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Draft Basic Assessment Report
Proposed Exxaro Belfast Resettlement
Project, Belfast, Mpumalanga Province


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EXECUTIVE SUMMARY

Exxaro Coal Mpumalanga (Pty) Ltd (hereafter referred to as Exxaro) operates a coal mining complex between the towns of Belfast and Carolina. The complex is referred to as the North Block Complex, and consists of the Glisa, Eerstelingsfontein and Strathrae Coal Mines. Through the proposed Belfast Coal Mine Project (Belfast Implementation Project), Exxaro is expanding its operations to extract coal resources from an estimated 46 Megaton (Mt) reserve. The envisaged mining activities will require the relocation of 32 non-landowning households which will directly be impacted by the proposed mining operation.

Exxaro commenced with a resettlement action plan (RAP) in 2013. As part of the RAP, Exxaro will be donating approximately 80 ha of land (owned by Exxaro) to the affected 32-household community. A small piece of the to-be-donated area will be used to develop a small-scale rural farming development for the community. Each affected household will receive a 2 500 m² plot.

The purpose of this application is to establish these 32 (2 500 m²) plots which will be sufficient in size to establish residential- and outbuildings (500 m² of the 2 500 m² plot has been allocated for this purpose). The remainder of each plot to be used for various small-scale agricultural activities (2000 m² of the 2 500 m² has been allocated for this purpose) e.g. poultry, small livestock, fruit trees, small-scale dryland cropping and homestead vegetable gardens. The remainder of the 80 ha property will be used by the households for e.g. grazing and/ or other agricultural activities. Additional grazing areas will be also be made available to the community as required (although these additional grazing areas will not be donated to the community).

Out of the seven locality alternatives initially considered during the RAP, two site alternatives were investigated and consulted on with the communities for this proposed project. These two alternatives are discussed in more detail in Section 3. The community-preferred resettlement site that has been identified is located on Zoekop Farm 426 JS Portion 13, Leeuwbank Farm 427 JS Portion 13 and Paardeplaats Farm 425 JS Portion R (the study site) (Figure 1-2).

Various specialist studies were undertaken in order to assess the ecological, and historical sensitivity of the preferred site. The results of the biodiversity investigation indicate that the natural habitats on site have been fragmented as a result of human induced impacts. Large sections have been transformed to Eucalyptus plantations and/or are in a state of recovery to pioneer grassland.

During the Heritage Impact Assessment, 7 sites were identified of which none were found to be significant.

Four wetland units were identified during the Wetland Study conducted. These units have been classified as two hillslope seeps linked to a stream channel (HGM Unit 1 and 4), an isolated hillslope seep (HGM Unit 2) and a depression or pan (HGM Unit 3) wetland (Refer to section 4.7). The wetland units in the study area provide intermediate to moderately high levels of ecosystem services. In terms of its ecological importance and sensitivity to changes in water quality and floods, all of the HGM units were classified as having biodiversity that is insensitive to flow and habitat modifications. The wetland units in the study area provide intermediate to moderately high levels of ecosystem services.

The resettlement of this community will improve the living conditions of these community members and have an enormous positive social impact on the community. The resettlement project will give community members houses with sufficient space to accommodate all the family members, enough space for self-sustaining farming activities, and access to water, sewage and electricity services. All of these services will be self-sustaining on-site and thus these services will not be required from the local municipality. It could potentially increase the possibility of employment as the community will be located closer to the N4, providing transport opportunities to and from potential employers.

In conclusion, no fatal flaws were identified during specialist studies. The positive social impact on the community in terms of residential security and agriculture, outweighs the negative biophysical impacts. There is therefore no reason why the resettlement site should not be granted environmental authorisation.

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ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
BID	Background Information Document
CARA	Conservation of Agricultural Resources Act (Act. No. 43 of 1983)
CBA	Critical Biodiversity Areas
DWE	Digby Wells Environmental
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIR	Environmental Impact Report
ELM	Emakhazeni Local Municipality
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESTA	Extension of Security of Tenure Act
GDP	Gross Domestic Product
GN	Government Notice
ha	hectare
HGM	Hydrogeomorphic
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
kV	kilo Volt
kVA	kilo Volt Ampere
LED	Local Economic Development

MAP	Mean Annual Precipitation
MDARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environment Affairs
MBSP	Mpumalanga Biodiversity Sector Plan
MPRDA	Mineral and Petroleum Resource Development Act (Act. No. 28 of 2002)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:WA	The National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act (Act No 36 of 1998)
PAIA	Promotion of Access to Information Act (Act No. 2 of 2000)
PAJA	Promotion of Administrative Justice Act (Act No. 3 of 2000)
PET	Potential Evapotranspiration
PPP	Public Participation Process
RAP	Resettlement Action Plan
RDL	Red Data List
SAHRA	South African Heritage Resources Agency
SDF	Social Development Framework
SLP	Social Labour Plan
ToR	Terms of Reference

GLOSSARY OF TERMS

Environment	The surroundings (biophysical, social and economic) within which humans exist and that are made up of <ol style="list-style-type: none"> i. the land, water and atmosphere of the earth; ii. microorganisms, plant and animal life; iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action.
Basic Assessment Report (BAR)	A report assessing the potential significant impacts as identified during the environmental process.
Environmental impact	An environmental change caused by some human act
Public Participation Process	A process of involving the public in order to identify needs and address concerns, in order to contribute to more informed decision-making relating to a proposed project, programme or development
Red Data Book (South African)	An inventory of rare, endangered, threatened or vulnerable species of South African plants and animals
Scoping	A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

1. INTRODUCTION

Exxaro Coal Mpumalanga (Pty) Ltd. (hereafter referred to as Exxaro) is in the developmental phases of the Belfast Implementation Project (BIP). The BIP is located approximately 8 km to the south of Belfast town in the Mpumalanga province (Figure 1-1), with the proposed plant site located within Portions 6, 7, 9 and 10 of the Farm Blyvooruitzicht 383 JT (newly consolidated Portion 23 Blyvooruitzicht 383 JT). One of the consequences of the proposed mining development is the need to resettle a small community that currently resides within the mining site. The resettlement site, which will be donated by Exxaro to the affected community, which has been identified is Zoekop Farm 426 JS Portion 13, Leeuwbank Farm 427 JS Portion 13 and Paardeplaats Farm 425 JS Portion R (the study site) (Figure 1-2).

Exxaro has appointed Aurecon South Africa (Pty) Ltd (Aurecon) to provide environmental services for the establishment of a resettlement village of approximately 9 ha (on a property of approximately 80 ha) as part of their Resettlement Action Plan (RAP) for the proposed Belfast mine, Mpumalanga Province.

The area where the development is proposed is located in an undeveloped rural area with no existing water, sewerage, internal roads or storm water infrastructure. The resettlement village is proposed for the households eligible for the Belfast RAP process.

The proposed project will consist of a residential component with 32 x 2500 m² plots. The remainder of the site will be left undeveloped and can be used for grazing and other potential agricultural uses as may be required by the community to be resettled. The intention is to reserve 500 m² per plot for residential and outside buildings with the remaining 2000 m² for small-scale food production in the form of a combination of poultry, trees, dryland cropping and a homestead vegetable garden. Water for the households will be obtained from a borehole/s that is located north-west of the proposed property. One community facility which includes a church is also being proposed on an additional stand.

1.1. PROJECT LOCALITY

The settlement is proposed on portion 13 of the farm Zoekop 426 JS, part of the remainder of the farm Paardeplaats 425 JS and portion 13 of the farm Leeuwbank 427 JS, 11.5 km from Belfast Town in Mpumalanga Province. The site is located 10km southwest of Belfast Town and 10 km east of the N4 and R33 interchange. It falls under the jurisdiction of Ward 1 of the eMakhazeni Local Municipality in the Nkangala District Municipality. The property is owned by Exxaro Coal (Pty) Ltd. The proposed project location is shown in Figure 1-2, and affected properties in Figure 1-3.

Coordinates of the centre of the proposed Exxaro Belfast Resettlement Project:

Latitude: 25° 45' 37.54" S

Longitude: 29° 58' 16.85" E

Four household groups will be relocated. The distances of current community/household locations to the proposed resettlement site is approximately 6.4 km, 5 km, 5.2 km, and 3.6 km. The proposed site is located approximately 6.5 km north of the southernmost point of the mine.

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Figure 1-1 | Locality map of the Belfast Project mining site and the proposed relocation site to its north.

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Figure 1-2 | Project locality map.

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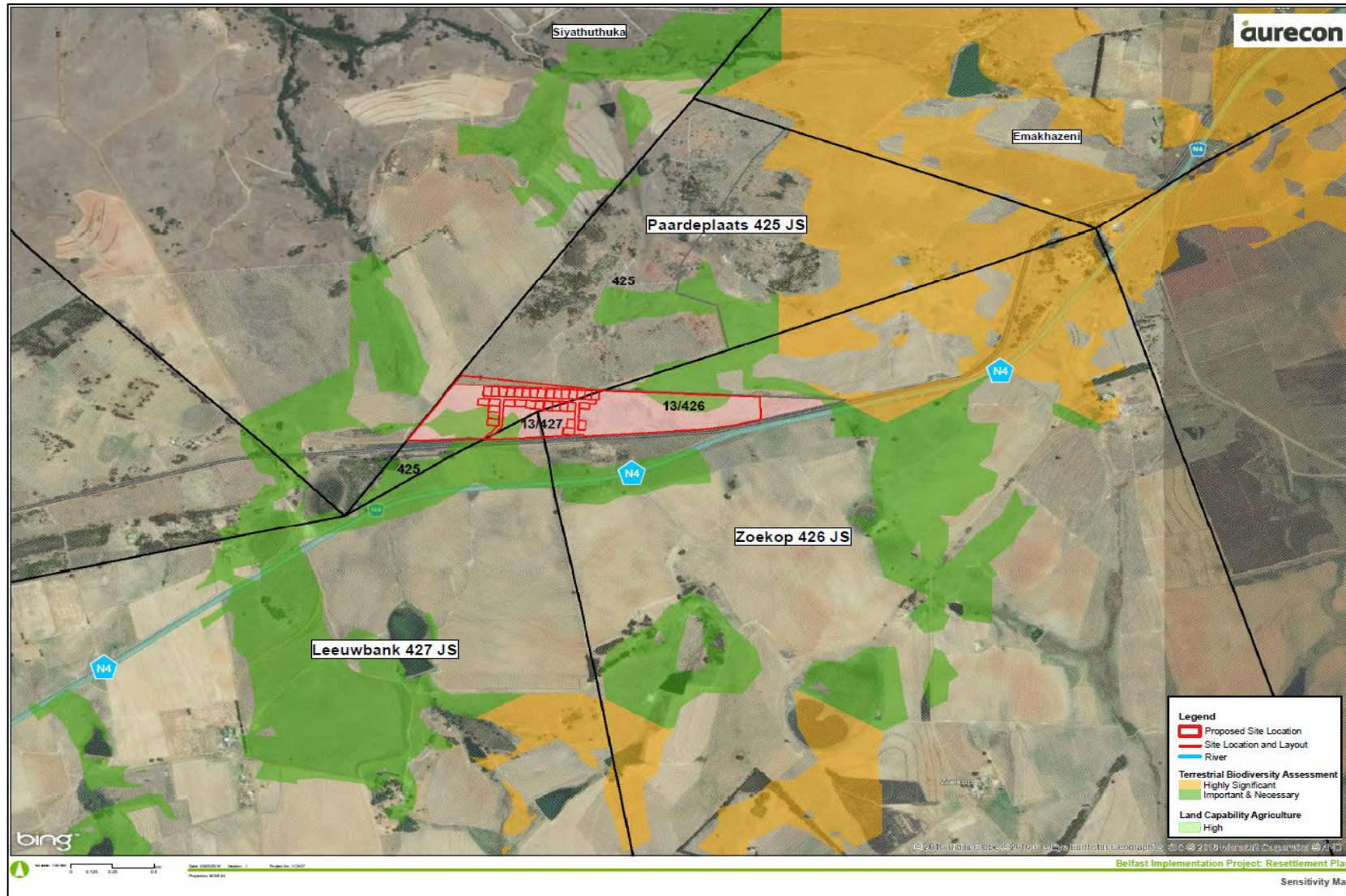


Figure 1-3 | Affected farms of the proposed site.

1.2. DETAILS OF THE EAP

Mr Barend Smit, who is the Project Director and Unit Manager for the Environmental Unit at Aurecon, has gained over 25 years' experience in the strategic management of environmental aspects relating to the construction of bulk water supply projects such as dams, pipelines and tunnels, but also relating to roads, industrial and residential developments, and recreation and tourism infrastructure. He gained extensive experience in leading, managing and conducting a range of environmental impact assessments, and the preparation and subsequent implementation of project specific environmental management plans (EMPs). Mr Smit has also managed social impact studies in the course of his work, and has experience in liaison with local communities in project areas. He gained significant experience in the contractual aspects of implementing EMPs as part of larger construction projects, and the procurement of specialist services for impact assessments. In addition, he has undertaken landscape designs especially for rehabilitation of rock quarries, borrow pits and spoil dumps in relation to tunnels, dams and roads, in addition to purely aesthetic landscape design. He is experienced in working as part of consortiums or independent project teams set up for large scale engineering projects. Mr Smit is registered with the South African Council for the Landscape Architectural Profession as a Professional Landscape Architect.

The coordination of the EIA process is managed by Ms Anne-Mari White, an environmental project leader with Aurecon. She is also responsible for the overall project management of the project, including client liaison, financial management and progress reporting. Ms White is an Environmental Specialist, who started her studies at the North-West University (NWU) and completed her Bachelor of Science: Environmental Management at the University of South Africa (UNISA) in 2007. Ms White is registered with the South African Council for Natural Scientific Professions as a Certificated Natural Scientist (Reg. No 300067/15). In addition to her qualification, she completed short courses in soil classification and wetland delineations (Terrasoil Science), Geographic Information Systems (University of KwaZulu-Natal), and Environmental Impact Assessments (NWU).

1.3. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

1.3.1. BA requirements

Chapter 5 of the National Environmental Management Act (No. 107 of 1998) (NEMA) regulates, among others, the procedure and criteria for the submission, processing and

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consideration of, and decision on, applications for environmental authorisations for the commencement of certain listed activities. The purpose is to avoid detrimental impacts on the environment, or where they cannot be avoided, to ensure mitigation and management of impacts to acceptable levels, and to optimise positive environmental impacts, and for matters pertaining thereto.

Exxaro is responsible for ensuring that the proposed activity and Basic Assessment (BA) process conforms to the principles¹ and procedural requirements of NEMA. In developing the BA process, Aurecon has been cognisant of this need. Consequently, the BA process has been undertaken in terms of NEMA and the EIA Regulations (GN No. R 982 of 2014) of December 2014.

The EIA Regulations identify certain activities that require authorisation from the competent environmental authority, in this case the Mpumalanga Department of Agriculture, Rural Development, Land and Environment Affairs (MDARDLEA), before commencement. Listed activities in Government Notice (GN) No. 984 of 2014 require a Scoping and environmental impact reporting (EIR) process, whilst those in GN R 983 and 985 of 2014 require a BA, unless they are being assessed under a Scoping and EIR process. The activities being applied for in this BA process are listed in Table 1-1.

Table 1-1 | Listed activities in terms of NEMA GN No. 983 and 985 of 2014

GN No.	Listed Activity	Relevant to
R 983 of 2014, Activity 27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation , except where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan	The area to be cleared for the resettlement is approximately 9 hectares and the area consisting of indigenous vegetation is more than 1 hectare.
R 983 of 2014, Activity 28	Residential, mixed, retail, commercial, industrial developments where such land was used for agriculture	The area on which the resettlement is proposed was previously used for agricultural

¹ NEMA Principles, Chapter 1, Sections 1-4

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	<p>or afforestation on or after 1 April 1998 and where such development:</p> <p>(i) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare</p>	and afforestation purposes, with plantations remaining.
R985 of 2014, Activity 12	<p>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 purposes undertaken in accordance with a maintenance management plan.</p> <p>c) In Mpumalanga:</p> <p>(ii) within critical biodiversity areas identified in bioregional plans.</p>	A large portion of the area falls within the critical biodiversity area as identified within the bioregional plans. More than 300 square meters of this area will be cleared during the development.

1.3.2. Other legal requirements

Application to the MDARDLEA for Environmental Authorisation in terms of NEMA does not absolve the applicant from complying with other legal requirements. In this regard, the following national and provincial legislation may apply and is considered in the assessment process:

1.3.2.1. National Water Act (No. 36 of 1998)

The National Water Act (No. 36 of 1998) (NWA) governs all uses of water, a national resource of which the State is the custodian, for the benefit of all people. The NWA sets out central guiding principles in the protection, use, development, conservation, management and control of water resources, primarily by establishing a system of authorising and licencing of various defined water uses. Unless a particular use is exempt from the need for a licence by virtue of one of the particular provisions of the Act, a user will need to apply for and be granted a water use licence before commencing any such use.

As per Section 40 of the NWA, a water use licence application to the Department of Water and Sanitation (DWS) will be submitted for the following activities as listed in Section 21 of the NWA:

- 21 (c) impeding and/or diverting the flow of water;

- 21 (e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- 21 (f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit
- 21 (g) disposing of waste in a manner which may detrimentally impact on a water resource;
- 21 (i) altering the bed, banks, course or characteristics of a watercourse.

1.3.2.2. National Environmental Management: Biodiversity Act (No. 10 of 2004);

The National Environmental Management Biodiversity Act (No. 10 of 2004) provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment and functions of a South African National Biodiversity Institute. The ecological assessment conducted on the area proposed, found some species of concern that will require relocation.

1.3.2.3. National Heritage Resources Act (No. 25 of 1999);

The National Heritage Resources Act (No. 25 of 1999) (NHRA) aims to manage the national heritage resources, lay down general principles for governing heritage resources management throughout the Republic, and set norms and maintain essential national standards for the management of heritage objects. As stated in Section 38 of the any activity exceeding 5 hectares that will change the character of the site, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. Due to the fact that an area of 9 hectares will be transformed, a Heritage Impact Assessment was conducted.

1.3.2.4. Mineral and Petroleum Resources Development Act (No. 28 of 2002)

The Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) requires that mining companies assess the socio-economic impacts of their activities from construction

to decommissioning phases, by developing and implementing a Social Labour Plan (SLP). A component of the mine's SLP is the local economic development (LED) programme. The impacts on resettled households will be reduced substantially as they are integrated into these LED initiatives.

1.3.2.5. *Municipal Systems Act (No. 32 of 2000)*

The relevance of this Act for resettlement planning is that development of the resettlement site would need to be compatible with the local municipality's Spatial Development Framework, while resettlement-related development projects should preferably be consistent with priority areas identified in its Integrated Development Plan.

1.3.2.6. *Extension of Security of Tenure Act (Act 62 of 1997)*

The Extension of Security of Tenure Act (ESTA) confers certain rights to non-landowning residents of a property based on the period of time the persons have been resident on the land. The ESTA applies in all rural areas (anywhere outside a proclaimed township), and therefore the community considered in the RAP. Most of the households have been residing in the community for over ten years.

1.3.2.7. *Prevention of Illegal Eviction from and Unlawful Occupation of Land Act (Act 19 of 1998)*

The provisions of this Act apply in cases where illegal occupation of land (i.e. not in terms of ESTA) has taken place, and where such land is to be acquired for the project, and houses in the settlement will be displaced. It thus protects the rights of community members who reside on the farm without the owner's express permission.

1.3.2.8. *The Emakhazeni Local Municipal Planning By-Law*

The Emakhazeni Local Municipality By-Law on Spatial Planning and Land Use Management was promulgated in November 2015. The said By-Law makes provision for the subdivision of Agricultural Land and the By-Law further states in Section 71 that no person may subdivide land without the approval of the municipality, unless the subdivision is exempted under the provision of Section 75 of the By-Law if the subdivision is for the exclusive utilisation of land for agricultural purposes and if the subdivision will require approval in terms of other legislation that regulates the subdivision of agricultural land, and further subject thereto that the proposed subdivision will not lead to urban expansion.

1.4. THE PROJECT

1.4.1. Need and desirability

Exxaro Coal Mpumalanga (Pty) Ltd (hereafter referred to as Exxaro) operates a coal mining complex between the towns of Belfast and Carolina. The complex is referred to as the North Block Complex, and consists of the Glisa, Eerstelingsfontein and Strathae Coal Mines. Through the proposed Belfast Coal Mine Project (Belfast Implementation Project), Exxaro is expanding its operations to extract coal resources from an estimated 46 Megaton (Mt) reserve. The envisaged mining activities will require the relocation of 32 non-landowning households which will directly be impacted by the proposed mining operation.

Exxaro's mining right for the BIP is situated on the farms Zoekop 426 JS, Leeuwbank 427 JS and Blyvooruitzicht 383 JT. The envisaged mining activities will require the relocation of 32 non-landowning households which are situated in the mining area. These households (the resettlement community) are spread across the following farm portions in the mining right area:

- The “Zoekop community”, comprising 12 households, is located on the farm Zoekop portion 1;
- The “Leeuwbank community”, comprising 17 households, is located on the farm Leeuwbank portion 13;
- On the farm Zoekop portion 2, are Mr. David Khoza's and Mr. Elias Nhlapo's households; and
- Mr. Jan Mthimunye's household is located on the farm Zoekop portion 7.

These households consist mostly of families of farm workers that have been or are currently employed in commercial farming operations in the surrounding area.

The resettlement process is guided by, *inter alia*, the tenet that no household should be worse off after resettlement than they were before. In accordance with this principle, the most pressing needs identified in the community should be mitigated within the proposed resettled community. The most prominent challenges experienced by the community include: a lack of electricity and clean water, the distance from households to the main road, and unemployment. In 2013, an independent consultant, Digby Wells Environmental (DWE), initiated the consultation process for the RAP, and in 2016 GCS Water and Environmental

Consultants was appointed to implement the relocation of the aforementioned households to an area that will satisfy the community's needs.

The purpose of this application is to establish these 32 (2 500 m²) plots which will be sufficient in size to establish residential- and outbuildings (500 m² of the 2 500 m² plot has been allocated for this purpose). The remainder of each plot to be used for various small-scale agricultural activities (2000 m² of the 2 500 m² has been allocated for this purpose) e.g. poultry, small livestock, fruit trees, small-scale dryland cropping and homestead vegetable gardens. The remainder of the 80 ha property will be used by the households for e.g. grazing and/ or other agricultural activities. Additional grazing areas will be also be made available to the community as required (although these additional grazing areas will not be donated to the community).

1.4.2. Description of the project

The intention of the project is to establish a small-scale rural farming settlement on the farm Zoekop 426 JS portion 13, Leeuwbank 427 JS portion 13 and a portion of the remainder of the farm Paardeplaats 425 JS. This proposed site is located approximately 300m north of the N4 highway. The proposed site is one of seven potential resettlement sites initially identified in the RAP that was selected based on various criteria concerning settlement size, location, land use, land potential, access to services and employment, land claims and servitudes. The community-preferred site is within the BIP mining right area and on land owned by Exxaro, but outside the 500 m safety buffer around proposed pits and mine infrastructure. The land will be donated to the community. The land is currently zoned as agricultural land and is approximately 5 km from the community's current location.

No municipal services will be required, as water, electricity and sewage services will be contained on the site itself. Water will be obtained from two boreholes located on the property and a waste water reticulation network and treatment plant will be constructed to treat all sewage generated by these households. Exxaro will support and maintain these services for three years as per the RAP Entitlement Framework. A Communal Property Association (CPA) will be established consisting of all the home owners within the resettlement area. After Exxaro's monitoring period, the CPA will take over the responsibilities from Exxaro and be responsible for the maintenance of all structures, infrastructures and services. Services to be established at the site include roads, storm water drainage, potable water, sanitation, fencing and electricity. Each plot or stand will be fenced off with a wire fence and fitted with a steel gate wide enough to admit a motor vehicle. A concept layout of the resettlement site is shown in Figure 1-4.

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Figure 1-4 | Concept site layout (Digby Wells Environmental, 2015)

1.4.2.1. Resettlement housing construction

Exxaro will, through a local contractor, undertake to build the main structures of the each household.

The following arrangements will apply with regard to replacement housing (Digby Wells Environmental, 2015):

- Each household will receive one single storey residential structure with living space that is large enough to comfortably accommodate all registered household members. The houses will have between two and eight bedrooms depending on household size.
- Each replacement residential structure will consist of the following:
 - All external load-bearing walls to be founded on reinforced concrete strip foundations to engineers design and specification;
 - External walls of face brick and plastered internal walls(inside).

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- Concrete floor slab on 250micron damp proof membrane and 25mm sand/cement screed with Granolite non-metallic floor hardener;
- Natural Anodized Aluminium framed single glazed windows;
- Steel door frame with semi-solid timber door – front and back door;
- Corrugated roof sheeting;
- Ceilings;
- Gutters around the whole house and one point leading to a rainwater harvesting water tank;
- Indoor plumbing;
- Low-pressure solar geysers on top of roof;
- Bathroom with basin, toilet, and bath, towel rails and mirror cabinet;
- Kitchen with kitchen sink, counter tops, cupboards, gas hob; Electrical reticulation with distribution board with plug points and light switches;
- Carport: and
- Washing line

The houses will be placed on cut-to-fill platforms, extending 1 m from outside walls to prevent ponding against houses. *In situ* materials will be used for platform construction.

Besides the 32 houses proposed to be constructed, a community facility is also proposed on an additional plot within the boundaries of the proposed site.

The main features of concept designs for various services to be supplied at the residential resettlement site include the following (Digby Wells Environmental, 2015):

- **Roads:** Access to the property will be via secondary local access roads, which will provide access from the N4 highway. It is foreseen that the development will generate a negligible amount of private vehicular trips, as very few of the relocated families own cars. For this reason, no upgrades to the N4 intersection will be required. The internal and main access roads will be gravel with a maximum of two *in-situ* layers.
- **Storm water management:** Stormwater will be drained in an earth-lined stormwater channel running alongside the road. This channel will be a 2m wide vee-shaped channel and will have a reinforced concrete toe to prevent erosion at the foot of the

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channel. Pipe culverts with a diameter of 450mm will be provided at plot entrances ensure vehicular access to the plots where the vehicles need to cross over the stormwater channel. Gabion structures will also be placed within some of the channels to slow down the velocity of the stormwater within the channels. Stone-pitching will be provided at the various discharge points, to prevent erosion of material further downstream.

- **Potable water:** Since there is currently no municipal water supply or bulk water line in the area, it is envisaged that water would be most sustainably supplied through the use of groundwater accessed by boreholes located to the west and north-west of the proposed property. Water from the boreholes would be pumped to an elevated steel tank; this would be positioned at the highest point on the development to ensure sufficient head to supply the site's water needs without additional booster pumps being required. Water reticulation will lead to individual connections on the residential stands, and indoor plumbing in homes.

The average water consumption based on a population of 200 people is estimated at 17 170 litres per day, as set out in Table 1-2.

Table 1-2 | Average water consumption for a population of 200 people

Domestic Appliances	Average Water Consumption (l/d/p) (obtained from SANS 10252-1)	Average Water Consumption (l/d)
Car washing and garden use	6	1,200
Drinking, food preparation and cooking	22	4,400
Laundry	15	3,000
Personal washing and bathing	30	6,000
Washing dishes	12	2,400
WC – waterless	95	19 040
Subtotal	180	360 040
Allow for 10% losses	18	360

Total	198	36 400
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Following the Ground Water Assessment, the two boreholes to be abstracted yields 129 600 litres per day, which is more than required for a population of 200 people.

- **Sanitation:** The preferred option for the resettlement site are full waterborne flushing toilets inside houses. A waste water reticulation network and wastewater treatment plant will be constructed to treat all sewage generated by these households.
- **Fencing:** The site is to be fenced along the site perimeter. Two 1.8m access points will be provided at the main entrance. Another two 1.8m double swing gate will be placed strategically to provide emergency access. Two single rotation pedestrian gates will be provided near the railway culvert bridge. In addition, each stand will be fenced off and provided with two 1.8 m wide farm / swing gates to be installed to will allow for vehicular and pedestrian access.
- **Electricity:** Electricity supply to the site will have two components:
 - Communal supply to the boreholes and other possible service points outside the residential stands. All such communal services will be supplied with solar installations.
 - House connections will be equipped with prepaid meters. An existing 11 kV overhead power line, which is supplied from the Kraal / Wonderfontein Eskom substations, supplies the surrounding farming communities and is situated on the northern boundary of the site. Required infrastructure to connect the households to this line includes two 100 kVA transformers, a medium voltage overhead feeder line, and a low voltage overhead service connection to each dwelling. No street lighting will be installed. Houses will be supplied with gas or coal stoves to limit electricity demand and cost (Digby Wells Environmental, 2015).

1.4.2.2. Services at the resettlement site

As mentioned in section 1.4.2, stands for the replacement houses at the resettlement site will be provided with water, sanitation, indoor plumbing, and electricity services at the cost of Exxaro. As far as possible, these services will be self-contained by installing, for instance, solar power technology and borehole water.

Exxaro will, for a period of three years from date of resettlement, be responsible for the repair and/or maintenance of the internal services, as well as for the provision of potable water that complies with drinking water standards. After this, the households will be liable for any repair and/or maintenance required (Digby Wells Environmental, 2015).

1.4.2.3. Compensation for agricultural activities

1.4.2.3.1. Grazing land

Resettlement households will be able to keep their livestock once they have been relocated. Exxaro will demarcate and fence grazing land of suitable quality and sufficient size in close proximity to the relocation site. This land will be part of the resettlement site that will be transferred to the ownership of the Communal Property Association.

The exact size of the replacement grazing land will depend on the number of livestock each household wishes to graze at the relocation site, limited to a maximum number of livestock as recorded during the census, with allowance made for natural growth in herd sizes. The average carrying capacity of the area will be used to determine the exact size of the grazing area. Exxaro will ensure that adequate water supply for cattle is available at the grazing area.

Exxaro will be responsible for providing and erecting a secure standard wired stock fence around the demarcated grazing area, as well as a sufficiently large gate to allow cattle to move in and out of the allocated grazing area. A chain and padlock will be provided to lock the gate.

1.4.2.3.2. Cultivated fields

Each household (regardless of whether or not they currently cultivate crops) will receive a vegetable garden with a surface area of 32 m² at their new residences. Exxaro will prepare the areas and apply basal fertiliser. Resettled households will be responsible for supplying their own seeds and for cultivating the vegetable gardens.

1.4.2.3.3. Standing crops

Standing crops refer to crops that are on the field or fruit on the trees at the time of resettlement. In the event that there are such standing crops, compensation for these standing crops will be in the form of a monetary payment calculated on the basis of local market rates at the time.

1.4.2.3.4. Fruit trees

Households will, at Exxaro's cost, receive five peach saplings which will be planted by Exxaro. Households who currently own more than five trees will receive additional trees of the same number and type as they currently own. Exxaro will be responsible for transporting the saplings to household resettlement sites, as well as for digging the holes for each tree and have it planted by a horticulturist at a permissible place of the resettled household's own choosing.

Resettled households will be responsible for the watering of the trees at the resettlement site (Digby Wells Environmental, 2015).

2. THE PUBLIC PARTICIPATION PROCESS

The purpose of this chapter is to provide an outline of the public participation process (PPP) to date and the way forward with respect to the BA process.

Engagement and consultation with Interested and Affected Parties (I&APs) forms an integral component of the BA process and enables, *inter alia*, potentially directly affected landowners, neighbouring landowners and communities, authorities and key stakeholders to provide input into the proposed development.

I&APs were identified during the public participation phase of the project. All the members of the community have automatically been registered as an Interested and Affected Party for the BA. The registered I&AP list is attached as Appendix D.1.

Other methods for informing the public involved:

- Distributing a Background Information Document (BID) to all registered interested and affected parties, as well as providing the Ward Councillor of the community with 50 BIDs to distribute amongst the households on 6 June 2016. The BID was available in English and Zulu, and are attached in Annexure D.2 and Annexure D.3, respectively. Through registered mail, and email BIDs were distributed to certain I&APs, proof of which is attached in Annexure D.4;
- Placing two site notices at the proposed site, one at the proposed entrance of the resettlement area and one at the south-western corner of the site (see Annexure D.5); and
- Placing a newspaper advert in the *Lowvelder* on 3 June 2016 (see Annexure D.6).

The draft Basic Assessment Report (BAR) will be made available for review and comment by I&APs from 25 October 2016 to 24 November 2016.

3. CONSIDERATION OF ALTERNATIVES

Site selection is a complicated and multi-faceted issue, which is essential to the success of this application and ultimately to the proper, responsible and sustainable operation of the proposed project.

Seven potential resettlement sites have been considered in the RAP, but only two were selected based on benefits and disadvantages of each of the sites. A census and asset survey, completed by DWE, as well as numerous criteria, impacted the current site alternatives.

3.1. SITE LOCATION ALTERNATIVES

Out of the seven alternatives initially considered during the RAP, two site alternatives were investigated and consulted on with the communities for this proposed project:

3.1.1. Site 7 (Community Preferred Site)

Site 7 will be considered for the location of replacement housing. This site is the approximately 80 ha parcel on the farms Zoekop 426 JS Portion 13, the remaining extent of Paardeplaats 425 JS, and Leeuwbank 427 JS Portion 13. The site is located north of the mine and the N4 highway, close to the Sunbury intersection. Geotechnical studies and borehole analysis have been conducted preliminarily for this site, indicating that it would be appropriate for residential development.

3.1.2. Site 5

Site 5 is a 50 ha parcel of land located on the remaining extent of the farm Zoekop 426 JS, east of the mine. The site could potentially be used for agricultural activities.

Even though both sites have boreholes and are close to the power line, Site 7 has been selected as the preferred option for resettlement, considering that Site 5 is located on prime agricultural land (which is ideal for agriculture). For this reason no further investigation was done on Site 5. Site 7 is also located fairly close to the N4 highway, making it accessible and providing travel opportunities for development of small enterprises in the community.

3.2. NO-GO ALTERNATIVE

The 'no-go' alternative is the option of not relocating the community. This option is not preferred, as it would mean that authorised Exxaro mining activities cannot commence or will

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be limited to a smaller area, and all the associated benefits thereof will not come to fruition. These benefits include, *inter alia*, a potential improvement on the living conditions of the community that will be relocated (reliable electricity, water, and agricultural resource supplies), job creation through the proposed mine, the mine's potential contribution to mine tax etc.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

The description of the affected environment below draws on existing knowledge from published data, previous studies, specialist investigations, and site visits to the area.

4.1. TOPOGRAPHY

The proposed site has relatively flat topography, with a slight decline to the north and to the west. No outcrops are present.

4.2. CLIMATE

The study site has a Mean Annual Precipitation (MAP) of 714.7 mm. but can vary between 650 and 900 mm. Rainfall occurs in summer, with very dry winters. Potential Evapotranspiration (PET) of 1863.5 mm.

4.3. GEOLOGY AND SOILS

According to the 1:250 000 geological map (2528 Pretoria), the study area is underlain by sedimentary rocks of the Vryheid Formation, Karoo Supergroup. The rocks consist of sandstone, shale, gritstone, conglomerate with coal seams in places near the base and top. The few wetland areas within the study site are characterised by alluvial soils. Figure 4-1 gives an indication of the geology of the project area while figure 4-2, indicates the freely drained soil type.

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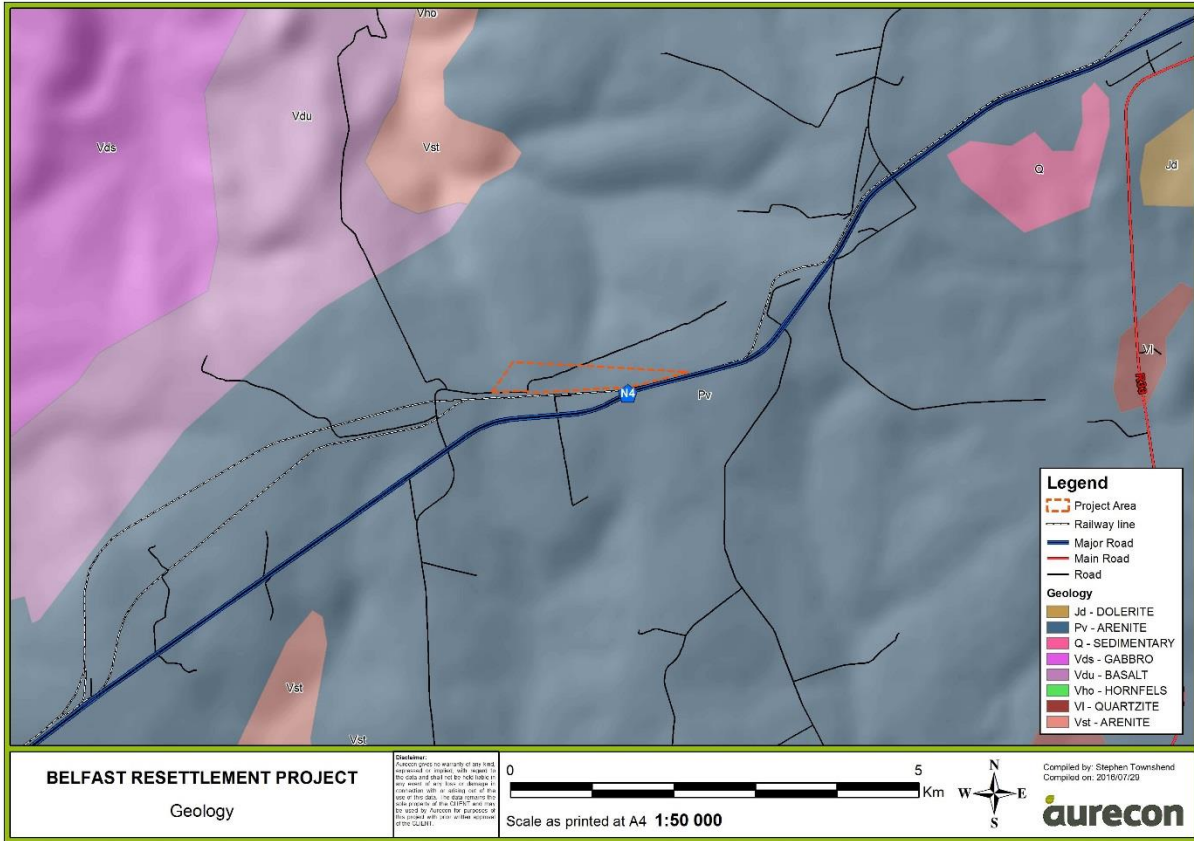


Figure 4-1: Geology of the area

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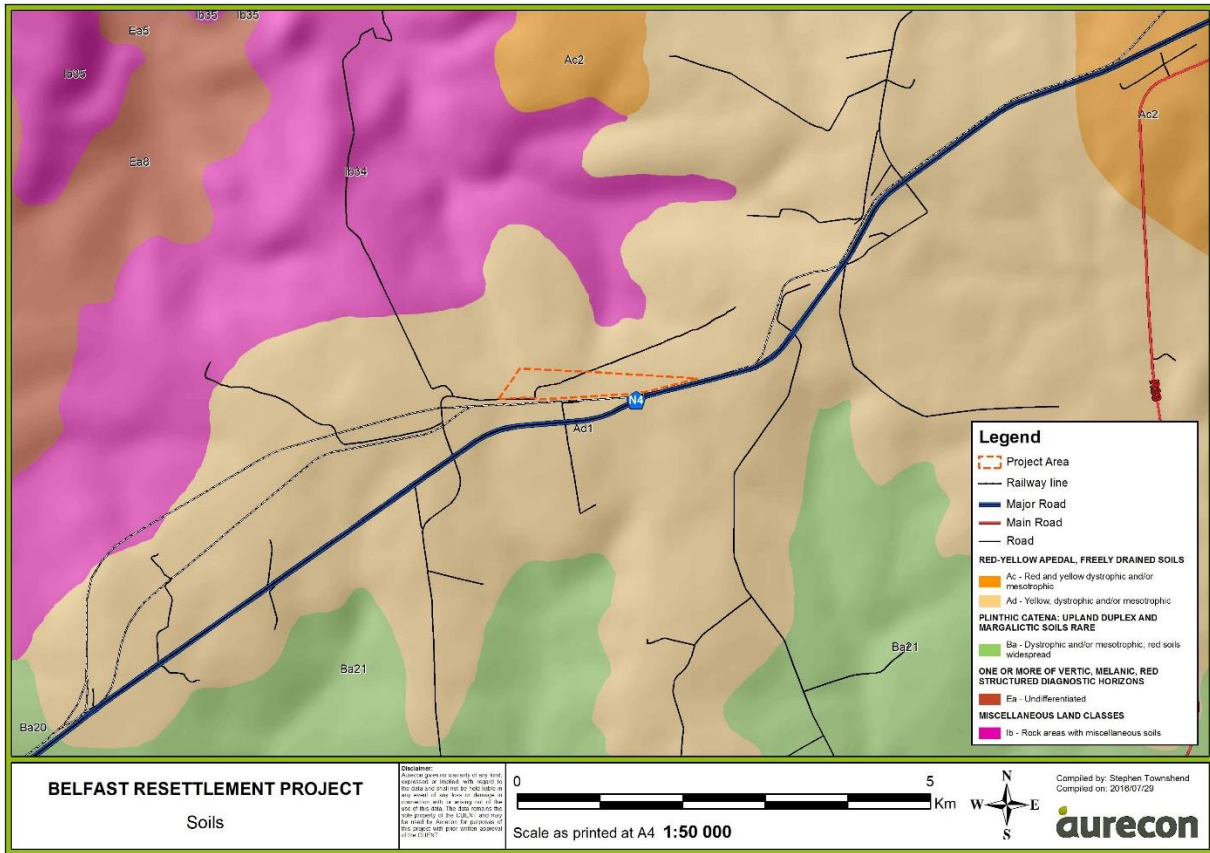


Figure 4-2: Map indicating the soil of the project area

4.4. LAND USE

The proposed site is currently zoned as agricultural, but undeveloped. Located north of a railway line and the N4 highway, it's bordered by cultivated lands to the east and west. Evidence of an old eucalyptus plantation can be found, as well as exotic trees and the aforementioned small wetlands. Figure 4-3 gives an indication of the land cover of the project area.

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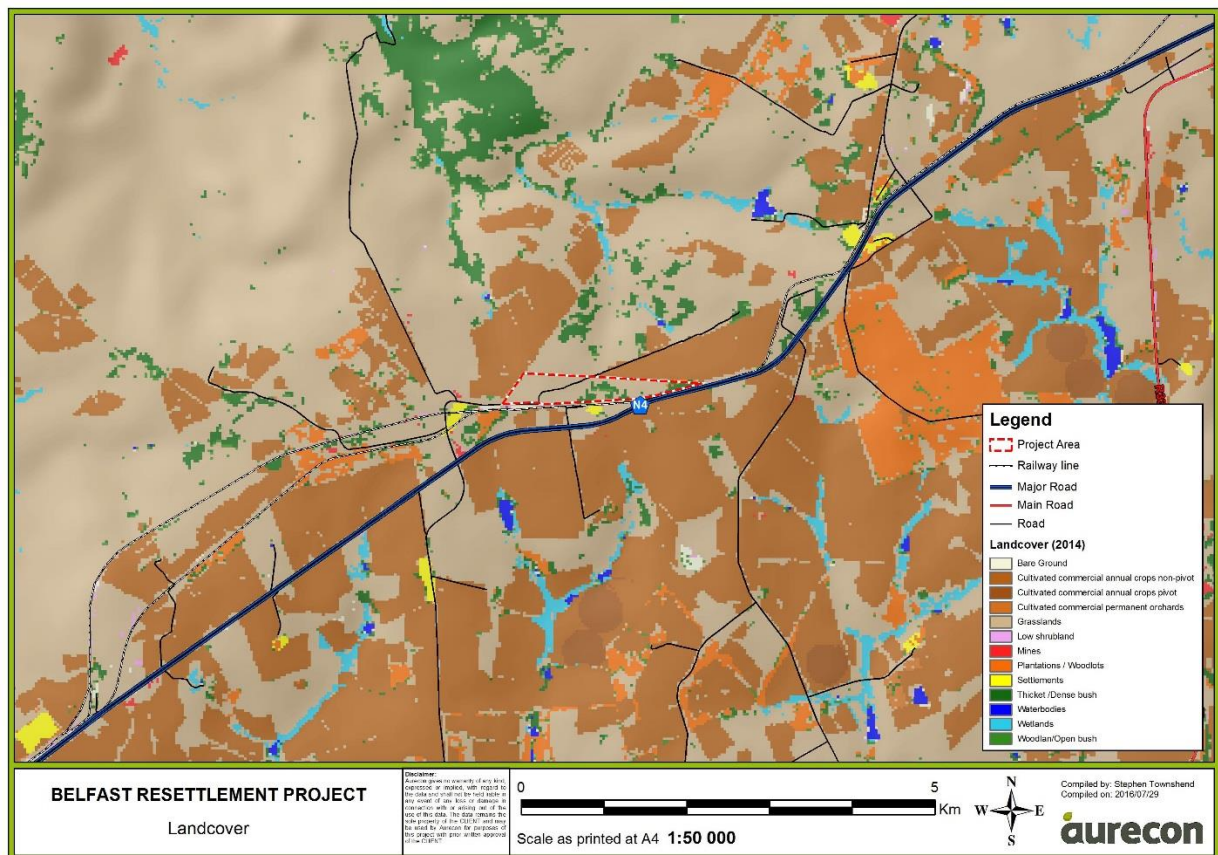


Figure 4-3: Land cover of the project area

4.5. HISTORY OF BELFAST AND SURROUNDING AREAS

The following summary of the history of Belfast and surrounds is from the Phase 1 Heritage Impact Assessment (HIA) for the Exxaro Belfast Resettlement Project conducted by Kudzala Antiquity CC (see Annexure C.1).

The earliest Africans to inhabit the Lowveld in Mpumalanga were of Sotho origin. Unsurprisingly, no major Stone Age or Iron Age sites are present in the Belfast area. Between the 1820s and 1830s, competition between gun-carrying Griquas and Shaka's Zulus attacked other tribes in the Highveld and Natal, as a result of competition for land. This period is commonly known as Difaqane. During the time of Difaqane, European settlers from the Cape migrated northwards, significantly impacting black farmer-herders in the northern regions of South Africa. Since the mid 1800's, South Africa had been subdivided into various districts of which the District Lydenburg included Belfast (Bergh, 1998). The town of Andries-Ohrigstad was the first to be established in July 1845 after successful negotiation between Voortrekkers

and Sekwati, a Pedi chief. In Belfast in particular, colonial settlement started in 1847 when the pasture proved desirable for stock farming.

In 1858 the Zuid-Afrikaansche Republiek (ZAR) was officially established. This development led to a boundary dispute between the ZAR and the then Republic of Lydenburg regarding the western boundary of the latter. In 1860 the Republic of Lydenburg united with the ZAR as the District of Lydenburg and ceded the land west of the Olifants River as part of the unification agreement to the District of Pretoria (Bergh, 1998).

The rate of town establishment increased from 1886, mostly as a result of the growing mining industry and the construction of railway lines in the ZAR. A number of new towns were proclaimed in the Transvaal, one of which was Belfast in June 1890.

Between 1878 and 1894 a stage-coach route, linking Pretoria to the Lowveld, was in place and the current section of the N4 route between Wonderfontein and Belfast roughly follows this old route (De Jongh, 2009).

The construction of the railway line between Pretoria and Delagoa Bay commenced after the Kruger Government gave the concession for the building of the line to the Nederlandsche Zuid-Afrikaansche Spoorweg-Maatschappij. The railway line was completed in 1895. The original railway line was located north of the farm Leeuwbank, and had cut through the northern part of Zoekop in 1900. The eastern railway line was built conjointly from the direction of Pretoria and Delagoa Bay. The two sections were ceremoniously joined by President Paul Kruger at Brugspruit Station on 2 November 1894 (De Jong, *et al.*, 1988).

An HIA was conducted by Kudzala Antiquity to identify any possible heritage resources within the area proposed for resettlement. The proposed area yielded eleven sites, four of which are survey orientation points. The remaining seven sites are building ruins and structural remains. No buildings were identified. None of the sites or features are of archaeological significance.

Exploratory studies of coal deposits in the Belfast region conducted in 1928 estimated that between the Klein Olifants and Komati rivers as well as north of the Ermelo coal-fields, coal seams extended far north. During the period 1890 to 1928 coal was mined at a small colliery west of Belfast on the farm Paardeplaats. O'Neill's Colliery then operated north of Belfast at Palmer Station. By 1928, estimates indicating the viability of coal mining in the Belfast area were made: proven reserves were in the region of 46 million tons while an estimated 86 million tons were on the table and an undetermined volume of 1 468 million tons concluded the estimate (De Jongh, 2009).

4.6. BIODIVERSITY

The Biodiversity Impact Assessment was carried out by Afrika Enviro and Biology. The baseline results are summarised below (see Annexure C.2.1 to C.2.4).

4.6.1. Flora

The study area is located within the Eastern Highveld Grasslands and is rated as Endangered, as only 44% of this vegetation type is officially conserved as small fragments. According to the Mpumalanga Biodiversity Sector Plan (MBSP) (MTPA, 2014), pockets within the proposed site are classified as Heavily or Moderately Modified (Figure 4-5). A large portion of the property is classified as a Critical Biodiversity Area (CBA) with Aquatic Ecological Support Areas also present (Figure 4-6).

The extreme northern section of the property is classified as “other natural areas” which are Heavily or Moderately Modified according to the MBSP (MTPA, 2014). The aquatic biodiversity in this section, is rated as irreplaceable, and provides an ecological and aquatic support area.

The vegetation consist of the aforementioned Eucalyptus plantations, as well as fragments of natural grasslands and small wetland areas. Two RDL species were recorded, namely *Boophane disticha* (L.f.) Herb and *Eucomis autumnalis* (Mill.) Chitt. Subsp. *Clavata* (Baker), shown in Figure 4-. The biodiversity investigation indicated that the natural habitat on the site had been fragmented as result of human induced impacts. The old Eucalyptus plantations are in a state of recovery, with pioneer grassland covering large sections of the site. The sensitivity ratings (based on floral integrity, fauna potential and ecological functions) for the different habitats are summarised in Table 4-1. Various alien invasive species and weeds were recorded at the site, including, but not limited to, Eucalyptus and pine tree species.

Figure 4-4, 4-5, and 4-6 has been included to indicate the sensitivity, the ratings in terms of the MTPA Biodiversity Sector Plan as well as the LN3 ratings as compiled by the DARDLEA for biodiversity and ecosystem importance.

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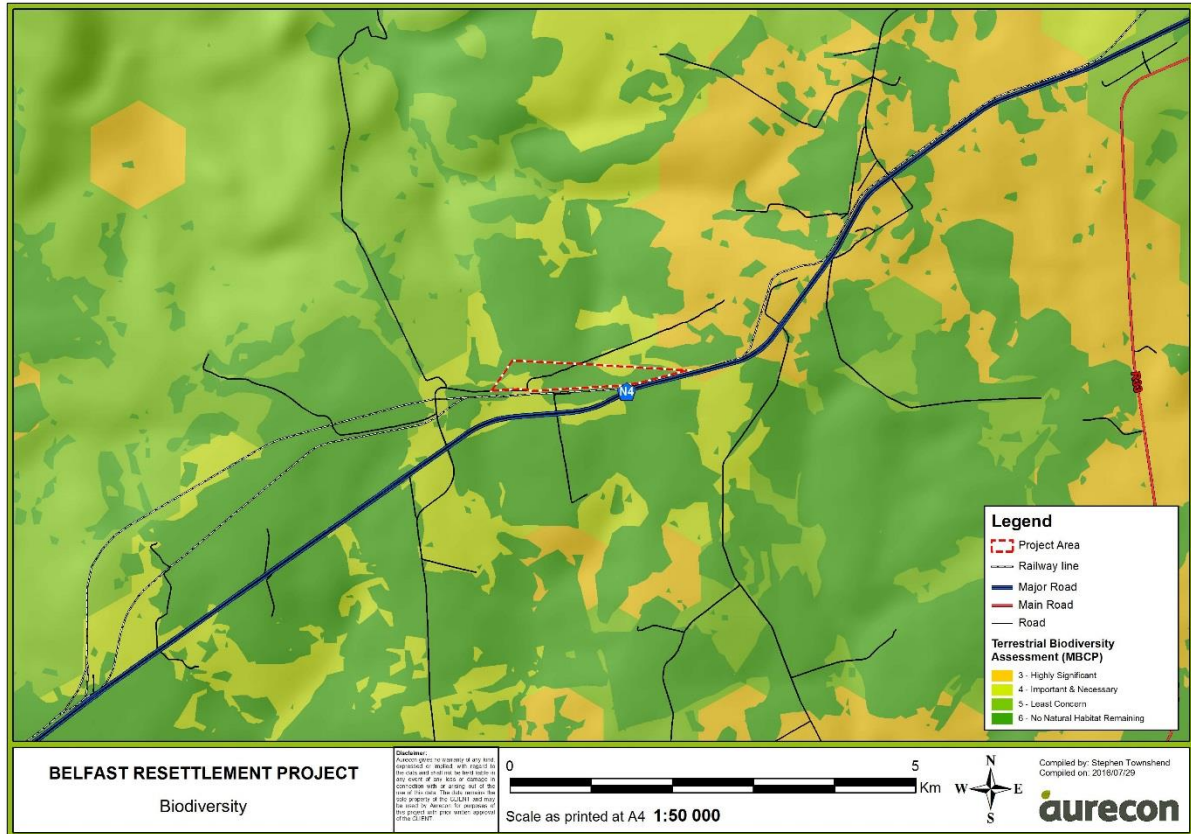


Figure 4-4 | Map indicating the sensitivity of the project area

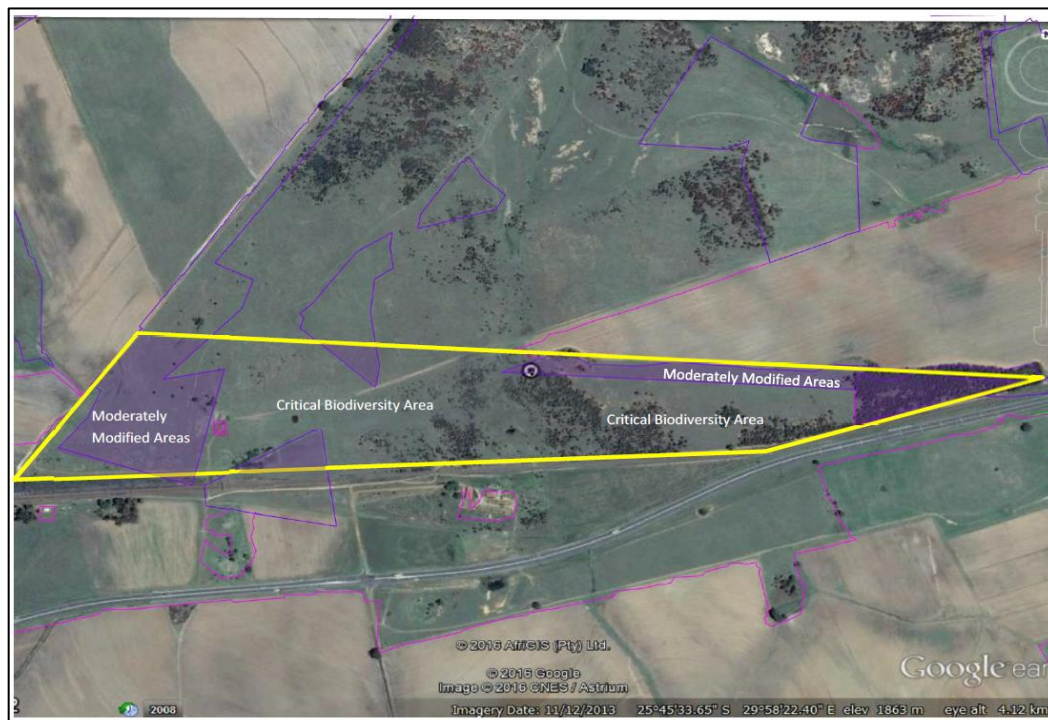


Figure 4-5 | The study site in relation to the MTPA Biodiversity Sector Plan ratings for biodiversity and ecosystem maintenance.

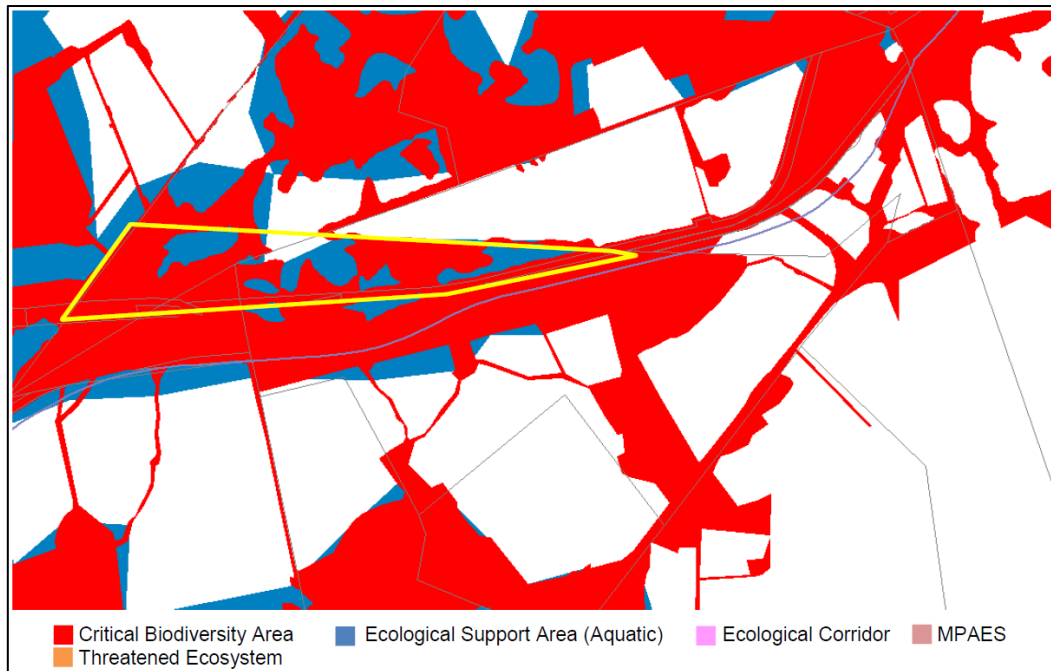


Figure 4-6 | The study site in relation to the LN3 ratings as compiled by DARDLEA for biodiversity and ecosystem importance.



Figure 4-7 | RDL species *Boophane disticha* (left) and *Eucomis autumnalis* (right).

**Table 4-1 | Sensitivity ratings of vegetation communities on the proposed resettlement site (Afrika Enviro
& Biology, 2016)**

Vegetation Community	Sensitivity Rating
Eucalyptus plantations and transformed land	Low
Disturbed land and pioneer grassland	Low to Medium
Fragmented grassland	High
Wetland zones	Medium to High

4.6.2. Fauna

Fragmentation and degradation will mostly have a negative impact on these species. The proposed project will have a small ecological footprint and with correct site selection it is not anticipated that it will have a significant impact on the terrestrial fauna if the natural habitat and adequate buffer zones are conserved.

4.6.2.1. Amphibians

The potential important frog assemblage for the study area is diverse but none of them have Red Data status. Six of the species potentially found are endemic/near endemic species. No amphibians were recorded on site during the survey but several of the potential species may utilise the natural habitats on the site.

4.6.2.2. Reptiles

The study area possesses 18 endemic and near endemic species which have the potential of being present in the study area.

4.6.2.3. Birds

More than 300 species' range of distribution fall within the study area. Twelve RDL and 19 endemic or near endemic species may occur in the study area. However, no Red Data or endemic species were observed during the survey.

4.6.2.4. *Mammals*

Sixteen RDL species and 10 endemic species can potentially be found in the study area. No RDL species could be confirmed during the assessment.

4.6.2.5. *Invertebrates*

No Red Data invertebrates are expected in the study area, however the natural habitats on site may offer refuge to numerous invertebrate groups.

4.7. WETLANDS

The study site falls within the B41A quaternary catchment. Considering the aforementioned MAP and PET typical to this catchment, the wetlands on the study site have a moderately high sensitivity to hydrological impacts in the surrounding catchment. The Hydrogeomorphic (HGM) units identified within the study site have been classified as two hillslope seeps linked to a stream channel (HGM Unit 1 and 4), an isolated hillslope seep (HGM Unit 2) and a depression or pan (HGM Unit 3) wetland (GroundTruth, 2016). These four HGM's are shown in Figure 4-8. Depression wetlands are regarded as critically endangered, and seepage wetlands are considered endangered owing to the fact that neither of them are protected.

The wetland units in the study area provide intermediate to moderately high levels of ecosystem services. These wetlands are considered to be particularly effective in flood attenuation, enhancing water quality, providing erosion control, phosphate trapping and nitrate removal. In terms of its ecological importance and sensitivity to changes in water quality and floods, all of the HGM units were classified as having biodiversity that is insensitive to flow and habitat modifications. The wetland units in the study area provide intermediate to moderately high levels of ecosystem services.

In terms of its ecological importance and sensitivity to changes in water quality and floods, all of the HGM units were classified as having biodiversity that is insensitive to flow and habitat modifications.

They are also considered to play an insignificant role in moderating the quantity and quality of water of major rivers.

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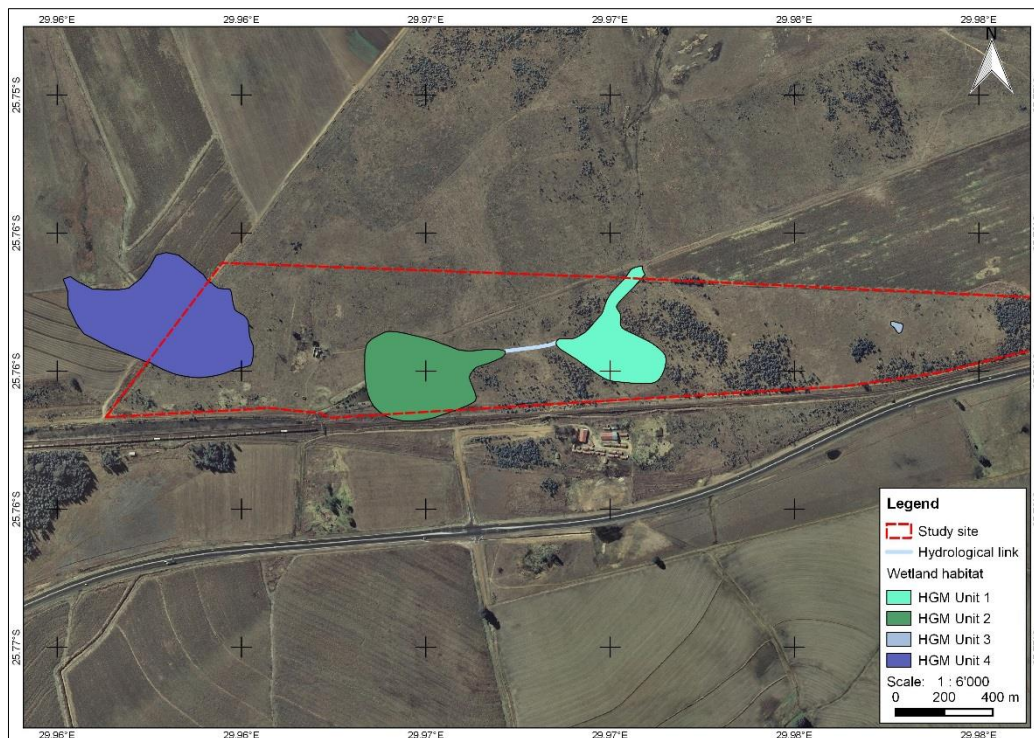


Figure 4-8 | Wetland units within the proposed study area (GroundTruth, 2016)

4.7.1. Ecological Importance and Sensitivity

The Ecological Importance and Sensitivity (EIS) of the four HGMs were all rated as D-class overall, falling in the Low / Marginal EIS category. D-class wetlands are not ecologically important or sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an *insignificant* role in moderating the quantity and quality of water of major rivers.

4.7.2. Present Ecological State

The ecological integrity or Present Ecological State (PES) of the HGM units associated with the proposed development are shown according to the hydrology, geomorphology and vegetation components of the HGMs in Table 4-2, with explanations of the impacts scores provided in Table 4-3.

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Table 4-2 | Summary of the overall PES of the HGMs

		Hydrology	Geomorphology	Vegetation	Overall Score
HGM Unit 1	Impact Score	3.5	2.5	5.0	3.7
	PES Category	C	C	D	C
HGM Unit 2	Impact Score	1.5	2.7	3.6	2.4
	PES Category	B	C	C	C
HGM Unit 3	Impact Score	1.0	1.0	2.4	1.4
	PES Category	B	B	C	B
HGM Unit 4	Impact Score	3.5	3.5	7.3	4.6
	PES Category	C	C	E	D

Table 4-3 | Descriptions of PES-ratings

Description	Impact Score	Present State Category
Unmodified, natural.	0 – 0.9	A
Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1 – 1.9	B
Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2 – 3.9	C
Largely modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4 – 5.9	D
The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognisable.	6 – 7.9	E
Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8 – 10	F

4.7.2.1. *Assessment of impacts on hydrology*

The impact scores recorded for the hydrological component of the three wetlands ranged from 1.0 to 3.5, translating into a Present Hydrological State (PHS) category of **B** to **C**. The change in ecosystem processes therefore ranges from largely natural to moderately modified, with the modifications to the wetlands' PHS being linked primarily to the following factors:

- Impeding features resulting in flooding of portions of the systems;
- Infilling directly within the wetland habitat;
- Alien invasive vegetation within the wetland habitat, increasing the direct uptake of water; and
- Altered water flows into the wetlands linked to catchment changes.

4.7.2.2. *Assessment of impacts on geomorphology*

The impact scores recorded for the geomorphic component of the three wetlands ranged from 1.0 to 3.5, which indicates a Present Geomorphic State (PGS) category of **B** to **C**. The modifications to the wetlands' PGS are linked primarily to the following factors:

- Altered water flows into the wetland linked to catchment changes; and
- Infilling directly within the wetland habitat.

4.7.2.3. *Assessment of impacts on vegetation*

The impact scores recorded for the vegetation component of the three wetlands ranged from 2.4 to 7.3, translating into a Present Vegetation State (PVS) category of **C** to **E**. The change in ecosystem processes and loss of natural habitat ranges from moderately to seriously modified, with modifications to the wetlands' PVS being linked primarily to the following factors:

- Encroachment of alien invasive and pioneer vegetation into portions of the wetland habitat;
- Impeding features resulting in flooding of portions of the systems;
- Infilling directly within the wetland habitat; and
- Excavation of portions of wetland habitat.

4.8. **GROUNDWATER**

According to Barnard (2000), the groundwater yield potential is classed as low, as 83% of the boreholes on record produce less than 2 litres per second. It can be assumed that the regional

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groundwater flow direction will emulate to local topography. Due to the fact that the site is situated on a water divide, groundwater flow will be in two directions, namely in a north westerly and north easterly direction towards the intermittent stream that both flow into the Steelpoort River downstream as well as a southern direction towards the intermittent stream flowing into the Klein Komati River. However, no rivers occur within the study site. Surface water investigations were, therefore, limited to the Wetland specialist study described above.

During the groundwater assessment, six boreholes were drilled. A summary of the newly drilled boreholes is provided in Table 4-4:

Table 4-4 | Summary of newly drilled boreholes

BH No.	S (WGS84)	E (WGS84)	Target on Geophysical Traverse	Depth (m)	Diameter (mm)	Water Strikes (m)	Blow Yield (l/h)
BRBH1	25.76156	29.96534	Re-drilled existing borehole	80	165	22	Seepage
BRBH2	25.75937	29.96526	C-180m	80	165	19	7,200
BRBH3	25.75619	29.96611	DI-480m	80	165	13	7,200
BRBH4	25.75947	29.96539	C-163	80	165	70	Seepage
BRBH5	25.75881	29.96888	DI-55m	80	165	9.71	7,200
BRBH6	25.75829	29.96506	H-53	80	165	21	4,680

The Flow Characterisation Method developed by the Institute of Groundwater Studies at the University of Free State was used to calculate the sustainable yield of the boreholes, as shown in Table 4-5.

Table 4-5 | Summary of sustainable yields of boreholes

Borehole No.	Depth (m)	Static Water Level (m)	Available Drawdown (m)	Sustainable Yield (l/h) Pumping 24 hours / day	Volume / day (m ³)
BRBH2	80	7.98	10.2	900	21.6
BRBH5	80	13.62	57.38	1,800	43.2
BRBH6	80	15.98	5.02	3,600	86.4
Total volume / day (m³)					151.2

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Based on the available data, it can be concluded that a total volume of 151.2 m³ per day can be abstracted from these boreholes, should all three boreholes be utilised.

The water quality of all three boreholes were tested and the results are shown in Table 4-6 below:

Table 4-6 | Water quality of drilled boreholes

Sample No.	BRBH2	BRBH5	BRBH6	Standard Limits
Ca	23.50	19.90	14.70	~
Mg	8.20	6.10	5.41	~
Na	9.28	8.60	7.47	200
K	5.39	4.40	4.19	~
Mn	0.02	0	0	0.1
Fe	2.43	0	0	0.3
F	0	0.27	0.16	1.5
NO ₃ -N	0.37	0.24	0.29	11
NH ₄ -N	0.09	0.01	0.07	1.5
Al	0	0	0	0.3
PO ₄	0.04	0.06	0.096	-
Cl	4.8	2.7	1.2	300
SO ₄	31.3	5.7	4.2	250
TDS	131	106	88	1,200
T-Alk	76	95	81	~
pH	8.23	8.06	8.25	5.0 – 9.7
EC	20	18	17	170
<i>E. Coli</i> count	0	0	0	0
Total Coli count	0	0	4	≤10
Faecal Coliform.	0	0	0	0

Notes:

Acceptable

Exceeds Standard limits

Below detection limit of analytical technique

From Table 4-6 above it can be concluded that, with the exception of BRBH2 (having elevated iron (Fe) concentrations), the water quality of the tested boreholes falls within the Drinking Water Quality Standard Limits.

The high iron concentrations within BRBH2 will result in problems with plumbing. Slight health effects may be expected in young children and sensitive adults. High iron concentrations may result in haemochromatosis, where tissue damage occurs as a result of iron accumulation. Treatment includes aerating the water or mixing the water with that of borehole 5 and 6 to lower the concentration of iron.

However, Exxaro has decided to only utilise borehole 5 and 6, as an accumulated yield of 129 600 litres per day will be more than the required 36 400 litres per day for a population of 200 people.

4.9. ECONOMY

The mining sector is the primary economic driver of the Emakhazeni Local Municipality's (ELM) economy (27.1%). It also contributes to employment by supplying 23% of jobs. The transport (25%) and community services (21%) sectors also contribute substantially to the local economy of ELM, and the trade sector contributes 21% of jobs. The percentage of unemployment within the Emakhazeni Local Municipality is 25.9%.

The power stations in Wilge, Komati, Arnot, Camden, Hendrina and Kriel contribute to the important coal generated energy supply in South Africa, and ELM forms part of this group. Two coalmines, Strathrae en Glisa, are in the ELM vicinity. Coal mines in the area could benefit from the planned rejuvenation of some of the abovementioned power stations that have been out of operation for some years.

Emakhazeni has the opportunity to serve as a tourism gateway as tourists on their way to the Kruger National Park, has to travel through Belfast.

The region also has high agricultural potential, and is the dominant economic activity within the municipality. The sector has, however, shown a decrease in the GDP contribution and employment in recent years (Digby Wells Environmental, 2015).

5. METHOD OF ASSESSING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS

This section outlines the method used for assessing the significance of the potential environmental impacts outlined above. These include both operational and construction phase impacts.

For each impact, the EXTENT (spatial scale), MAGNITUDE and DURATION (time scale) would be described, as shown in Table 5-1. These criteria are then used to determine the SIGNIFICANCE of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The mitigation described in the BAR represents the full range of plausible and pragmatic measures, but does not necessarily imply that they would be implemented.

The following tables show the scale used to assess these variables, and defines each of the rating categories.

Table 5-1 | Assessment criteria for the evaluation of impacts

Criteria	Category	Description
Extent or spatial influence of impact	Regional	Beyond a 30 km radius of the candidate site.
	Local	Within a 30 km radius of the candidate site.
	Site specific	On site or within 100 m of the candidate site.
Magnitude of impact (at the indicated spatial scale)	High	Natural and/ or social functions and/ or processes are <i>severely</i> altered
	Medium	Natural and/ or social functions and/ or processes are <i>notably</i> altered
	Low	Natural and/ or social functions and/ or processes are <i>slightly</i> altered
	Very low	Natural and/ or social functions and/ or processes are <i>negligibly</i> altered
	Zero	Natural and/ or social functions and/ or processes remain <i>unaltered</i>
Duration of impact	Construction period	Up to 3 years
	Medium Term	Up to 5 years after construction
	Long Term	More than 10 years after construction

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The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude of each impact. The criteria employed in arriving at the different significance ratings is shown in Table 5-2.

Table 5-2 | Definition of significance ratings

Significance ratings	Level of criteria required
High	<ul style="list-style-type: none"> • High magnitude with a regional extent and long term duration • High magnitude with either a regional extent and medium term duration or a local extent and long term duration • Medium magnitude with a regional extent and long term duration
Medium	<ul style="list-style-type: none"> • High magnitude with a local extent and medium term duration • High magnitude with a regional extent and construction period or a site specific extent and long term duration • High magnitude with either a local extent and construction period duration or a site specific extent and medium term duration • Medium magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Low magnitude with a regional extent and long term duration
Low	<ul style="list-style-type: none"> • High magnitude with a site specific extent and construction period duration • Medium magnitude with a site specific extent and construction period duration • Low magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Very low magnitude with a regional extent and long term duration
Very low	<ul style="list-style-type: none"> • Low magnitude with a site specific extent and construction period duration • Very low magnitude with any combination of extent and duration except regional and long term
Neutral	<ul style="list-style-type: none"> • Zero magnitude with any combination of extent and duration

Once the significance of an impact has been determined, the PROBABILITY and CONFIDENCE of this impact can be determined using the rating systems outlined in Table 5-3 and Table 5-4 respectively. The significance of an impact should always be considered in concert with the probability of that impact occurring. Lastly, the REVERSIBILITY of the impact is estimated using the rating system outlined in Table 5-5

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Table 5-3 | Definition of probability ratings

Probability ratings	Criteria
Definite	Estimated greater than 95 % chance of the impact occurring.
Probable	Estimated 5 to 95 % chance of the impact occurring.
Unlikely	Estimated less than 5 % chance of the impact occurring.

Table 5-4 | Definition of confidence ratings

Confidence ratings	Criteria
Certain	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 5-5 | Definition of reversibility ratings

Reversibility ratings	Criteria
Irreversible	The activity will lead to an impact that is in all practical terms permanent.
Reversible	The impact is reversible within 2 years after the cause of the impact is removed.

6. CONSTRUCTION AND OPERATIONAL PHASE IMPACTS

The construction and operational phases of the project activities are likely to result in a number of negative impacts on the biophysical and the social environment.

The positive and negative construction phase impacts include potential:

- Ecological impacts;
- Heritage impacts;
- Pollution of water resources (Wetlands and Groundwater);
- Erosion;
- Soil pollution (Domestic and Hazardous waste);
- Security risks;
- Health and safety issues;
- Noise pollution;
- Visual impacts;
- Dust impacts; and
- Social impacts.

The significance of construction phase impacts is likely to be limited by its relatively short duration. Many of the construction phase impacts can be mitigated through the implementation of an appropriate EMPr (appended to this report) that provides mitigation measures and ascribes responsibilities for managing the construction phase impacts.

The positive and negative operational phase impacts could potentially include the following:

- Degradation of the wetland;
- Ecological impact;
- Heritage of Cultural Impact; and
- Social impacts.

6.1. CONSTRUCTION PHASE IMPACTS

6.1.1. Ecological Impacts

Discussion

The results of the biodiversity investigation indicate that the natural habitats on site have been fragmented as result of human induced impacts. Large sections have been transformed to Eucalyptus plantations and/or are in a state of recovery to pioneer grassland. The sensitivity ratings (based upon floral integrity, fauna potential and ecological functions) for the different habitats are delineated in the Biodiversity Report (Appendix C.2).

The fragmented grassland and wetland zones are not recommended for development and these habitats must be well managed and protected during the operational phase. The conservation and responsible management of these areas will ensure that the presence of sensitive fauna and flora is maintained. The Mpumalanga Biodiversity Sector Plan and GN 985 ratings relevant to the project are discussed in the appended Biodiversity Report (Appendix C.2).

Impact Assessment

The following ecological impacts can be expected to result from construction activities within the proposed area:

- Loss of plants and habitats;
- Loss of important flora species;
- Increased levels of alien invasive plants;
- Changes to and fragmentation of habitats;
- Loss of general terrestrial fauna;
- Impacts on wetland areas; and
- Negative impacts on biodiversity priority areas and ecological support areas

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The biodiversity and impact assessment concludes that the footprint area for the proposed development site is of *Low – Medium* biodiversity and sensitivity value.

Table 6-1 | Ecological Impact

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
1	Ecological Impact	Proposed	No mitigation	Medium	Site specific	Long Term	Medium
		Proposed	Mitigation	Low	Site Specific	Long Term	Low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral

Mitigation Measures

- It is recommended that the remaining natural habitat and wetlands are not considered for development;
- Development areas must be planned to make use of already disturbed areas;
- Search for- and rescue important taxa before commencing with site preparation; and
- The wetland zones must be considered for development and must be protected by at least a 15 m buffer.

Additionally, the following measures must be included with the management plan:

- Use only indigenous flora for landscaping;
- Implement an alien invader plant control program;
- Topsoil must be protected and stabilized; and
- The Communal Property Association must protect the wetland and aquatic ecosystems and monitor for any signs of degradation/pollution or negative impacts arising from the construction and operational phases.

Cumulative Impacts

Various large areas to the north of the proposed area have already been modified. The site's development may lead to further fragmentation of the critical biodiversity area and wetlands identified during the biodiversity and assessment.

6.1.2. Pollution of Water Resources (Wetlands and Groundwater)

Discussion

Construction activities will take place within a close proximity to the two hillslope seepage wetlands and therefore pollution of the wetlands in terms of chemicals, oils, and construction rubble is possible if construction personnel do not adhere to the specifications as set in the Draft Environmental Management Plan.

Impact Assessment

Due to the low to medium sensitivity of the wetlands and the possibility of the wetlands to become polluted, the impact can be regarded to be of medium significance before the implementation of any mitigation measures.

Table 6-2 | Pollution of water resources

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
2	Pollution of water resources	Proposed	No mitigation	Medium	Site Specific	Construction	Medium
		Proposed	Mitigation	Low	Site Specific	Construction	Low
		No-go alternative	No Mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral

Mitigation Measures

The recommended mitigation measures for buffer zones during construction are:

- Sensitive systems should be demarcated and avoided by the construction team;
- Earth dikes and diversions should be implemented to direct storm water flows from disturbed areas into silt traps;
- Sediment traps or mulching could be employed to reduce the mobilisation of sediment;
- If vegetation clearing is required, it should be done immediately before earthworks commence, and only essential areas should be cleared;
- Roads are to be constructed along contour banks and should avoid water crossings, and should be constructed above ground level;
- Soil excavation should be carried out one layer at a time; and
- No storing of any materials or chemical toilets within 100 metres of the wetlands.

Cumulative Impact

No cumulative impact is expected during the construction phase of the project.

6.1.3. Erosion

Discussion

Although there are no steep gradients at the proposed site, clearing of vegetation increases the possibility of erosion during the construction phase.

Impact Assessment

Erosion will be limited to the development site and if the impact is mitigated properly, the surrounding environment will only be affected during the construction phase of the development, when vegetation has been stripped. The impact is therefore of low significance before the implantation of mitigation measures.

Figure 6-3 | Erosion

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
3	Erosion	Proposed	No mitigation	Low	Site Specific	Construction	Low
		Proposed	Mitigation	Very Low	Site Specific	Construction	very low
		No-go alternative	No mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral

Mitigation Measures

During construction, gabion structures must be used in areas prone to erosion. Sand bags can also be used as a temporary mitigation measure.

Cumulative Impact

No cumulative impacts are expected.

6.1.4. Soil Pollution

Discussion

As at any construction site, various hazardous substances and waste are likely to be used and stored on site. These substances include amongst other things, diesel, curing compounds, shutter oil and cement. Utilisation of such substances is of great concern when used in a terrestrial environment. A lot of waste is generated during the construction phase of a

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development. All waste such as general waste generated by construction workers to construction and hazardous waste, must be stored temporary and then be removed from the site. The possibility of waste being generated during the construction phase of the development is definite however, the significance of the impact is determined by the manner in which waste is managed and disposed of.

Impact Assessment

Construction activities, and accumulation of hazardous, domestic and construction waste on site could potentially cause soil pollution and for this reason the significance of this impact is seen as medium before the implementation of mitigation.

Table 6-4 | Soil Pollution

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
4	Soil pollution	Proposed	No mitigation	Medium	Local	Construction	Medium
		Proposed	Mitigation	Low	Local	Construction	Low
		No-go alternative	No mitigation	Zero	Local	Construction	Neutral
		No-go alternative	Mitigation	Zero	Local	Construction	Neutral

Mitigation Measures

- Refuse bins with lids must be provided at the construction site for all general waste;
- Skips must be used to store general waste on a temporary basis until waste is collected and disposed of at a registered landfill site;
- All construction waste material must be stored in a specific location until it can be disposed of at a registered landfill site;
- A contractor who is registered to dispose of hazardous waste must collect all hazardous waste on site and should there be any hazardous spills during the construction phase, a registered contractor must be contacted to clean up the spill; and
- Use of hazardous substances at a construction site is controlled by various pieces of legislation. However, the management and protection of the environment would be achieved through the implementation of an EMP, which would, inter alia, specify the storage conditions of hazardous compounds and the emergency procedures to follow in the event of a spillage.

Cumulative Impact

No cumulative impact is expected.

6.1.5. Heritage Impacts

Discussion

During the fieldwork component of the HIA for the proposed area, seven heritage sites were identified, none of which were significant.

Impact Assessment

The heritage sites listed in Table 6-5 were identified during the field investigation.

Table 6-5 | Descriptions, field ratings, and locations of heritage sites

Site no.	Description	Type of significance	Degree of significance	Heritage rating	S	E
PZ 1	The remains of a rondavel and rectangular dwelling. Bricks and mortar structure with an associated outside latrine a few metres west.	Historic architecture	Archaeological: Low Historic: Low	Not significant	25°4 5'38. 37"	29°57 '56.5 1
PZ 2	The remains of a rectangular pump house and a nearby circular concrete dam.	Historic / industrial architecture	Archaeological: Low Historic: Low	Not significant	25°4 5'41. 58"	29°57 '55.4 2"
PZ 3	This is the location of ruins or remains of a dwelling which was demolished at some stage.	Historic architecture	Archaeological: Low Historic: Low	Not significant	25°4 5'35. 66"	29°57 '52.8 5"
PZ 4	The remainder of the eastern wall which was probably a farmstead. The wall comprises large dressed sandstone blocks coursed with mortar. The wall measures	Historic architecture	Archaeological: Low Historic: Low	Not significant	25°4 5'35. 64"	29°57 '58.4 5"

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	approximately 17 metres in a south-north orientation.					
PZ 5	An unidentified elongated concrete structure measuring 2,5m (north-south) by 0,5m (east-west). It is probably associated with the railway which is located approximately 50m to the south thereof. It is currently in a poor state of preservation and its function not known	Historic / industrial architecture	Archaeological: Low Historic: Low	Not significant	25°4 5'37. 91"	29°58 '36.6 2"
PZ 6	This is the location of ruins or remains of a dwelling and associated outbuildings which was demolished at some stage.	Historic architecture	Archaeological: Low Historic: Low	Not significant	25°4 5'42. 14"	29°57 '48.9 3"
PZ 7	This is the location of a ruins or remains of a dwelling which was demolished at some stage.	Historic architecture	Archaeological: Low Historic: Low	Not significant	25°4 5'41. 04"	29°57 '41.7 9"

In terms of the archaeological component of the Act (25 of 1999, Section 35) no sites or features of archaeological significance was recorded during the survey. In terms of the built environment in the area (Section 34 of the Act) no significant buildings were identified. **No fatal flaws** were identified from a cultural, historical, archaeological or palaeontological perspective.

Table 6-6 | Heritage Impact

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
5	Heritage Impact	Proposed	No mitigation	Medium	Site Specific	Construction	Low
		Proposed	Mitigation	Low	Site Specific	Construction	very low
		No-go alternative	No mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral

Mitigation Measures

All of the sites were of low significance, and no recommendations are therefore needed.

The bulk of archaeological remains are normally located beneath the soil surface. Therefore, it is possible that some significant material was not identified during the site survey and may only be revealed if the soil is disturbed. Should any material of cultural or historical significance, or skeletal remains be exposed during digging or excavating, SAHRA must be notified, all construction activities must be stopped, and a Heritage / Archaeological Specialist should be notified in order to determine proper mitigation measures.

Cumulative Impact

No cumulative impacts are expected.

6.1.6. Security risks

Discussion

A large number of people are likely to be employed during construction, with the numbers rising and falling throughout the construction period, dependent on the activities taking place at the time. While the contractor would want to source construction labour locally, it is inevitable that there will be an influx of people to the area.

Impact Assessment

The increase in people to the area, and the periods where some construction workers are unemployed, could lead to an increase in crime and social friction in surrounding areas of Belfast. The impact is of medium significance.

Table6-7 | Security Risks

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
6	Security risks	Proposed	No mitigation	Medium	Local	Short Term	Medium
		Proposed	Mitigation	Low	Local	Short Term	Low
		No-go alternative	No mitigation	Zero	Local	Short Term	Neutral
		No-go alternative	Mitigation	Zero	Local	Short Term	Neutral

Mitigation Measures

Employ local labourers as far as possible.

Cumulative Impact

The unemployment rate in the area is already very high and unemployment leads to crime. There will be an influx of workers seeking employment, therefore adding to the unemployment and crime rate.

6.1.7. Health and Safety

Discussion

The migration of construction workers into the Belfast region could result in an increase in the prevalence of diseases, including HIV/AIDS and tuberculosis, in the area. Construction activities also pose a safety risk to all construction workers and the public.

Impact Assessment

Health risks could be increased by an influx of sex workers to the area, fed by a large number of construction workers who are away from their families. Medical facilities in the area may not be equipped to deal with the increased requirement for healthcare as a result of the construction activities. Construction activities also increases the safety risk. Therefore, the significance of the impact has been rated as medium before the implementation of any mitigation measures.

Table 6-8 | Health and Safety

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
7	Health and Safety	Proposed	No mitigation	Medium	Site specific	Construction	Medium
		Proposed	Mitigation	Low	Site specific	Construction	Low
		No-go alternative	No mitigation	Zero	Site specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site specific	Construction	Neutral

Mitigation Measures

- Condoms must be made available at all the bathrooms at the construction site;
- The contractor should implement a HIV campaign, educating the construction workers and surrounding community about the dangers of STDs;
- All unattended open excavations must be adequately demarcated; and
- All construction personnel must wear appropriate protection gear and adhere to all safety rules and regulations.

Cumulative Impact

No cumulative impacts are expected.

6.1.8. Noise Pollution

Discussion

An increase in noise pollution would be expected from the operation of heavy machinery and other construction activities during the construction phase.

Impact Assessment

Due to the proximity of people and other houses to the area where the resettlement is proposed, the extent and short duration, the magnitude of the impact can be regarded to be low before mitigation measures are implemented.

Table 6-9 | Noise Pollution

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
8	Noise pollution	Proposed	No mitigation	Medium	Site Specific	Construction	Low
		Proposed	Mitigation	Low	Site Specific	Construction	very low
		No-go alternative	No mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral

Mitigation Measures

- The contractor must use appropriate and effective silencing devices for operating tools; and
- No loud music is allowed on site.

Cumulative Impact

No cumulative impacts are expected.

6.1.9. Visual Impact

Discussion

During construction, the construction site might become untidy, with construction materials and waste being present. This could have a negative impact on the surrounding environment.

Impact Assessment

Construction activities will have a negative visual impact if not mitigated properly. Due to the location of construction activities and the proximity to N4 highway and adjacent landowners, the magnitude of the impact is of low significance.

Table 6-10 | Visual Impact

Ref	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
9	Visual Impact	Proposed	No mitigation	Medium	Site specific	Construction	Low
		Proposed	Mitigation	Low	Site specific	Construction	very low
		No-go alternative	No mitigation	Zero	Site specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site specific	Construction	Neutral

Mitigation Measures

- Rubble and litter must be removed regularly and disposed of at a registered landfill site;
- Cluster construction activities on the site; and
- Cordon off construction site with shade cloth, if necessary.

Cumulative Impacts

No cumulative impacts are expected.

6.1.10. Dust Impacts

Discussion

The construction will involve the clearing of vegetation, excavation and other earthworks that would exacerbate dust, especially in the dry winter months.

Impact Assessment

Currently, the nearest human activity, Pfaconi Investments, a logistics management company, is located approximately 100m south-east of the proposed resettlement area. If dust is not managed properly, this company will be affected by the generation of dust, especially during windy conditions. The significance of the impact can be regarded to be medium without the implementation of mitigation measures.

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Table 6-11 | Dust Pollution

Ref	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
10	Dust pollution	Proposed	No mitigation	Medium	Local	Construction	Medium
		Proposed	Mitigation	Low	Local	Construction	Low
		No-go alternative	No mitigation	Zero	Local	Construction	Neutral
		No-go alternative	Mitigation	Zero	Local	Construction	Neutral

Mitigation Measures

- The construction site must be watered to control possible dust fallout or an appropriate alternative method must be used.

Cumulative Impact

No cumulative impact is expected.

6.1.11. Social impacts

Discussion

The construction and establishment of the area where resettlement is to take place, could have the following positive and negative social impacts:

- temporary employment opportunities;
- influx of people looking for job opportunities; and
- possible increase in theft in surrounding areas.

Impact Assessment

The construction activities can also have positive impacts as it presents direct and indirect employment opportunities. However, these opportunities are only temporary and after the construction period, some people might find themselves once again unemployed. But taking into account that employment opportunities will be created during the construction phase, the social impact will be positive and of medium significance.

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Table 6-12 | Employment Opportunities

Ref	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
12	Employment opportunities	Proposed	No mitigation	Low	Regional	Construction	Low
		No-go alternative	Mitigation	Medium	Regional	Construction	Medium (+)
		Proposed	No mitigation	Zero	Regional	Construction	Neutral
		No-go alternative	Mitigation	Zero	Regional	Construction	Neutral

There will be an influx of people looking for job opportunities during the construction phase which will have a negative social impact as these people might settle illegally in the hope of being employed during the course of the project. Influx of unemployed people could result to an increase of theft as well as increase of people residing within the informal settlement. The social impact of people invading the area looking for job opportunities are of medium to high significance.

Table 6-13 | Influx of people

Ref	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
13	Influx of people	Proposed	No mitigation	High	Local	Short Term	High
		No-go alternative	Mitigation	Medium	Local	Short Term	Medium
		Proposed	No mitigation	Zero	Local	Short Term	Neutral
		No-go alternative	Mitigation	Zero	Local	Short Term	Neutral

Unemployed people flocking to the area in need of employment could result to an increase in theft within the area. This impact is difficult to manage and mitigate as the influx of people cannot be controlled and theft could also occur outside of the construction site boundaries. As the impact of theft can only be managed within the construction site the impact can be regarded to be of medium significance with or without the implementation of mitigation measures.

Table 6-14 | Theft

Ref	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
14	Theft	Proposed	No mitigation	Medium	Local	Short Term	Medium
		No-go alternative	Mitigation	Medium	Local	Short Term	Medium
		Proposed	No mitigation	Zero	Local	Short Term	Neutral
		No-go alternative	Mitigation	Zero	Local	Short Term	Neutral

Mitigation

- Only construction personnel should be allowed at the construction site, no loiters or jobseekers;
- Construction workers are not allowed to enter any unauthorised properties; and
- Use local labour as far as possible. As soon as people from other areas are employed, people will start flocking to the area in the hope of being employed.

The creation of temporary employment opportunities will have a positive social impact on the local community, however mitigation measures as mentioned above must be implemented to minimise the impact of unemployed people flocking to the area which could result to theft. As mentioned above the management of theft outside of the construction site is difficult and therefore the no feasible mitigation measure can be proposed, besides ensuring that construction personnel does not enter any unauthorised properties.

Cumulative Impact

There are numerous unemployed people in the surrounding area and there will also be an influx of people seeking job opportunities. After the construction period, this will have a cumulative negative effect with regards to the number of unemployed people within the area.

6.2. OPERATIONAL PHASE IMPACTS

6.2.1. Degradation of the wetlands

Discussion

It is anticipated that the functioning of the wetland systems will remain largely unchanged in the post-development landscape. The introduction of livestock to the areas could result in the degradation of the systems particularly if the livestock are not managed appropriately. Grazing of the wetland habitat during summer months could lead to the trampling of the wetlands and overgrazing of the vegetation, thereby negatively affecting the integrity of the systems.

Storm water runoff into the wetland, toxic contaminants, possibility of sewage pipes leaking and increased nutrient inputs can also impact the wetland system negatively.

Impact Assessment

Although construction activities will take place within a close proximity of the wetland system, during the operational phase, the wetlands and recommended surrounding buffer area of 15m will be fenced off to prevent any degradation. Fencing the wetlands can however not eliminate degradation as storm water runoff, toxic contaminants and untreated sewage can still enter the wetland system. The implementation of mitigation measures are therefore required to minimise the potential impact on the wetland system. The significance of the impact can therefore be regarded to be of medium significance before the implementation of mitigation measures.

Table 6-15 | Degradation of the wetland

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Operational Phase							
1	Degradation of the wetland	Proposed	No mitigation	Medium	Site Specific	Long Term	Medium
		Proposed	Mitigation	Low	Site Specific	Long Term	Low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral

Mitigation Measures

- To limit the impacts of storm water runoff on the downstream freshwater ecosystems, the discharge of storm water runoff into the buffer zone should be managed by means of a storm water management plan, including *inter alia*:
 - A means of attenuating flows originating from the site, so as to ensure the post-development scenario is 'flood neutral';
 - Multiple discharge points that are reasonably spread out across the development;
 - Accompanying each discharge point should be suitable baffle structures (e.g. gabion mattresses) that will dissipate the energy of storm flow and encourage infiltration thus reducing the likelihood of erosion;
 - Bare areas should be minimised and revegetated where possible. In those instances where revegetation may not be an option, silt fences, mulch and other runoff controls should be implemented;
 - The runoff entering the natural environment should not exceed 1.5m/sec as this is considered to reduce the pollutant removal performance of buffer areas; and

- Outflow points should be able to trap excess suspended solids and/or waste originating from the proposed development before entering the natural environment. These will need to be regularly serviced and maintained to ensure adequate functioning and efficacy. This may include the installation of oil/grit separators and sand filters to manage the potential risks of pollution and uncontrolled soil mobilisation (GroundTruth, 2016).
- To limit the impact of increased nutrient inputs and toxic contaminants to the downstream freshwater ecosystems, the following mitigation measures should be implemented:
 - The establishment of indigenous vegetation cover within the buffer zone to filter runoff before it enters the freshwater habitat;
 - The buffer zone should be characterised by a high density of natural vegetation that is taller than 15 cm. Overgrazing, trampling by livestock, alien invasive encroachment and undesirable burning regimes should be managed continually;
 - Sanitation systems are to be accompanied by detailed contingency plans to ensure that the risks of pollution have been properly managed. To prevent sewage leaking into the wetland system, it is recommended that the sewage pipe should be of such material that prevents leaking. Treated effluent to be disposed into the wetland system must adhere to SANS before disposal;
 - It is recommended that rehabilitation of the systems is undertaken including the fencing of the wetland and 15m buffer area, except for a large dam within HGM Unit 2 (the dam affects infilling of this unit). This dam could be used for watering of livestock. The fencing of the wetlands could ensure that wetlands are protected from trampling, as there would be no open water to attract livestock;
 - Should livestock be brought into the area, ideally stocking rates and grazing regimes should be implemented;
 - Measures to inhibit groundwater pollution, e.g. leaking sewerage, should also be implemented;
 - Alien invasive species are to be removed and replaced with dense grass species to improve the vegetation component and integrity of the wetlands; and

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- Additionally, it is recommended that any cultivation of land should take place beyond the 15 m mitigated buffer zone around each HGM unit (or 20 to 24 m if no mitigation measures are implemented).

Cumulative Impact

Some wetland systems have already been impacted by anthropogenic activities such as dirt tracks traversing the wetland unit (HGM Unit 2). Without the implementation of mitigation measures as mentioned above, the proposed activities may further impact the already disturbed wetland system.

6.2.2. Ecological Impact

Discussion

Transforming the proposed area could result in the loss of plants and habitats, loss of flora and fauna, increase in alien vegetation, and fragmentation of habitats.

Impact Assessment

Only 9 hectares within the approximately 80 hectare area is proposed to be transformed. The area to the north-east of the proposed plots which have been identified to be of high ecological significance, will remain unchanged. The area proposed to be transformed are of low ecological significance and therefore the significance of the impact has been rated as low.

Table 6-16 | Ecological Impact

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Operational Phase							
2	Ecological Impact	Proposed	No mitigation	Medium	Site Specific	Long Term	Low
		Proposed	Mitigation	Low	Site Specific	Medium Term	very low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral

Mitigation Measures

It is recommended that the natural grassland area located north-east of the proposed plots as well as the wetland areas, remains unchanged.

Cumulative Impact

No cumulative impact expected.

6.2.3. Heritage or Cultural Impact

Discussion

During the operational phase, the community will require a place of burial for their loved ones. The place of burial must be well demarcated to prevent any negative cultural impact.

Impact Assessment

Should graves not be marked or demarcated, the possibility exists that graves may be disturbed. The cultural impact without the implementation of any mitigation measures is of medium significance.

Table 6-17 | Heritage and Cultural Impact

Ref	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Operational Phase							
3	Heritage and Cultural Impact	Proposed	No mitigation	Medium	Local	Long Term	Medium
		Proposed	Mitigation	Low	Local	Long Term	Low
		No-go alternative	No mitigation	Zero	Local	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Local	Long Term	Neutral

Mitigation Measures

All graves must be located outside of the wetland boundaries and marking and or demarcation of the graves are essential.

Cumulative Impact

No cumulative impact is expected.

6.2.4. Health and Safety

Discussions

Settlements within a close proximity to the N4 highway could result in illegal access to the N4, as well as pedestrians crossing the N4 resulting in unsafe road conditions and pedestrian fatalities. The health and safety of the community members can therefore be impacted negatively if mitigation measures are not adhered to.

Impact Assessment

Due to the magnitude, and long term duration of the impact, the significance of the impact without the implementation of mitigation measures can be regarded as medium.

Table 6-18 | Health and Safety

Ref		No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE	
Operational Phase							
4	Health and Safety	Proposed	No mitigation	Medium	Site Specific	Long Term	Medium
		Proposed	Mitigation	Low	Site Specific	Long Term	Low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral

Mitigation Measures

- No illegal access to the N4 will be allowed. TRAC controls the N4 Highway continuously and will block any possible illegal access created by the community members.

Cumulative Impact

No cumulative impact expected.

6.2.5. Social Impact

Discussion

As discussed in section 1.4.1, lack of water, lack of electricity, unemployment, the distance to the main road as well as blasting activities at the mine, is causing problems within the community to be relocated. The community is currently living in very poor conditions.

With the relevant approvals from the Competent Authorities, the community will be relocated to a site that will fulfil all their needs and address their current poor living conditions.

Due to the improved living conditions to be provided, people might settle within the area to also benefit from the water, sanitation and electricity supply.

Impact Assessment

Improving the living conditions of these community members will have an enormous positive social impact for the community. With the approval of this resettlement of this community and the implementation of the livelihood restoration plan, the community members will be given houses with sufficient space to accommodate all the family members, enough space for self-

sustainable farming activities, and access to water and electricity. It will increase the possibility of employment as the community will be located closer to the N4, providing transport opportunities to and from potential employers.

With the provision of better living conditions to the community to be relocated, the village will become an attraction and other people could possibly erect informal settlements within the boundaries of the site. Mitigation measures to prevent the erection of any informal settlements within the site boundaries, must be enforced.

However, taking all of the social impacts into consideration, it is clear that the positive impact of the resettlement of the community will be high.

Table 6-19 | Social Impacts

Ref	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Operational Phase							
5	Social Impacts	Proposed		High	Local	Long Term	High (+)
		No-go alternative		High	Local	Long Term	High (-)

Mitigation Measures

The influx of people must initially be monitored and regulated by Exxaro. Thereafter, the monitoring and regulation thereof must be done by the CPA to be implemented within Exxaro's monitoring programme. A legal system must be implemented whereby homeowners of unlawful properties must be notified and given the opportunity to relocate. Should this not succeed, the necessary legal steps should be followed.

Cumulative Impact

No cumulative impact expected.

6.3. ENVIRONMENTAL IMPACT STATEMENT

In conclusion, the significance of all construction related impacts can be regarded as low after the implementation of mitigation measures.

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Table 6-20 | Environmental Impact Statement

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Construction Phase							
1	Deterioration of grassland	Proposed	No mitigation	medium	Site specific	Long Term	Medium
		Proposed	Mitigation	Medium	Site Specific	Long Term	Medium
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral
2	Increased alien vegetation	Proposed	No mitigation	Medium	Site Specific	Construction	Medium
		Proposed	Mitigation	Low	Site Specific	Construction	Low
		No-go alternative	No Mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral
3	Disruption to fauna	Proposed	No mitigation	Low	Site Specific	Construction	Low
		Proposed	Mitigation	Very Low	Site Specific	Construction	very low
		No-go alternative	No mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral
4	Potential pollution of water resource	Proposed	No mitigation	Medium	Local	Construction	Low
		Proposed	Mitigation	Low	Local	Construction	very low
		No-go alternative	No mitigation	Zero	Local	Construction	Neutral
		No-go alternative	Mitigation	Zero	Local	Construction	Neutral
5	Erosion	Proposed	No mitigation	High	Site Specific	Construction	Medium
		Proposed	Mitigation	Medium	Site Specific	Construction	Low
		No-go alternative	No mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral
6	Soil pollution	Proposed	No mitigation	Medium	Local	Short Term	Medium
		Proposed	Mitigation	Low	Local	Short Term	Low
		No-go alternative	No mitigation	Zero	Local	Short Term	Neutral
		No-go alternative	Mitigation	Zero	Local	Short Term	Neutral
7	Waste Disposal	Proposed	No mitigation	Medium	Site specific	Construction	Low
		Proposed	Mitigation	Low	Site specific	Construction	very low
		No-go alternative	No mitigation	Zero	Site specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site specific	Construction	Neutral
8	Heritage Impact	Proposed	No mitigation	Medium	Site Specific	Long Term	Medium
		Proposed	Mitigation	Low	Site Specific	Long Term	Low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral
8	Security risks	Proposed	No mitigation	Medium	Site specific	Construction	Medium
		Proposed	Mitigation	Low	Site specific	Construction	Low
		No-go alternative	No mitigation	Zero	Site specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site specific	Construction	Neutral
9	Health and Safety	Proposed	No mitigation	Medium	Site specific	Construction	Medium
		Proposed	Mitigation	Low	Site specific	Construction	Low
		No-go alternative	No mitigation	Zero	Site specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site specific	Construction	Neutral
9	Noise pollution	Proposed	No mitigation	High	Local	Construction	Medium
		Proposed	Mitigation	Medium	Local	Construction	Low
		No-go alternative	No mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral
10	Visual Impact	Proposed	No mitigation	High	Site Specific	Construction	Medium
		Proposed	Mitigation	Medium	Site Specific	Construction	Low
		No-go alternative	No mitigation	Zero	Site Specific	Construction	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Construction	Neutral
11	Dust pollution	Proposed	No mitigation	High	Local	Construction	Medium - High
		Proposed	Mitigation	Medium	Local	Construction	Medium - Low
		No-go alternative	No mitigation	Zero	Regional	Construction	Neutral
		No-go alternative	Mitigation	Zero	Regional	Construction	Neutral

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12 Employment opportunities	Proposed	No mitigation	Low	Regional	Construction	Low
	No-go alternative	Mitigation	Medium	Regional	Construction	Medium (+)
	Proposed	No mitigation	Zero	Regional	Construction	Neutral
	No-go alternative	Mitigation	Zero	Regional	Construction	Neutral
13 Influx of people	Proposed	No mitigation	High	Local	Short Term	High
	No-go alternative	Mitigation	Medium	Local	Short Term	Medium
	Proposed	No mitigation	Zero	Local	Short Term	Neutral
	No-go alternative	Mitigation	Zero	Local	Short Term	Neutral
14 Theft	Proposed	No mitigation	Medium	Local	Short Term	Medium
	No-go alternative	Mitigation	Medium	Local	Short Term	Medium
	Proposed	No mitigation	Zero	Local	Short Term	Neutral
	No-go alternative	Mitigation	Zero	Local	Short Term	Neutral

All impacts during the operational phase can be mitigated to be of low significance except for the social aspect that will be impacted positively by the resettlement.

Ref Nr.	Potential impact	Site	No mitigation/ Mitigation	Magnitude	Extend	Duration	SIGNIFICANCE
Operational Phase							
1	Degradation of the wetland	Proposed	No mitigation	Medium	Site Specific	Long Term	Medium
		Proposed	Mitigation	Low	Site Specific	Long Term	Low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral
2	Ecological Impact	Proposed	No mitigation	Medium	Site Specific	Long Term	Low
		Proposed	Mitigation	Low	Site Specific	Medium Term	Very Low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral
3	Heritage and Cultural Impact	Proposed	No mitigation	Medium	Local	Long Term	Medium
		Proposed	Mitigation	Low	Local	Long Term	Low
		No-go alternative	No mitigation	Zero	Local	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Local	Long Term	Neutral
4	Health and Safety	Proposed	No mitigation	Medium	Site Specific	Long Term	Medium
		Proposed	Mitigation	Low	Site Specific	Long Term	Low
		No-go alternative	No mitigation	Zero	Site Specific	Long Term	Neutral
		No-go alternative	Mitigation	Zero	Site Specific	Long Term	Neutral
5	Social Impacts	Proposed		High	Local	Long Term	High (+)
		No-go alternative		High	Local	Long Term	High (-)

7. CONCLUSIONS AND WAY FORWARD

The results of the biodiversity investigation indicate that the natural habitats on site have been fragmented as a result of human induced impacts. Large sections have been transformed to Eucalyptus plantations and/or are in a state of recovery to pioneer grassland.

During the Heritage Impact Assessment, 7 sites were identified of which none were found to be significant.

Four wetland units were identified during the Wetland Study conducted. These units have been classified as two hillslope seeps linked to a stream channel (HGM Unit 1 and 4), an isolated hillslope seep (HGM Unit 2) and a depression or pan (HGM Unit 3) wetland (Refer to section 4.7). The wetland units in the study area provide intermediate to moderately high levels of ecosystem services. In terms of its ecological importance and sensitivity to changes in water quality and floods, all of the HGM units were classified as having biodiversity that is insensitive to flow and habitat modifications. The wetland units in the study area provide intermediate to moderately high levels of ecosystem services. Groundwater investigations concluded that borehole yield would be sufficient to sustain the approximately 200 people who would occupy the resettlement site.

The resettlement of this community will improve the living conditions of these community members and have an enormous positive social impact on the community. The approval of the resettlement of this community will give community members houses with sufficient space to accommodate all the family members, enough space for self-sustainable farming activities, and access to water and electricity. It will increase the possibility of employment as the community will be located closer to the N4, providing transport opportunities to and from potential employers.

Based on the above, the EAP is of the opinion that the resettlement of the 32 households should be authorised, as the benefits outweigh the negative environmental impacts when the recommended mitigation measures are implemented. No fatal flaws were identified during specialist studies. The positive social impact of potentially improved community opportunities in terms of residential security and agriculture, outweighs the negative biophysical impacts. Provided that the recommended mitigation measures are implemented, the biophysical impacts can be controlled to acceptable levels.

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The significance of negative impacts can be effectively reduced with effective and appropriate mitigation measures as stipulated in the EMP. If authorised, the implementation of an EMP should be included as a condition of authorisation.

8. REFERENCES

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