine. • Exxaro must continue with the investigations to the most effective way to possibly treat water on site if needed at the end of LoM. • The level to which the water is treated depends on the use of the water after treatment but should be determined in consultation with the DHSWS. * • As a minimum, treated water should meet the standards for use for livestock watering and irrigation.							
Water quality - Discard Dump Extension	No	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 (Medium)
	Yes	Negative	2 (Local)	5 (Permanent)	8 (High)	4 (High)	60 (Medium)
Mitigation measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• The same mitigation measures as mentioned during the operational phase will apply and should be maintained until such a time as seepage water out of the mine dump conforms to the relevant standards for aquatic ecosystems. • Rehabilitation of the mine dump should also be undertaken in such a way as to limit infiltration of rainwater into the mine dump. The use of a clay layer under the topsoil should be investigated and implemented if feasible.							

11.2.4 TERRESTRIAL BIODIVERSITY

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The impact on terrestrial biodiversity is more for the construction phase. Most of the identified impacts are of medium significance with mitigation measures.							
Assessment of the impacts related to the extension of discard dump							
Loss if indigenous vegetation	No	Negative	2 (Site)	5 (Permanent)	8 (High)	5 (Definite)	75 (High)
	Yes	Negative	1 (Local)	4 (Long Term)	6 (Moderate)	5 (Definite)	55 (Medium)
Loss of exotic vegetation	No	Negative	2 (Site)	5 (Permanent)	6 (Moderate)	5 (Definite)	65 (Medium)
	Yes	Neutral	1 (Local)	4 (Long Term)	2 (Minor)	5 (Definite)	35 (Medium)
Loss of or displacement of fauna	No	Negative	2 (Site)	5 (Permanent)	8 (High)	4 (High)	60 (Medium)
	Yes	Negative	1 (Local)	4 (Long Term)	4 (Low)	3 (Medium)	27 (Low)
Increase in alien invasive vegetation	No	Negative	3 (Regional)	5 (Permanent)	6 (Moderate)	5 (Definite)	70 (High)
	Yes	Negative	2 (Site)	3 (Medium Term)	4 (Low)	3 (Medium)	27 (Low)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Loss of ecological function (Expansion of existing discard dump)	No	Negative	3 (Regional)	5 (Permanent)	10 (High)	5 (Definite)	90 (High)
	Yes	Negative	2 (Site)	4 (Long Term)	8 (High)	3 (Medium)	44 (Medium)

Issue	Mitigation measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impacts related to the conveyor belt routes and service road							
Loss of indigenous vegetation (Route A)	No	Negative	3 (Regional)	5 (Permanent)	8 (High)	5 (Definite)	80 (High)
	Yes	Negative	2 (Local)	4 (Long Term)	6 (Moderate)	5 (Definite)	60 (Medium)
Loss of indigenous vegetation (Route B)	No	Negative	3 (Regional)	5 (Permanent)	8 (High)	5 (Definite)	80 (High)
	Yes	Negative	3 (Regional)	4 (Long Term)	8 (High)	5 (Definite)	75 (High)
Loss of exotic vegetation	No	Negative	2 (Local)	4 (Long Term)	4 (Low)"	5 (Definite)	65 (High)
	Yes	Neutral	1 (Site)	4 (Long Term)	2 (Minor)	5 (Definite)	35 (Medium)
Loss of or displacement of fauna	No	Negative	3 (Regional)	4 (Long Term)	8 (High)	5 (Definite)	75 (High)
	Yes	Negative	1 (Site)	4 (Long Term)	4 (Low)"	3 (Medium)	27 (Low)
Loss of ecological function	No	Negative	3 (Regional)	5 (Permanent)	8 (High)	5 (Definite)	80 (High)
	Yes	Negative	2 (Local)	4 (Long Term)	6 (Moderate)	3 (Medium)	36 (Medium)
Mitigation Measures							

- Avoid or minimise loss of sensitive habitats.
- Avoid any disturbance to the No-Go habitats, i.e. the rocky ledges south of the current mining plant
- Minimise the physical destruction of any remaining *primary* vegetation, especially in or near wetland areas. In general, minimise clearing and operations in habitats with a High sensitivity rating and clearly delineate and maintain a no-go buffer of at least 100 m around such habitats.
- Use existing gravel roads and already disturbed areas to access mining operations as far as possible to avoid the creation of new roads or access routes across natural areas.
- Avoid any direct impacts of mining operations on any surrounding or adjacent areas with sensitive habitats or any adjacent or nearby riparian habitats (except the clearing of alien invasive species).
- Avoid blocking and/or destruction of any seasonal streams, channelled or un-channelled valley bottom wetlands or hillslope seepage areas.
- After the final layouts of new mining operation components has been approved and prior to any new groundwork's, conduct a thorough footprint investigation (during summer) to assess all Protected or Threatened plant species (population location and its size).
- Parking and operational areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur. Reinforce portions of existing access routes that are prone to erosion or seasonal inundation, create structures or low banks to drain the access road rapidly during rainfall events, yet preventing erosion of the track and surrounding areas.
- If filling material is to be used, this should be sourced from areas free of invasive species, and alien plant control measures are to be applied to all areas used for sourcing fill materials.
- Efforts will be taken to minimise the footprint of short-duration activities and/or linear infrastructure during construction, operation and decommissioning phases of the mine. Efforts to minimise such footprints will include grouping all infrastructure to the same servitude and/or as close as possible to existing and planned long-term physical disturbances. This will also reduce fragmentation due to mining operations.

11.2.5 LAND AND SOIL CAPABILITY

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on land and soil capability							
Soil erosion and dust emission	No	Negative	2 (Site)	4 (Long Term)	8 (High)	5 (Definite)	70 (High)
	Yes	Negative	2 (Site)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Any disturbance of high potential agricultural soils must be actively avoided, should this be not feasible, the footprint of the proposed mining and infrastructure areas should be clearly demarcated to restrict the planned activities within infrastructure footprint as far as possible, thus minimising edge effects and reducing the extent and overall significance of impact; • An adequate storm water management plan must be carefully designed and implemented in order to avoid erosion of topsoil on adjacent arable soils throughout all the mining phases. In this regard, special mention is made of: o Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed; o Runoff from paved surfaces should be slowed down by the strategic placement of berms; and o All overburden stockpiles and waste stockpiles must have berms and/catchment paddocks at their toe to contain runoff of the facilities; • If possible, commencement of construction activities can be scheduled to coincide with low rainfall conditions when the erosive runoffs and wind are anticipated to be low; • As the footprints of the proposed development are not vegetated it is best to be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast; • Bare soils adjacent to the infrastructural areas can be vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission; and • Erosion control is regarded critical as the majority of the soils are susceptible to erosion, as they have finer particles, due to their sandy texture and continuous tillage practises taking place.						

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on soil compaction	No	Negative	2 (Local)	4 (Long Term)	8 (High)	5 (Definite)	70 (High)
	Yes	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	27 (Low)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Mitigation Measures							
• All vehicular traffic should be restricted to the existing service roads and the selected road servitude as far as practically possible; to avoid unnecessary compaction of the surrounding soils; • Direct surface disturbance of the identified high clay content/wetland (i.e. Katspruit, Rensburg, etc.) soils should be limited within demarcated areas where possible to minimise the intensity of compaction due to the susceptibility of these soils to prolonged waterlogging conditions (inundation); • Compacted soils adjacent to the mining project footprints and associated infrastructure footprint can be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation, and • Compaction of soil can be mitigated by ripping the footprint and introducing both organic and inorganic fertilizers.							
Issue	**Corrective measures**	**Impact rating criteria**					**Significance**
		Nature	**Extent**	**Duration**	**Magnitude**	**Probability**	
Impacts on the loss of agricultural potential							
Loss of agricultural potential.	No	Negative	2 (Local)	5 (Permanent)	8 (High)	5 (Definite)	75 (High)
	Yes	Negative	2 (Local)	5 (Permanent)	8 (High)	5 (Definite	75 (High)
Mitigation measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Unnecessary disturbances of the potentially arable soils outside the demarcated areas (i.e. Hutton) can be avoided where possible to minimise loss of arable soils; • During the decommissioning phase the footprint should be thoroughly cleaned, and all building material should be removed to a suitable disposal facility; • The footprint should be ripped at 25 cm to alleviate compaction as part of rehabilitation; • Stored topsoil should be replaced (if any) and the footprint graded to a smooth surface; • The landscape should be backfilled and re-profiled to mimic the natural topography for potential agricultural activities and grazing opportunities post mining. If possible, ensure a continuation of the pre-mining surface drainage pattern; • The soil layers should be put back in the reverse order of stripping (e.g. subsoil first then followed by topsoil); • It is recommended that soil quality assessments (through laboratory analysis) be conducted prior to establishing vegetation on the rehabilitated; • The analytical data should be evaluated by a suitably qualified expert, and soil fertility or soil acidity problems should be corrected prior to vegetation establishment; and • Slopes of the backfilled surfaces should change gradually since abrupt changes in slope gradient increase the susceptibility for erosion initiation; and • The footprint should be re-vegetated with a grass seed mixture as soon as possible, preferably in spring and early summer to stabilise the soil and prevent soil loss during the rainy season.							
Impact: Potential soil contamination							
Soil contamination	No	Negative	2 (Local)	5 (Permanent)	10 (High)	5 (Definite)	85 (High)
	Yes	Negative	2 (Local)	2 (Short Term)	4 (Low)	2 (Low)	16 (Low)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Contamination prevention measures should be addressed in the Environmental Management Programme (EMPr) for the proposed development, and this should be implemented and made available and accessible at all times to the contractors and construction crew conducting the works on site for reference; • Spill prevention and emergency spill response plan should be compiled to guide the construction works; • An emergency response contingency plan should be put in place to address clean-up measures should a spill and/or a leak occur; and • Mining vehicles/equipment should be regularly checked for leakages to avoid soil contamination by hydrocarbons.							

11.2.6 IMPACT ON WETLANDS

Impacts on wetlands are similar for both the construction and operational phases of the project.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on wetlands during the Construction and operational phases							
Destruction and degradation of wetlands	No	Negative	3 (Regional)	5 (Permanent)	8 (High)	5 (Definite)	80 (High)
	Yes	Negative	2 (Local)	3 (Medium Term)	6 (Moderate)	3 (Medium)	33 (Medium)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• All soils within the footprint of the discard facility must be appropriately separated and stored; • Avoid mining activities in the wetland areas identified as far as possible through proper planning, demarcation and appropriate environmental training; • Lay-out designs should incorporate wetland sensitive designs e.g. appropriate watercourse crossings that do not concentrate flows or impact on subsurface interflow. A wetland specialist must be appointed to guide engineers for the detailed designs; • Any proclaimed weed or alien species that germinate during the operational period shall be cleared by hand before flowering; • The re-release of clean water from clean and dirty water separation infrastructure must be diffused and not reach wetland habitat as concentrated flows where it will have serious negative impacts on especially the valley bottom wetlands. • The storm water plan must include adequate attenuation facilities to ensure that peak flows do not cause negative impacts on wetlands. • Caution must be taken to ensure building materials are not dumped or stored within the proximity of the delineated wetlands; • Emergency plans must be in place in the case of spillages into wetland systems. • All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised and be surrounded by bunds. It should also only be stored for the minimum amount of time necessary; • Erosion control of all banks must take place to reduce erosion and sedimentation into wetland areas; • Littering and contamination of water sources during mining activities must be mitigated by effective camp management; and • All construction materials including fuels and oil should be stored in a demarcated area that is contained within a bunded impermeable surface to avoid spread of any contamination (outside of wetlands). • Where impacts could not effectively be mitigated or in instances where mitigation measures failed, a wetland off-set mitigation approach should be followed as a last resort. Appropriate wetlands studies should be conducted in order to facilitate such a process.						

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Sedimentation of wetlands and increased erosion.	No	Negative	3 (Regional)	3 (Medium Term)	8 High)	5 (Definite)	70 (High)
	Yes	Negative	2(Local)	2 (Short Term)	6 Moderate)	3 (Moderate)	30 (Medium)
Mitigation Measures							
• A phased planned approach must be taken when construction is initiated. Areas must only be stripped directly prior to construction and only expose soils to erosion for the minimum period necessary. Where possible, re-vegetation of areas must be implemented as soon as possible; • An effective storm water and clean and dirty water separation system (that includes serviceable sedimentation basins) must be designed by the mine and approved by a wetland specialist as part of the WULA. • Topsoil and subsoil must be stockpiled separately in low heaps. • Stockpile any topsoil or any overburden material at least 40m outside of the outer boundary of wetlands. • Erosion must not be allowed to develop on a large scale before effecting repairs. • A wetland monitoring program should be initiated before the start of the construction phase. The Environmental Control Officer should be briefed by a wetland specialist on specific monitoring issues. • Vegetation and soil must be retained in position for as long as and wherever possible, and only removed immediately ahead of construction / earthworks in that area • Areas exposed to erosion due to construction should be vegetated with appropriate species naturally occurring in the area; and • Surface water or storm water must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being put in place.							
Sedimentation of wetlands and increased erosion	No	Negative	3 (Regional)	3 (Medium term)	8 (High)	5 (Definite)	70 (High)
	Yes	Negative	2 (Local)	2 (Short term)	6 (Moderate)	3 (Moderate)	30 (Medium)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Mitigation Measures							
• A phased planned approach must be taken when construction is initiated. Areas must only be stripped directly prior to construction and only expose soils to erosion for the minimum period necessary. Where possible, re-vegetation of areas must be implemented as soon as possible; • An effective stormwater and clean and dirty water separation system (that includes serviceable sedimentation basins) must be designed by the mine and approved by a wetland specialist as part of the WUL; • Erosion control and stormwater infrastructure must form the basis of the initial construction activities, prior to production related construction activities; • Topsoil and subsoil must be stockpiled separately in low heaps; and • Stockpile any topsoil or any overburden material at least 40m outside of the outer boundary of wetlands.						
Pollution of water resources	No	Negative	3 (Regional)	4 (Long term)	8 (High)	4 (High)	60 (Medium)
	Yes	Negative	2 (Local)	2 (Short term)	8 (High)	3 (Moderate)	42 (Medium)
Mitigation measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Construction vehicles are to be maintained in good working order so as to reduce the probability of leakage of fuels and lubricants; • Emergency plans and infrastructure to deal with spillages (especially hydro-carbon spillages) must be in place, this should include mobile response units to deal with spillages in the field; • A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas; • Storage of potentially hazardous materials should be above any 100-year flood line, or as agreed with the Environmental Control Officer. These materials include fuel, oil, cement, bitumen etc.; • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils; and • All construction materials are to be stored in appropriate structures with impermeable flooring;							
Altered hydrological regime	No	Negative	3 (Regional)	5 (Permanent)	8 (High)	4 (High)	64 (High)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Moderate)	3 (Moderate)	42 (Medium)
Mitigation measures							
• Results of hydropedological investigation to be incorporated into the lay-out design in conjunction with a wetland specialist, including base preparation, clean and dirty water separation design (clean water cut-off trench on the northern side of the facility as well as diffuse release intervention); • Implement an ecologically-sensitive stormwater management plan that includes not allowing stormwater to be discharged directly into the identified watercourse and drainage lines and seepage wetland areas.							
Impact during decommissioning							
Loss of wetlands	No	Negative	3 (Regional)	4 (Long term)	(6 Moderate)	5 (Definite)	65 (High)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
	Yes	Negative	3 (Regional)	4 (Long term)	4 (Long term)	3 (Moderate)	33 (Medium)
Decreased downstream water quality	No	Negative	3 (Regional)	4 (Long term)	6 (Moderate)	5 (Definite)	65 (High)
	Yes	Negative	3 (Regional)	4 (Long term)	4 (Long term)	3 (Moderate)	33 (Medium)
Mitigation measures							
• Stockpile all wetlands soils to be impacted separately according to various soil horizons and not higher than 2,5m; • Where the above is not possible, it is recommended that a compensation mechanism or wetland offset approach be considered as there are many rehabilitation opportunities within the vicinity of the study area which can increase wetland functionality and support to the Olifants River downstream; • An appropriate wetland and hillslope monitoring program must be implemented prior to the start of the construction phase; and • Appropriate wetland rehabilitation design and implementation must ensure that wetland functionality is restored.							

11.2.7 HERITAGE IMPACT

The impacts on heritage resources are similar for all alternatives.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impacts on Heritage							
Impact on heritage	No	Negative	1 (Site)	2 (Short term)	4 (Low)	4 (Possible)	28 (Low)
	Yes	Negative	1 (Site)	2 (Short term)	4 (Low)	4 (Possible)	28 (Low)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Sites of low significance require minimum or no mitigation. Minimum mitigation recommended could be a collection of all surface materials and/ or detailed site mapping and documentation. No excavations would be considered necessary. • A Heritage Management Plan be compiled before project commencement. This plan must be compiled by a professional archaeologist and be tailored made to ensure the protection of heritage sites that are not directly affected by the proposed development but are within the 2km radius of the proposed development. The plan must also include a monitoring plan which must be taken at infrequent or irregular intervals. • Before construction, contractors should be given training on how to identify and protect archaeological remains that may be discovered during the project. The pre-construction training should include some limited site recognition training for the types of archaeological sites that may occur during the construction phase. This should be done by an accredited archaeologist. • If any chance archaeological or previously unknown grave(s), be exhumed or discovered during the course of construction work, activities on the proposed development area should be stopped within a radius of at least 10m of such indicator, and a heritage specialist monitoring the project be notified immediately. The area should then be demarcated by a danger tape. In the meantime, it is the responsibility of the Environmental Officer and the contractor to protect the site from publicity (i.e., media) until a mutual agreement is reached. • It is mandatory to report any incident of human remains encountered to the South African Police Services, SAHRA staff member, and professional archaeologist. Any measure to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law under Section 35(4) and 36(3) of the National Heritage Resources Act, Act 25 of 1999. The developer should induct field workers about archaeology, and steps that should be taken in the case of exposing archaeological materials.						

11.2.8 VISUAL IMPACT

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The visibility analyses consider worst-case scenarios, using line-of-sight, based on topography alone. The impacts for the construction phase are insignificant, while impacts for the operational phase are rated below.							
Visual Impact on residents during operational phase							
Conveyor Route A	No	Negative	2 (Local)	4 (Long term)	6(Moderate)	(5) Definite	60 (Medium)
	Yes	Negative	2 (Local)	4 (Long term)	6 (Moderate)	(4) (High)	48 (Medium)
Conveyor Route B	No	Negative	2 (Local)	4 (Long term)	4 (Low)	(5) Definite	60 (Medium)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	(4) High	48 (Medium)
Extension of existing discard dump.	No	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)
Visual Impact on tourists during operational phase							
Conveyor Route A	No	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)
Conveyor Route B	No	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)
Extension of existing discard dump	No	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	(2) Low	20 (Low)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact on motorists during operational phase							
Conveyor Route A	No	Negative	2 (Local)	4 (Long term)	6 (Moderate)	2 (Low)	24 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	2 (Low)	20 (Low)
Conveyor Route B	No	Negative	2 (Local)	4 (Long term)	4 (Low)	2 (Low)	20 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	2 (Low)	20 (Low)
Extension of existing discard dump	No	Negative	2 (Local)	4 (Long term)	4 (Low)	2 (Low)	20 (Low)
	Yes	Negative	2 (Local)	4 (Long term)	4 (Low)	2 (Low)	20 (Low)
Mitigation Measures							

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• It is recommended that a permeable steel structure be used for the pylons of the conveyor to create the lowest degree of visual obstruction; • Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil. • Plant fast-growing endemic trees along the service road and conveyor system. The trees will with time create a screen and increase the biodiversity of the area. • It is also recommended that trees be planted in areas where the proposed discard dump is most visible, to reduce the visual impact of viewers. • Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation; • Avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover; • Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors; • Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and • Screen the construction camp and lay-down yards.							

11.2.9 HYDROLOGY IMPACT ASSESSMENT

Issue	Mitigation measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
CONSTRUCTION PHASE							
Siltation and/or contamination of surface water resources							

The footprint clearance will expose bare soil that could result in sheet wash into nearby watercourses during a precipitation event. In addition, dust can further be transported into watercourses or be deposited on infrastructure near watercourses thereby exacerbating the impact of siltation during rainfall events. During the construction phase, the impact of the expansion activities on the hydrology is low with and without mitigation measures.							
Discard Dump extension	No	Negative	1 (Site)	1 (Immediate)	4 (Low)	4 (High)	24 (Low)
	Yes	Negative	1 (Site)	1 (Immediate)	2 (Minor)	2 (Low)	12 (Low)
Route A	No	Negative	2 (Local)	1 (Immediate)	6 (Moderate)	4 (High)	36 (Medium)
	Yes	Negative	1(Site)	1 (Immediate)	2 (Minor)	2 (Low)	8 (Low)
Route B	No	Negative	2 (Local)	1 (Immediate)	6 (Moderate)	4 (High)	36 (Medium)
	Yes	Negative	1 (Site)	1 (Immediate)	4 (Low)	2 (Low)	12 (Low)
Mitigation measures							
• Ensure that clean and dirty water separation infrastructure is in place prior to the commencement of construction; • Prevent spillage of fuel and oils by using drip trays and storing hazardous substances and vehicles in bunded areas; • Design criteria should prevent the seepage of contaminated water to avoid lateral subsurface movement of contaminants into drainage lines; • The conveyor belt must be constructed across drainage lines and not along drainage lines. Spanning across drainage lines is encouraged; • Watercourses and their buffers affected by unavoidable construction activities should be rehabilitated soon after construction. Emphasis should be placed on the reinstatement of the topography to a similar profile as was present pre-construction; • Construction activities and access tracks roads should be located outside of watercourses as far as practically possible; • Avoid driving in watercourses during the construction phase to prevent vehicle track incision and the potential for channel initiation; and • The implementation of erosion protection measures, such as energy dissipaters, at new formalised vehicle tracks to contain pipes or culverts.							
OPERATIONAL PHASE							
Deterioration of surface water quality and siltation of water resources							

The discard dump extension will reduce the DCM West sub-catchment areas and runoff volumes. The proposed development is not anticipated to have a large potential peak flow reduction impact on the runoff of the immediate and general areas. This impact refers to changes in water flow patterns caused by construction activities within watercourses. It is also associated with watercourse habitat loss, but focusses more on habitat modification, specifically regarding changes in water movement. Water flow changes can also occur as a result of heavy motorised vehicles driving through watercourse and the need for access tracks in watercourses that have channels. Vehicle track entrenchment commonly occurs due to vehicles driving in wetlands with temporary, seasonal, or permanent zones of wetness.

During the operational phase, the extension of the discard dump was rated medium and low without and with the implementation of mitigation measures, respectively. Route A of the conveyor belt was rated medium to low during the operation phase. Route B was rated high without mitigation measures and medium with the mitigation measures.

Discard Dump extension	No	Negative	1 (Site)	2 (Short Term)	6 (Moderate)	4 (High)	36 (Medium)
	Yes	Negative	1 (Site)	2 (Short Term)	4 (Low)	2 (Low)	14 (Low)
Conveyor Route A	No	Negative	2 (Local)	1 (Immediate)	4 (Low)	5 (Definite)	35 (Medium)
	Yes	Negative	1 (Site)	1 (Immediate)	2 (Minor)	4 (High)	16 (Low)
Conveyor Route B	No	Negative	2 (Local)	1 (Immediate)	6 (Moderate)	5 (Definite)	45 (Medium)
	Yes	Negative	2 (local)	1 (Immediate)	4 (Low)	4 (High)	28 (Low)

Mitigation Measures

- No furrows or drains should be made to channel water from infrastructure. Where this is unavoidable, these furrows and drains need to be closed and revegetated as soon as possible.
- Where this is unavoidable in watercourses with channels or wetlands with temporary seasonal or permanent zones of wetness, crossing structures should be in place within affected wetlands and other watercourses.
- Additional benefits of using a formal crossing structure that has engineering input to mitigate watercourse impacts based on site conditions, include the following:
    - It defines a single route alignment for vehicle travel.
    - Provides a 'wear and carry' surface over unsuitable and easily compactable wetland soils.
    - This results in a stable, durable crossing surface for vehicle access, including heavy motor vehicle traffic.
    - Halts the widening and the development of braided crossing sections, while formerly used track alignments are allowed to naturally stabilise and revegetate.

11.2.10 NOISE IMPACT ASSESSMENT

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Construction phase							
Noise impacts during the construction phase were rated low with and without mitigation.							
Site clearing and grubbing of the footprint	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Earthmoving activities	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Preparation of ground for the mining extension activities	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Construction of the access roads, return water pipeline and slurry feed line at the discard dump	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Construction of the overland conveyor and service road	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Mitigation measures							
• Implementation of the noise mitigatory measures and the noise management plan							
Noise Impacts during the construction phase							
Noise increase at the boundary of the mine footprint and at the abutting residential areas during construction phase were rated low with and without implementation of the mitigation measures.							
Overland conveyor A and Service road activities	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Overland conveyor B and Service road activities	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Discard activities at the existing discard dump.	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Mitigation measures							
• Implementation of the noise mitigation measures and the noise management plan							
Decommissioning phase							
The noise intrusion levels during the decommissioning phase will be insignificant the different noise receptors from 1 to 14.							
Demolition of all infra-structure.	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Planting of the grass on rehabilitated areas.	No	Negative	2 (Local)	2 (Short Term)	4 (Low)	3 (Medium)	24 (Low)
	Yes	Negative	2 (Local)	2 (Short Term)	2 (Minor)	3 (Medium)	18 (Low)
Mitigation Measures							
• Implementation of the noise mitigatory measures and the noise management plan							

11.2.11 CLIMATE CHANGE

From the climate vulnerability significance analysis for DCM West's current operations and expansion project the following observations can be made:

- Water scarcity and drought can constrain exploration, processing and site rehabilitation and has been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause damage to infrastructure and facilities and have been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause reduced accessibility due to flooding of roads and have been assessed as highly significant without mitigation measures.
- All other potential climate risks have been assessed as medium without and with mitigation measures.

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The impacts of increased temperature on current operations and the expansion project were rated medium without and with mitigation measures.							
Current Operations and Expansion Project – Increased Temperature							
Increased temperature, heatwaves and wildfires can pose a health risk to employees.	No	Negative	3 (Regional)	4 (Long Term)	4 (Low)	4 (High)	44 (Medium)
	Yes	Negative	3 (Regional)	4 (Long Term)	4 (Low)	4 (High)	44 (Medium)
Mitigation Measures							
• The risk and management of heat related illnesses should be integrated in the Occupational Health and Safety Plans. • Educating staff to recognise early symptoms of heat stress.							

From the climate vulnerability significance analysis for DCM West's current operations and expansion project the following observations can be made:

- Water scarcity and drought can constrain exploration, processing and site rehabilitation and has been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause damage to infrastructure and facilities and have been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause reduced accessibility due to flooding of roads and have been assessed as highly significant without mitigation measures.
- All other potential climate risks have been assessed as medium without and with mitigation measures.

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Increased temperature and heatwaves can influence productivity.	No	Negative	5 (International)	4 (Long Term)	4 (Low)	4 (High)	52 (Medium)
	Yes	Negative	5 (International)	4 (Long Term)	2 (Minor)	4 (High)	44 (Medium)
Mitigation Measures							
• Monitoring of temperature and humidity levels. • Providing of adequate cooling and ventilation. • Introducing systems to limit exposure to heat.							
Increased temperature and heatwaves may present a risk of spontaneous combustion of	No	Negative	2 (Local)	4 (Long-Term)	4 (Low)	4 (High)	40 (Medium)

From the climate vulnerability significance analysis for DCM West's current operations and expansion project the following observations can be made:

- Water scarcity and drought can constrain exploration, processing and site rehabilitation and has been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause damage to infrastructure and facilities and have been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause reduced accessibility due to flooding of roads and have been assessed as highly significant without mitigation measures.
- All other potential climate risks have been assessed as medium without and with mitigation measures.

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
stockpiles.	Yes	Negative	2 (Local)	4 (Long-Term)	4 (Low)	3 (Moderate)	30 (Medium)
Mitigation Measures							
• Adequate monitoring, fire detection and suppression systems for the spontaneous combustion of coal stockpiles should be implemented.							
Wildfires may damage infrastructure and facilities.	No	Negative	2 (Local)	4 Long-Term)	4 (Low)	4 (High)	40 (Medium)
	Yes	Negative	2 (Local)	4 Long-Term)	4 (Low)	3 (Moderate)	30 (Medium)
Mitigation Measures							

From the climate vulnerability significance analysis for DCM West's current operations and expansion project the following observations can be made:

- Water scarcity and drought can constrain exploration, processing and site rehabilitation and has been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause damage to infrastructure and facilities and have been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause reduced accessibility due to flooding of roads and have been assessed as highly significant without mitigation measures.
- All other potential climate risks have been assessed as medium without and with mitigation measures.

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• The risk of wildfires in relation to infrastructure and facilities should be assessed. • Adequate monitoring, fire detection and suppression systems for the spontaneous combustion of coal stockpiles should be implemented.							
Impact of Water Scarcity and Drought							
The impact of water scarcity and draught on exploration, processing and site rehabilitation was rated high without mitigation and medium with mitigation. All other impacts related to reduced rainfall were rated medium without and with mitigation measures.							
Current Operations and Expansion Project – Reduced Rainfall							
Water scarcity and draught can constrain exploration, processing and site rehabilitation.	No	Negative	5 (International)	4 (Long Term)	8 (High)	4 (High)	68 (High)
	Yes	Negative	5 (International)	4 (Long Term)	6 (Moderate)	4 (High)	60 (Medium)

From the climate vulnerability significance analysis for DCM West's current operations and expansion project the following observations can be made:

- Water scarcity and drought can constrain exploration, processing and site rehabilitation and has been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause damage to infrastructure and facilities and have been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause reduced accessibility due to flooding of roads and have been assessed as highly significant without mitigation measures.
- All other potential climate risks have been assessed as medium without and with mitigation measures.

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Mitigation Measures							
• Regular monitoring of operational water requirements and available resources should be conducted. • A contingency response plan should be developed in the event of short, medium or long-term water shortages. • A water policy should be developed as to manage and minimise water usage, setting clear objectives and targets to improve efficiency.							
Water scarcity and draught can lead to water conflicts with communities.	No	Negative	2 (Local)	4 (Long Term)	4 (Low)	4 (High)	40 (Medium)
	Yes	Negative	2 (Local)	4 (Long Term)	4 (Low)	3 (Low)	30 (Medium)
Mitigation Measures							

From the climate vulnerability significance analysis for DCM West's current operations and expansion project the following observations can be made:

- Water scarcity and drought can constrain exploration, processing and site rehabilitation and has been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause damage to infrastructure and facilities and have been assessed as highly significant without mitigation measures.
- Floods, cyclones and storms may cause reduced accessibility due to flooding of roads and have been assessed as highly significant without mitigation measures.
- All other potential climate risks have been assessed as medium without and with mitigation measures.

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Regular monitoring of operational water requirements and available resources should be conducted. • A contingency response plan should be developed in the event of short, medium or long-term water shortages. • A water policy should be developed as to manage and minimise water usage, setting clear objectives and targets to improve efficiency. • Community participation should be considered with regards to water infrastructure and management.							

Issue	Corrective Measures	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	

Water scarcity and draught may further exacerbate water quality.	No	Negative	2 (Local)	4 (Long Term)	4 (Low)	4 (High)	40 (Medium)
	Yes	Negative	2 (Local)	4 (Long Term)	4 (Low)	3 (Low)	30 (Medium)
Mitigation Measures							
• Regular monitoring of water quality should be implemented. • A contingency response plan should be developed in the event that water quality deteriorates.							
Draught may result in increased dust generation and increased water requirements for dust suppression.	No	Negative	2 (Local)	4 (Long Term)	4 (Low)	4 (High)	40 (Medium)
	Yes	Negative	2 (Local)	4 (Long Term)	4 (Low)	3 (Low)	30 (Medium)
Mitigation Measures							
• Dust deposition monitoring should be performed. • A contingency response plan should be developed for dust suppression in the event of dry spells and periods of elevated dust generation.							
The impacts of floods, cyclones and storms on infrastructure, facilities and reduced accessibility were rated high without mitigation and medium with mitigation. All other impacts related to extreme events were rated medium without and with mitigation measures.							
Current Operations and Expansion Project – Extreme Events							
Floods, cyclones and storms may cause damage to infrastructure and facilities.	No	Negative	5 (International)	4 (Long Term)	8 (High)	4 (High)	68 (High)
	Yes	Negative	5 (International)	4 (Long Term)	6 (Moderate)	4 (High)	60 (Medium)
Mitigation Measures							
• A site-specific flood risk assessment should be conducted to identify areas vulnerable to flooding.							

Floods, cyclones and storms may cause discharge of contaminated water into surrounding areas.	No	Negative	2 (Local)	4 (Long Term)	6 (Moderate)	4 (High)	48 (Medium)
	Yes	Negative	2 (Local)	4 (Long Term)	4 (Low)	4 (High)	40 (Medium)
Mitigation Measures							
• A site-specific flood risk assessment should be conducted to identify areas vulnerable to flooding.							
Floods, cyclones and storms may cause reduced accessibility due to flooding of roads.	No	Negative	5 (International)	4 (Long Term)	8 (High)	4 (High)	68 (High)
	Yes	Negative	5 (International)	4 (Long Term)	6 (Moderate)	4 (High)	60 (Medium)
Mitigation Measures							
• A risk assessment should be conducted to assess the flood risk in relation to key access roads. • A contingency response plan should be developed should operations become inaccessibility due to floods.							
Current Operations and Expansion Project – Wind Impacts							
All impacts related to wind impacts were rated medium without and with mitigation measures.							
High wind speeds and gusts may damage infrastructure.	No	Negative	1 (Site)	4 (Long Term)	4 (Low)	4 (High)	36 (Medium)
	Yes	Negative	1 (Site)	4 (Long Term)	4 (Low)	4 (High)	36 (Medium)
Mitigation Measures							
• A continuous monitoring station should be installed to obtain site specific wind data. • Regular maintenance checks for wind-related damage should be performed.							

High wind speeds and gusts may result in increased dust generation.	No	Negative	2 (Local)	4 (Long Term)	4 (Low)	4 (High)	40 (Medium)
	Yes	Negative	2 (Local)	4 (Long Term)	4 (Low)	4 (High)	40 (Medium)

12 WHERE APPLICABLE, A SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF ANY SPECIALIST REPORT COMPLYING WITH APPENDIX 6 OF EIA REGULATIONS AND AN INDICATION AS TO HOW THESE FINDINGS AND RECOMMENDATIONS HAVE BEEN INCLUDED IN THE FINAL ASSESSMENT REPORT

Twelve (12) specialist studies were undertaken during the EIA process and are listed in Table 22 below. In addition to the ones undertaken during the Scoping phase, the Climate Change Impact study was undertaken during the EIA phase.

Table 22: List of specialists

Specialist Study	Company	Specialist
Biodiversity (flora and fauna);	Vegetation Research and Ecological Consulting	Marianne Strohbach
Soil, land use and land capability	Scientific Aquatic Services	Braveman Mzila
Heritage;	Vhubvo Archeo Heritage Consulting	Munyadziwa Magoma
Wetland	WaterMakers	Willem Lube
Hydropedology	Scientific Aquatic Services	Braveman Mzila
Hydrology	Humba Environmental Consulting	Tinashe Maramba
Traffic	Eco Elemetum	Pieter Jooste
Air quality	Eco Elementum	Henno Engelbrecht
Socio-economic	NGT	Nkosinathi Thomose
Visual impacts	Outline Landscape	Katherin Hamelouw
Hydrogeological	GCS	Pieter Boshoff
Climate Change	EHRCON	Jeandré Neveling
Closure and Rehabilitation Study	Digby Wells and Associates	Anthony Lamb

Input from specialist have been considered throughout the compilation, and it is the same information that was referenced during the elimination of alternatives. Further, the findings of specialist studies undertaken are summarised in Section 9, and impacts assessed are included in Section 11 above.

13 AN ENVIRONMENTAL IMPACT STATEMENT WHICH CONTAINS THE FOLLOWING

13.1 A SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

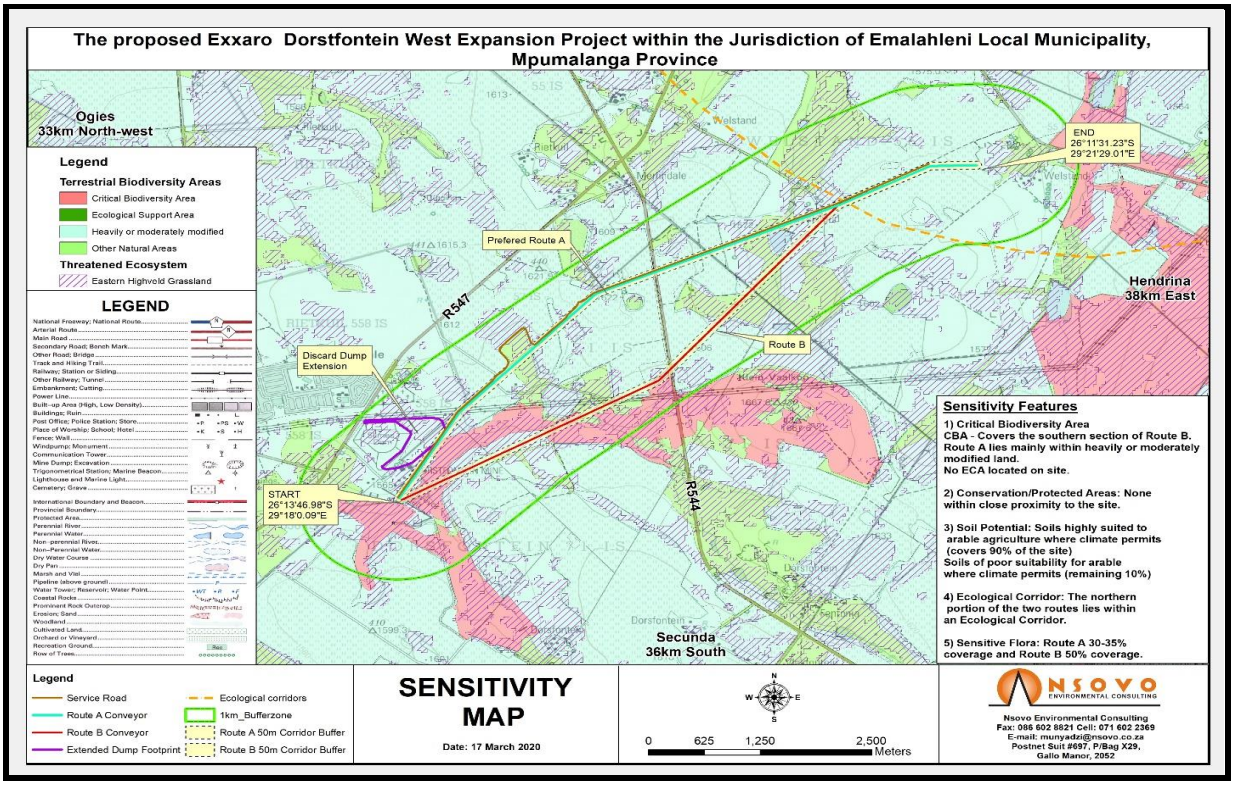
Potential environmental impacts identified during the EIA phase are described in Table 21 above, and it is not an exhaustive list but an insight into the potential impacts associated with the proposed project.

Further, the potential impacts associated with the proposed project also include impacts on:

- Biodiversity (flora and fauna);
- Soil, land use and land capability;
- Heritage;
- Agriculture;
- Wetland;
- Hydropedology;
- Hydrology;
- Traffic;
- Air quality;
- Socio-economic;
- Visual impacts;
- Topographical changes;
- Geological changes;
- Climate Change Impact; and
- Geohydrology.

13.2 A MAP AT AN APPROPRIATE SCALE WHICH SUPERIMPOSES THE PROPOSED ACTIVITY AND ITS ASSOCIATED STRUCTURES AND INFRASTRUCTURE ON THE ENVIRONMENTAL SENSITIVITIES OF THE PREFERRED DEVELOPMENT FOOTPRINT ON THE APPROVED SITE AS CONTEMPLATED IN THE ACCEPTED SCOPING REPORT INDICATING ANY AREAS THAT SHOULD BE AVOIDED, INCLUDING BUFFERS

The maps below show the proposed activities and their associated structures and infrastructure on the environmental sensitivities of the proposed study area, as contemplated in the accepted scoping report. The Maps at an appropriate scale with all the proposed activities on environmental sensitivities are attached as **Appendix A**.



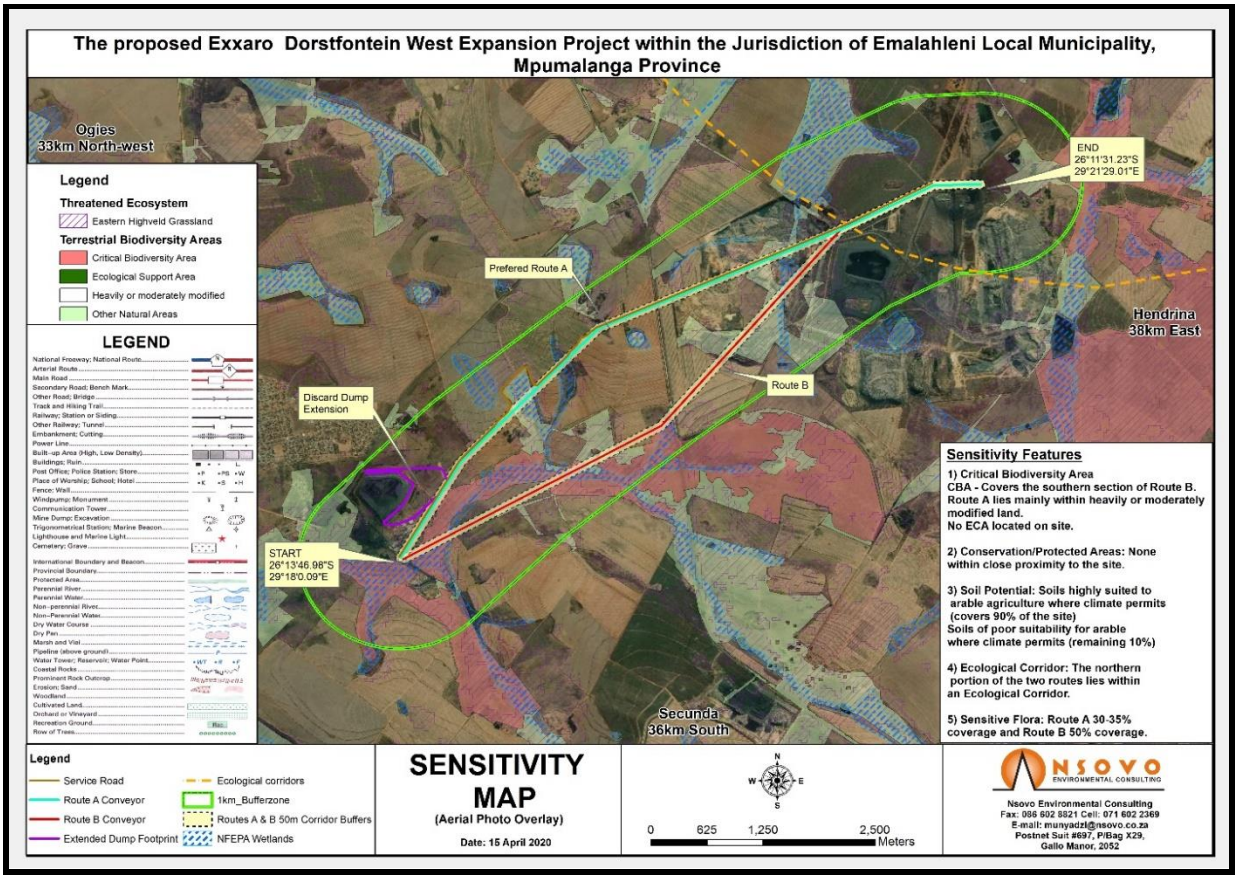


Figure 20: Proposed activities on environmental sensitivity area

13.3 A SUMMARY OF THE POSITIVE AND NEGATIVE IMPACTS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

A summary of the positive and negative impacts and risks of the proposed activities (i.e., discard dump and conveyor belt) is provided in section 9.7 of this EIA report.

14 BASED ON THE ASSESSMENT, AND WHERE APPLICABLE, RECOMMENDATIONS FROM SPECIALIST REPORTS, THE RECORDING OF PROPOSED IMPACT MANAGEMENT OUTCOMES FOR THE DEVELOPMENT FOR INCLUSION IN THE EMPR AS WELL AS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

The Table 23 below presents the recommendations from the applicable specialists inputs associated with the proposed project as follows:

Table 23: Specialist's recommendations

Recommendations by specialists	
Specialist	**Recommendation**
Hydropedological impact assessment	Both proposed conveyor options and associated service roads traverse wetlands as well as areas regarded essential for wetland recharge, the only difference being the extent in the length of conveyor traversing the wetlands. Conveyor Belt Route A should considered since the portion traversing the wetlands and wetland recharge soils is smaller than that of Route B. **Discard Dump** The proposed discard extension will have impacts on the environment, and the following recommendations must be taken into account: • Expansion into the wetland and interflow soils should be avoided as far as practically possible; • An appropriate barrier system should be engineered prior to expansion of the discard dump as measure to prevent seepage of contaminants into the groundwater regime and freshwater systems and must be appropriately maintained to mitigate impact during all phases of development; and • Furthermore, a dirty water trench (at least 1.5m) should be installed downgradient of the discard facility to capture seepage which might potentially pollute the wetlands.
Soil Land Use and Land Capability	The proposed development will have an impact on the land capability of the prevailing soils, as they will be permanently be removed as a result of the proposed activities such as removal of overburden for discard dump. After rehabilitation, the soils will not regain the original land capability even with mitigation. However, the soils must be rehabilitated to support grazing land capability.

	Following the assessment of the study area and the identified potential impacts, the following is recommended: • Excavation of soil must be limited within the demarcated areas as far as practically possible. • Ensure that all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined no-go areas. • Soil stripping must be done in consultation with a soil specialist, and careful consideration of the pre-mining soil survey is essential. • This will ensure optimal soil availability for closure and rehabilitation as well as the post-closure land use and avoid excessive mixing of undesirable soil due to over-stripping, as well as the loss of available cover due to under-stripping. Such consultation is recommended for the whole soil handling process, from stripping through stockpiling to final rehabilitation. • Stockpile height should be restricted to that which can be deposited without additional traversing by machinery. A maximum height of 3m. is therefore proposed, and the stockpile should be treated with temporary soil stabilisation methods such as the application of organic matter to promote soil aggregate formation, leading to an increased infiltration rate, thereby reducing soil erosion.
Visual Impact assessment	The proposed activities will, to a certain extent, change the visual character of the site, thus have a visual impact on the surrounding communities. However, the mitigation measures and recommendations were proposed with the aim of reducing or alleviating the intrusive contrast between the proposed project components and activities, and the receiving landscape to a point where it is acceptable to visual and landscape receptors. The following are the recommendations and mitigation measures associated with identified impacts. • It is recommended that a permeable steel structure be used for the pylons of the conveyor to create the lowest degree of visual obstruction; • Rehabilitate disturbed areas around pylons as soon as practically possible after construction to restrict extended periods of exposed soil. • Plant fast-growing endemic trees along the service road and conveyor system. The trees will, with time, create a screen and increase the biodiversity of the area. • Trees must be planted in areas where the proposed discard dump is most visible, to reduce the visual impact on the receptors. • Locate access routes to limit modification to the topography and to avoid the removal of established vegetation. • Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors.

Wetland Impact Assessment	The impact assessment identified the destruction of wetland habitat, surface water pollution, including sedimentation as well as increased erosion, altered hydrological regimes, loss of wetland functionality and decreased downstream water quality as the primary impacts during the construction and operational phase. Several general and specific mitigation measures are proposed to reduce negative impacts and incorporate some potentially positive impacts of the proposed development. Some of the most pertinent recommendations include: • An appropriate wetland and hillslope monitoring program must be implemented before the commencement of the construction phase; • Suitable wetland rehabilitation design and implementation must ensure that wetland functionality is restored. • Wetland mitigation and rehabilitation plan must be prepared to compensate for a minimum loss of 4, 45 healthy hectare wetland equivalents (the final multiplication factor to be determined in consultation with DHSWS). • All soils, especially wetland soils within the footprint of the discard facility must be appropriately separated and stored. A soil management program must be implemented before construction commencement to secure all wetland soils in situ as these will be utilised for mitigating wetland loss through the wetland mitigation and rehabilitation plan. • For the conveyor routing, it is highly recommended that any sections crossing a wetland should only be constructed during the winter months. • A special works program must be implemented, which ensures that a wetland specialist is part of the design and construction team (to minimise impacts on wetland habitat) and that the wetland monitoring program makes provision for increased monitoring intensity for the conveyor route specifically. The monitoring program must focus on wetland crossings, and special measures must be designed and put in place to prevent coal spillages in the vicinity of wetland habitat.
Hydrology	The following recommendations associated with the hydrological impacts for the proposed project have been made as follows: • The construction phase of the project must take place during the dry months so as to minimise pollutant runoff; • An independent ECO must be appointed during construction to ensure environmental monitoring; • The mine's internal Environmental officers must be conversant with best practices in line with rehabilitation during decommissioning and an audit is to be conducted during and after rehabilitation.

	• Where mining infrastructure is required across natural watercourses, new storm water infrastructure such as pipes and culverts, could replace the hydraulic function currently offered by the natural watercourses. This infrastructure should be designed for both hydraulic performance and environmental functionality. A thorough assessment of the suitability of the new stormwater infrastructure must be made at preliminary design stage. • A GN 704 audit is to be conducted bi-annually to assist with compliance to the separation of clean and dirty water infrastructure unless otherwise, the frequency of the audit is determined by the existing Water Use Licence.
Heritage	There were no significant archaeological materials identified in the proposed area for development. However, it must be taken into account that unavailability of archaeological materials (e.g., pottery, stone tools, remnants of stone-walling, graves, etc.) and fossils does not mean absentee, archaeological material might be hidden underground, and as such the following recommendations must be considered: • In the event that archaeological materials are unearthed, all development within a radius of at least 10m of such indicator should cease and the area be demarcated by a danger tape. • Accordingly, a professional archaeologist or LIHRA officer should be contacted immediately. • In the meantime, it is the responsibility of the contractor to protect the site from publicity (i.e., media) until a mutual agreement is reached. • Noteworthy that any measures to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law. In the same manner, no person may exhume or collect such remains, whether of recent origin or not, without the endorsement by LIHRA.

Biodiversity	The proposed project will have impacts on the local biodiversity. and the following recommendations must be considered:
	• Avoid or minimized loss of sensitive habitats
	  ○ Avoid any disturbance to the No-Go habitats, i.e., the rocky ledges south of the current mining plant
	  ○ Minimize the physical destruction of any remaining primary vegetation, especially in or near wetland areas
	  ○ In general, minimize clearing and operations in habitats with a high sensitivity rating and clearly delineate and maintain a no-go buffer of at least 100m around such habitats
	• Avoid blocking and/or destruction of any seasonal streams, channeled or unchannelled valley bottom wetlands or hillslope seepage areas

	• Avoid the loss of indigenous fauna and flora of conversation concern • Reduce fragmentation of natural habitat by keeping long-terms or permanent impacted areas as close as possible together • Dust from all activities must be controlled and minimized at all times using potable water or other environmentally compatible methods. • After decommissioning, if access roads or portions thereof will not be of further use to the landowners, remove all foreign material and rip area to a depth of at least 30cm to facilitate the establishment of vegetation, followed by a suitable revegetation program.
Air quality	Recommended mitigation measures, as recommended by Australian NPI are as follows: **Conveyor belts** systems • 70% reduction of fugitive dust can be achieved by enclosing the conveyor belt. • 90% reduction when water sprays with chemicals are used, and • 99% reduction in fugitive emissions can be achieved when the conveyor system is enclosed and the fabric filter system installed. **Service Road** • For the service road standard Australian NPI measures indicate that dust emissions can be mitigated by 50% for level 1 watering (2 litres/m²/h) or 75% for level 2 watering (>2 litres/m²/h). • Sealing the road or salt-encrusted roads can mitigate 100% according to the Australian NPI. **Discard Dump** • According to the Australian NPI, dust generation from material transfer points can be reduced by 50% where water sprays are applied. Adding windbreak can reduce dust emissions by 30%. • Enclosing the operations, the emissions will become insignificant. • Wind erosion from stockpiles can be mitigated by 50% using water sprays according to the Australian NPI. Revegetation of stockpiles can bring 90% mitigation. • Total enclosure of the stockpiles can mitigate erosion by 99%.
Hydrolgeological Investigation	• A closure water management plan should be developed. This should assess the management of decanting via channelled decant or the management of a critical water level to minimise contamination of the shallow weathered aquifer.

	• The discard dump facility should also be assessed in terms of a remediation action plan should the risk for contaminating the stream be high. This should all be analysed in a financial model to further inform the most effective closure water management options. The groundwater model should be used as a management tool to inform this process; • The actions in the groundwater monitoring plan should be adhered to; • Treatment options of decanting should be investigated for the post-closure phase; • Water quality sampling of the two tributaries of the Olifants River is essential for the operational and post-closure phase; • The groundwater monitoring network should be expanded for the operational and post-closure phases at DCMW; • The numerical model should be updated once every three years or after significant changes in mine schedules or plans by using the measured water ingress and water levels to re-calibrate and refine the impact predictive scenario.
Climate Change	Mitigation will not alter the impacts of GHG emissions in terms of the extent, duration or probability of the project impact, the intensity of the impact can be reduced, notably by reducing the quantity of GHG emissions. There are many ways to reduce GHG emissions from coal mining, which include basic mitigation strategies to specific tactics and actions. Basic mitigation strategies include: • Optimisation of operational activities and logistics. • Implementation of a fuel management strategy, which encourages more efficient use of plant and vehicles, planning, logistics, driver education, and maintenance. • Reduction in the amount of waste disposed to landfill and reuse of waste, which will subsequently reduce the number of vehicle movements and fuel usage. • Procurement of generators, which use biodiesel. • Exploring alternative energy possibilities. • Regular monitoring of fuel and energy. • Identification of significant energy-consuming equipment and recognising opportunities where technical efficiencies in plant and equipment can be applied. • Annual GHGs emissions inventory review.

Socio-economic	• The mine is already a socioeconomic anchor within the immediate communities and more so for the country. The proposed project's planned infrastructure, excluding the actual mine investment, will further stimulate the local economy, given that total expenditure of R120,000,000.00 is budgeted for the proposed project's planned infrastructure, which translates to 0,003% of Emalahleni's Gross Geographic Production (GGP) calculated at 40,5 billion. • The proposed Discard Dump extension is situated in an area that is already disturbed; therefore it will not have an impact on agricultural activities and livestock grazing.
Traffic	The specialist highlighted that based on this significance rating, the project can proceed without the need to implement any mitigation measures. However, the following is recommended: • All legal authorisations and permits must be obtained for the transportation of abnormal loads and hazardous materials on public roads; • Measures should be taken to ensure that all health and safety requirements regarding transportation activities are complied with. This may include dust covers for hauling vehicles and dust control on all gravel roads; • It is proposed that flagmen and temporary warning signs be placed at all access points where heavy vehicles will access public roads during construction, and • Controls should be in place to ensure that vehicles exiting the site are not overloaded.

15 THE FINAL PROPOSED ALTERNATIVES WHICH RESPOND TO THE IMPACT MANAGEMENT MEASURES, AVOIDANCE, AND MITIGATION MEASURES IDENTIFIED THROUGH THE ASSESMENT

In considering the final proposed alternatives, various aspects were considered, and this included the degree of sensitivity of the site, technical viability, and to a certain extent, the economic viability. The preferred site and route alternatives are the alternatives with the least environmental impacts as well as providing the most benefits to the socio-economy. Consequently, the final alternatives proposed and assessed are as follows:

- Route A vs. Route B of the Conveyor Belt;
- Discard Dump expansion; and
- No Go Option.

15.1 CONVEYOR BELT ROUTE ALTERNATIVES

Two conveyor routes, Route A and Route B have been proposed and were assessed during this EIA phase. The main aim of the conveyor is to transport coal from DCM west to DCM east. The assessment of the impacts of the conveyor belt took into consideration the impacts of the service road associated with the conveyor belt. Further, the No-Go option was also considered and assessed for this proposed project.

Based on input from the specialist, assessment of the site, comparative analysis of the two conveyor route alignments, and many other factors highlighted above, both sites are feasible; however, Conveyor Route A is the preferred site.

15.2 DISCARD DUMP EXPANSION

The proposed project entails the expansion of the existing discard dump to accommodate the discard and slurry generated within the DCM West. This proposed activity does not have any site alternatives as it is the extension of the existing infrastructure. However, the EIA phase assessed the impacts associated with discard dump extension as well as the No go option, and mitigation measures were also proposed for such impacts.

15.3 NO-GO ALTERNATIVE

The no go option was assessed as an alternative, and this option aligns with maintaining the status quo. When assessed against the potential positive environmental as well as socio-economic impacts, the no go option was seen as an unviable option. The socioeconomic benefits, as well as the benefits to the physical environment as a result of the proposed activities during the operational phase, far outweigh the status quo.

16 ANY ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR SPECIALIST WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

None identified. The specialists have proposed recommendations which must form part of the authorisation and be adhered to by the applicant.

17 A DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE WHICH RELATE TO THE ASSESSMENT AND MITIGATION MEASURES PROPOSED

Below are some of the assumptions and limitations of the study. While additional limitations may be read in the respective specialist reports.

17.1 ASSUMPTIONS AND LIMITATIONS

It is assumed that technical data supplied by the client was correct and valid at the time of the compilation of specialist studies and the draft EIA Report. Furthermore, it is assumed that the alternatives presented by the client are feasible.

17.1.1 PUBLIC PARTICIPATION PROCESS

It is likely that some of the Stakeholders may not have been reached, however, efforts were made as part of the process to identify relevant stakeholders for the project.

17.1.2 LITERATURE REVIEWS IS VIEWED AS CORRECT

The compilation of the reports was based on various literature reviews and specialist input, which were viewed as correct at the time. However, it is acknowledged that there might be some gaps in knowledge with regards to the literature reviewed, although conceited efforts were made to attain as much information as possible.

17.1.3 HERITAGE STUDY

The Phase 1 HIA may have missed heritage resources in the project area, as some heritage structures may lie below the surface and may only be exposed once development commences.

17.1.4 CLIMATE CHANGE

The compilation of the GHG emission inventory for DCM West was based on ISO/SANS 14064 Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals (2006) and The Greenhouse Gas Protocol's A Corporate Accounting and Reporting Standard (Revised Edition) (2015).

The reporting boundary was set, GHG sources identified, quantification method established and the GHG emissions inventory was calculated. Default emission factors, as set out in the *Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (2006*) and the Department of *Environmental Affairs' Technical Guidelines for Monitoring, Reporting and Verification of Greenhouse Gas Emissions by Industry (2017)* were used to calculate the GHG emissions inventory. Relevant South African emission factors were a source for related Scope 2 and Scope 3 emissions.

The climate change impact of the GHG emissions was benchmarked against South Africa's national emissions inventory and the global greenhouse gas inventory.

However, data limitations and assumptions associated with the climate change impact assessment in support of mining operations at DCM West are as follows:

- The inventory included all sources that were practically and economically feasible to assess.
- The GHG inventory for the project includes the current operations and the proposed expansion.
- The construction and rehabilitation phases have been excluded due to a lack of available data.
- Limitations exist with the use of climate change projections to inform future climate scenarios.

17.1.5 VEGETATION AND TERRESTRIAL FAUNA ASSESSMENT

There is a key difference between the approach of the ecological consultant and that of the ecological researcher. In consultancy, judgements must be made and advice provided that is based on the best available evidence, combined with collective experience and professional opinion. The available evidence may not be especially good, potentially leading to over-simplification of ecological systems and responses, and do contain a considerable deal of uncertainty.

17.1.6 HYDROPEDOLOGY STUDY

Hydropedological science and research are rapidly evolving and there are currently no standard methods to assess and/or model the recharge capacity of soils. As a result, the findings of this assessment are therefore a mix of qualitative and quantitative results and based on the specialist's training, opinion, and experience with the hydrological properties of the identified soil types.

Hydropedological investigations are limited in the degree to which hydropedological losses can be quantified, with no standard method of approach to quantify the impact significance of various activities on the hydropedological drivers of wetland systems. For the assessment, a model was developed using basic hydrological principles in efforts to quantify the percentage loss of hydrological drivers due to the proposed activities. Although the model outcomes correlate with expected results and results obtained using other methods, the model used remains untested.

The wetlands presented in this document was sourced from a wetland assessment undertaken by WaterMakers in March 2019, as provided by the proponent. The verification of soil characteristics at selected points was undertaken during a field assessment by the hydropedological consultants. It should, however, be noted that not all the boundaries of the wetlands were confirmed. Thus the specialist assumes that the soil data provided is accurate. This approach was deemed sufficient to provide the relevant data to describe the wetland recharge mechanisms of the region appropriately.

Sampling by definition means that not all areas are assessed, and therefore some aspects of soil and hydropedological characteristics may have been overlooked in this assessment.

18 A REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED AND IF THE OPINION IS THAT IT SHOULD BE AUTHORISED, ANY CONDITIONS THAT SHOULD BE MADE IN RESPECT OF THAT AUTHORISATION

18.1 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORIZED

The proposed project entails the following:

- It has been established that the discard dump at Dorstfontein West is coming to the end of its life, and a dumping facility expansion would be required by 2022. The discard dump extension would cater to both slurry and discard coal and is expected to cater for the life of mine; and
- The construction of a conveyor belt from DCM West will be linked to the conveyor systems at DCM East to ensure that coal is conveyed from West to East where it will be loaded into trains and thereafter transported to Richards Bay Coal Terminal which will reduce the traffic congestion and accidents associated with the trucks which are currently being used to transport coal from DCM West to East.

The project should thus be authorized for the following reasons:

- The proposed discard dump expansion is a prerequisite for the operation of the mine, without which the mine will have major challenges in the management of both slurry and discard coal.
- The proposed construction of the conveyor belt addresses several challenges that the mine was experiencing as a result of road transport, including increased emissions, high risk of accidents, increases vehicles on the regional roads, and subsequent damage of the roads as a result of high truck volumes.
- The proposed activities seek to ensure the least impacts of mining operations on the environment by adhering to the legislative and regulatory requirements as well as world best practice.
- The proposed activities will allow for the identified positive impacts to be realised at a local, regional, and national scale.

- It is acknowledged that the various phases of the proposed project will yield negative impacts on the environment; however, given the mitigation proposed, it can be confirmed that the identified socioeconomic benefits far outweigh the negative consequences identified.
- Given the current high regarding climate change and coal mining and the significant concerns that South Africa, together with the world, has, the proposed project did not take this for granted. Thus, the necessary assessment has been made, and mitigation measures recommended. Therefore, climate change cannot be considered a fatal flaw.
- Considering the current state of the economy following the world-wide pandemic, i.e., COVID-19 and the adverse effects it has had on South Africa's economy, any activity that seeks to stimulate the economy and sustain jobs where possible must be encouraged.

The proposed project has considered all the requirements and followed the necessary processes to comply with the requisite regulations. It is therefore recommended that the Integrated Environmental Authorisation and Waste Management Licence in line with the requirements of the NEMA and NEM: WA be issued to the applicant.

18.2 IF THE OPINION IS THAT IT SHOULD BE AUTHORISED, ANY CONDITIONS THAT SHOULD BE MADE IN RESPECT OF THAT AUTHORISATION

Given the comprehensiveness of the impact assessment undertaken to this end it is recommended that the proposed project be authorised, i.e., the proposed expansion of the discard dump as well as conveyor route A. The conditions that must be included in this Environmental Authorisation are as follows:

- All mitigation measures detailed in this report and the specialist studies must be implemented.
- The EMPr, as contained within **Appendix H**, must be used as a blueprint throughout all phases of the project.
- The Design of the discard dump must be in line with the Minimum Liner standards and approved by the Department of Human Settlement Water and Sanitation.
- An integrated Water Use license must be obtained from the Department of Human Settlement Water and Sanitation before commencement.
- An appropriate barrier system should be engineered before the expansion of the discard dump as a measure to prevent seepage of contaminants into the groundwater regime and freshwater systems and must be appropriately maintained to mitigate impact during all phases of development; and
- Furthermore, a dirty water trench (at least 1.5m) should be installed downgradient of the discard facility to capture seepage, which might potentially pollute the wetlands. Excavation of soil must be limited within the demarcated areas as far as practically possible.
- Ensure that all stockpiles (especially topsoil) are clearly and permanently demarcated and located in defined no-go areas.

- Soil stripping must be done in consultation with a soil specialist, and careful consideration of the pre-mining soil survey is essential
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors
- An appropriate wetland and hillslope monitoring program must be implemented before the commencement of the construction phase;
- Suitable wetland rehabilitation design and implementation must ensure that wetland functionality is restored.
- Wetland mitigation and rehabilitation plan must be prepared to compensate for a minimum loss of 4, 45 healthy hectare wetland equivalents (the final multiplication factor to be determined in consultation with DHSWS).
- All soils, especially wetland soils within the footprint of the discard facility, must be appropriately separated and stored. A soil management program must be implemented before construction commencement to secure all wetland soils in situ as these will be utilised for mitigating wetland loss through the wetland mitigation and rehabilitation plan.
- For the conveyor routing, it is highly recommended that any sections crossing a wetland should only be constructed during the winter months.
- A special works program must be implemented, which ensures that a wetland specialist is part of the design and construction team (to minimise impacts on wetland habitat) and that the wetland monitoring program makes provision for increased monitoring intensity for the conveyor route specifically. The monitoring program must focus on wetland crossings, and special measures must be designed and put in place to prevent coal spillages in the vicinity of wetland habitat.
- An independent ECO must be appointed during construction to ensure environmental compliance monitoring and timeous reporting;
- The mine's internal Environmental officers must be conversant with best practices in line with rehabilitation during decommissioning, and an audit is to be conducted during and after rehabilitation.
- Where mining infrastructure is required across natural watercourses, new stormwater infrastructures, such as pipes and culverts, could replace the hydraulic function currently offered by the natural watercourses. This infrastructure should be designed for both hydraulic performance and environmental functionality. A thorough assessment of the suitability of the new stormwater infrastructure must be made at the preliminary design stage.
- A GN 704 audit is to be conducted triennial (once in three years) to assist with compliance to the separation of clean and dirty water infrastructure, unless otherwise, the frequency of the audit is determined by the existing Water Use Licence.
- If archaeological materials are unearthed, all development within a radius of at least 10m of such indicator should cease, and the area be demarcated by a danger tape. Accordingly, a professional archaeologist or LIHRA officer should be contacted immediately.

- Avoid any disturbance to the No-Go habitats, i.e., the rocky ledges south of the current mining plant.
- Minimize the physical destruction of any remaining primary vegetation, especially in or near wetland areas

19 IN GENERAL, MINIMIZE CLEARING AND OPERATIONS IN HABITATS WITH A HIGH SENSITIVITY RATING AND DELINEATE AND MAINTAIN A NO-GO BUFFER OF AT LEAST 100M AROUND SUCH HABITATS. WHERE THE PROPOSED ACTIVITITY DOES NOT INCLUDE OPERATIONAL ASPECTS, THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED AND THE DATE ON WHICH THE ACTIVITY WILL BE CONDUCTED AND THE POST CONSTRUCTION MONITORING REQUIREMENTS FINALISED

The proposed project includes the operational aspects of both the discard dump and conveyor belts. It is expected that both activities will be expected to operate for the Life of Mine. Subsequently, the authorisation is required for the Life of Mine. While the necessary resource monitoring will continue post-construction and post-operation.

20 AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO THE FOLLOWING:

20.1 THE CORRECTNESS OF THE INFORMATION PROVIDED IN THE REPORTS

In undertaking this project, the EAP has taken into consideration the requirements stipulated in the EIA 2014 Regulation as amended, as well as other relevant Acts and Regulations. Further, the EAP considered the information provided by the client as well as the specialist on the project as true and correct. Subsequently, in the compilation of the reports and consolidating information from other parties, the EAP, as a result of this, confirms the correctness of the information provided in the report.

Should there be any form of misrepresentation, it was not intended.

20.2 THE INCLUSION OF COMMENTS AND INPUTS FROM STAKEHOLDERS AND I&APS

The EIA process was undertaken in accordance with the requirements of the Regulations as highlighted above, further the process adhered full to the principles of public participation, i.e., transparent and afforded a fair opportunity to stakeholders and I&APs to participate meaningfully.

Subsequently, the EAP confirms that comments and issues raised by both stakeholders and I&APs have been addressed fully and included in all communication to the Authorities.

20.3 THE INCLUSION OF INPUTS AND RECOMMENDATIONS FROM THE SPECIALIST REPORTS WHERE RELEVANT

To allow comprehensiveness and increased accuracy in assessing the impacts of the proposed project on the environment, input was sought from the specialists in the various fields as indicated above. This report is a culmination of the EAP's independent opinion based on experience and expertise as well as input from specialists. A full section of recommendation from specialists is also included above as part of the report. The EAP confirms that specialist observations and recommendations have been comprehensively included in the EIA report where relevant and their reports attached accordingly.

20.4 ANY INFORMATION PROVIDED BY THE EAP TO INTERESTED AND AFFECTED PARTIES AND RESPONSES BY THE EAP TO COMMENTS OR INPUTS MADE BY INTERESTED OR AFFECTED PARTIES

Throughout the process, several notices and documentation were shared with stakeholders as well as I&APs. Further, several engagements in the form of both public and focus group meetings were held to share information and address any concerns. The information and responses provided to these parties, either in writing or verbally, are confirmed to have been accurate and correct.

21 WHERE APPLICABLE, DETAILS OF ANY FINANCIAL PROVISION FOR THE REHABILITATION, CLOSURE, AND ONGOING POST DECOMMISSIONING MANAGEMENT OF NEGATIVE ENVIRONMENTAL IMPACTS

The proposed new activities, i.e., the expansion of the existing discard dump and the construction of a conveyor belt and associated service road, will add on to the current footprint and thus require that the necessary financial provisions for the Project to comply with GN R 1147. Therefore, the scope will be calculated according to the requirements encapsulated in the Financial Provision Regulations, 2015 (Government Notice Regulation [GN R] No. 1147), published under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended, in Government Gazette 39425. A financial provision model was be compiled using Microsoft Excel, which comprises:

- An input sheet, containing measurements of the infrastructure;
- A standard rate sheet; and
- A summary sheet, which summarises the costs for closure.

The proposed model calculates the cost of demolishing, removing, and rehabilitating each component of the mining area infrastructure.

The provisions have been prepared accordingly and are included as part of this submission.

22 AN INDICATION OF ANY DEVIATION FROM APPROVED SCOPING REPORT INCLUDING THE PLAN OF STUDY

The Scoping Report identified three primary activities that formed part of this application as follows:

- Expansion of the existing discard dump which is coming to the end of its life a by 2022;
- Pillar extraction mining at 4 Seam; and
- The construction of a conveyor belt and associated service road, from DCM West which will be linked to the conveyor systems at DCM East to ensure coal is conveyed from DCM West to DCM East where the coal will be loaded into trains and thereafter transported to Richards Bay Terminal.

The Scoping Report indicated that subsidence is a highly likely impact that would occur as a result of pillar extraction mining. As raised by the landowners, this impact would have a direct impact on their livelihoods and also pose considerable discomfort. Further, during the focus group meetings with the landowners, they raised property value as a significant issue and indicated their willingness to sell their properties should this take place. They were also concerned about the timing of pillar extraction and when it is expected to take place, as well as groundwater impacts.

In response, the applicant committed to resolving the land issues with the landowners before the commencement of the pillar extraction activities. They further indicated that it is still very early in the process as pillar extraction will not be taking place in the next five years. With specific regard to the impact of pillar extraction on groundwater, a detailed Geohydrological study has been undertaken and the potential impacts identified, and associated measures recommended. The report indicated that the aquifer within the weathered zone is generally low-yielding (range 100 – 2000 l/h) because of its insignificant thickness. Few farmers, therefore, tap this aquifer by boreholes. Wells or trenches dug into the upper aquifer are often sufficient to secure a constant water supply of excellent quality.

Further investigation regarding the impact of pillar extraction on groundwater availability during and post mine is underway, and land issues related issues still need attention. Given the identified gaps in addressing the concerns about pillar extraction and its impacts, and further studies and assessments that must yet be done to ensure that pillar extraction mining is done with the least impacts on the environment; the mine has decided to withdraw pillar extraction from the current application. Subsequently, the proposal to undertake pillar extraction as indicated in the Scoping Report is removed from this application, and therefore as part of this project, the pillar extraction proposal is consequently withdrawn.

The withdrawal of pillar extraction from the current application constitutes a deviation from the approved Scoping and Plan of Study. This deviation has been discussed with the DMRE and communicated formally in a letter dated 25 March 2020 (Attached as part of this EIAR as Appendix D4).

23 ANY DEVIATION FROM THE METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS MOTIVATION FOR THE DEVIATION

The Methodology used in determining the significance of the identified potential impacts is as proposed in the approved Scoping and Plan d of study for EIA; therefore, no deviation in this regard.

24 ANY SPECIFIC INFORMATION THAT MAY BE REQUIRED BY THE COMPETENT AUTHORITY

A letter from the Department of Mineral Resources and Energy dated 04th of December 2019 requested the following information to form part of final EIR and EMPr (Table 24).

Table 24: Information required by the competent authority

Required information	Actions on required information
The financial provision calculations must be provided for the proposed activities.	Financial provisions have been prepared accordingly and included as part of the Amended EMPr attached as **Appendix H**.
The plan to be submitted must depict the location and aerial extent of all the proposed mining activities.	A plan which shows the location and aerial extent of all the proposed mining activities is attached in A3 size as **Appendix A.**
A map at an appropriate scale that superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. All maps must be visible in A3 with a clear legend.	A map (sensitivity map) with all proposed activities (i.e., discard dump extension and conveyor belt) is included in section 13.2 of this EIA report and attached with all other maps in A3 size as **Appendix A.** These maps also indicate the preferred alternative for the project.
Public participation process must be transparent, and all comments received during the process must be incorporated into the comments and response report of the Final Environmental Impact Report	The public participation process undertaken during the Scoping phase was transparent and all comments received were incorporated in the approved scoping report. All the comments that will be received during draft Environmental Impact Assessment (EIA) report will be

	incorporated in the final EIA report.
Traffic impact assessment study must be conducted, and recommendations must be incorporated in the EIA/EMPr to be submitted.	The Traffic Impact Assessment (TIA) study was conducted during the Scoping Phase of this project and it forms part of this EIA phase. The TIA report is attached as **Appendix C10** of this EIA report.
Proof of correspondence with the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department.	The proof of correspondence with various stakeholders during the EIA phase will be attached as **Appendix D3,** and this will include: • Notification of availability of EIR as well as an invitation to public and focus group meetings; and • Comments and Responses on the Draft EIAR.
All the comments from Interested and Affected Parties (I&APs) must be adequately addressed in the final Environmental Impact Report (EIR).	All the comments from I&APs will be considered and addressed adequately. All the responses to the comments raised by the I&APs will be attached as **Appendix D4.**
Furthermore, it must be reiterated that, should an application for the Environmental Authorisation (EA) be subjected to any permits or authorisation in terms of the provisions of any specific Environmental Management Acts (SEMAs), proof of such application will be required.	This application of an EA is not subjected to any permits or authorisation in terms of the provisions of any specific SEMAs. However, this EA is an integrated authorisation which entails activities from the National Environmental Management: Waste Act (59 of 2008), known as the NEM: WA.
Any other matters required in terms of Appendix 3 (3) and Appendix 4 (1) of the EIA Regulation 2014.	This EIA and EMPr reports were compiled in terms of Appendix 3 (1) and 4 (1) respectively of the EIA Regulation 2014, and they contain all the information that is necessary for the competent authority to consider and come to a decision on the application.

25 ANY OTHER MATTERS REQUIRED IN TERMS OF SECTION 24(4) (A) AND (B) OF THE ACT

This Report has been prepared in terms of NEMA, its respective 2014 EIA Regulations as well as other various Acts. Information that is required by the NEMA has been included in the draft EIA Report and will also be included in the final EIA report.

26 FATAL FLAWS

No fatal flaws or highly significant impacts were identified during the EIA phase that would necessitate substantial redesign or termination of the project. Potential negative impacts have been identified, and where the impacts were detrimental to the environment, alternatives were proposed together with mitigation measures.

The main impacts are outlined below and recommended mitigation measures were also proposed for the impacts outlined below. A summary of site suitability and residual impacts was also assessed in detail during this EIA phase. Such potential impacts include the following:

- Impacts on flora and fauna;
- Impacts on Wetlands;
- Impacts on water resources (Hydrology);
- Impacts on Hydropedology
- Impacts on soil and land capability
- Impacts on heritage and archaeology;
- Visual impact to neighbouring communities, road users and tourist
- Impacts on the topography;
- Impact on air quality due to the discard and the associated roads
- Impact on noise;
- Impact on the geology of the area;
- Climate change impact;
- Traffic impact;
- Impact on groundwater.

The EIA phase provided a detailed assessment of the identified aspect, rated the significance accordingly, and proposed mitigation measures as applicable.

27 CONCLUSION

Based on conclusions of the specialist studies and impact assessment for the proposed project as well as the EAPs assessment of impacts, it is concluded that the impacts associated with the construction and operation of the proposed Dorstfontein West Mine project are expected to be Medium to Low significance with the implementation of adequate mitigation measures. No environmental and social fatal flaws were identified to be associated with the proposed project.

The findings of the EIA process concluded that:

- The impacts associated with the expansion of the discard dump and the construction of the conveyer belt and associated infrastructure are expected to be Medium to Low significance with the implementation of adequate mitigation measures.
- No environmental and social fatal flaws were identified to be associated with the proposed project.
- Two conveyor routes, Route A and Route B have been proposed and were assessed during this EIA phase. The main aim of the conveyor is to transport coal from DCM west to DCM east. The assessment of the impacts of the conveyor belt took into consideration the impacts of the service road associated with the conveyor belt. Further, the No-Go option was also considered and assessed for this proposed project. Based on input from the specialist, assessment of the site, comparative analysis of the two conveyor route alignments, and many other factors highlighted above, both sites are feasible; however, Conveyor Route A is the preferred option.

Furthermore, based on the nature and extent of the proposed development, the local levels of disturbance predicted vs. the expected benefits at a regional and national scale, the findings of the EIA and the understanding of the significance level of potential environmental and social impacts, it is the opinion of the EIA project team that the proposed project can proceed subject to the implementation of the mitigation measures detailed in Chapters 11 and 13 of this report and the EMPr.

28 REFERENCES

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