

**ENVIRONMENTAL AUTHORISATION FOR THE UPGRADE OF THE R510
ROAD BETWEEN THABAZIMBI AND BERSPRUIT, LIMPOPO PROVINCE**

DRAFT BASIC ASSESSMENT REPORT

DEA Ref: to be advised

Prepared for:



Under the direction of:
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Prepared by:



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SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

Background and introduction

The National Route R510, Section 2 is located between Northam and Thabazimbi in the Limpopo Province. The project starts at km 6.3 just before the Bierspruit Bridge and ends at km 33.4 at the informal Mine intersection. The total length of the project is 27.1 km of single carriageway road with an existing surfaced width of 7m.

Included in the project are five river bridges and two roads-over-rail bridges that must be widened to accommodate the road cross section improvement.

A detailed investigation of the road has confirmed that road pavement layers exhibits signs of distress like cracking and deformation, and that rehabilitation of the pavement is required to meet the demands the expected future traffic for a period of 20 years.

Project Details

The carriageway is to be widened to accommodate passing lanes, where required, thus resulting in a carriageway that varies from 13.4 m to 16.8 m surfaced width, with two to four 3.7 m lanes and 3.0 m or 1.0 m surfaced shoulders respectively.

Included in the project are four river bridges and two roads over rail bridges that must be widened to accommodate the road cross section improvement.

Major aspects of this project include the following:

General Roadworks

- General widening of the existing road cross section to a minimum width of 13.4 m, comprising 2 x 3.7 m wide traffic lanes and 2 x 3.0 m wide surfaced shoulders;
- Provision of 11.6km (6.4 km northbound and 5.2 km southbound) passing lanes with 3.0 m paved shoulders be provided;
- Exclusive turning lanes are provided at the future brickyard access via R510 at chainage km12.4;
- Strengthening of the existing pavement structure;
- The existing horizontal alignment will be maintained;
- Vertical realignment of the R510 to improve the vertical clearance of the overpass bridge located at km7.182;
- Upgrade of the R510/ Zwartkop intersection to include a dedicated right turning lane and refuge islands;

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- Upgrade of the R510/R511 intersection to include a dedicated right turning lane and refuge islands; and
- Work on structures and major culverts (detailed below).

Drainage and culverts

- All rivers structures will be widened between 0.325 m – 1.825 m on each side respectively;
- C013 Bierspruit 6 where the inlet and outlet structures, (that have failed structurally) need to be replaced and the culvert will be lengthened at the same time;
- The bridges will receive new F-shape parapets barrier and will be rehabilitated;
- All of the major culverts will receive new guardrails on top and will be rehabilitated;
- The B3663 Rail over Road Bridge at km7.180 will receive pier protection in the form of New Jersey Barriers;
- All minor culverts that are not able to pass the required flow for a Class 3 road be upgraded;
- All the culverts affected by provision of the 13.4 m – 16.8 m wide cross section be lengthened accordingly; and
- Replacement of side drains due to the new vertical alignment.

Project locality

- Figure A1 in Appendix A – Maps illustrates the overall project region, i.e. the entirety of the study section.

This region contains all the proposed works including intersection upgrades, drainage and rail crossing upgrades, and culvert replacements or lengthening. The entire road section shown here is deemed the study area, in an effort to include all possible environmental considerations for the proposed development.

Existing Services

There are currently telecoms (Telkom), electrical (Eskom), and water and gas services located along the road; either running parallel or crossing the road as indicated on the detailed design drawings, to be attached to the draft and final BAR.

Furthermore, there are water pipes crossing below the R510 roadway, via stormwater culverts, supplying adjacent mines and farm properties. According to the results of the topographical survey, the observed overhead Telkom and Eskom services crossing the road have sufficient vertical clearances. The service owners will be included into the I&AP lists and comments will be requested from these parties.

The engineering team have submitted formal written requests to the service providers to confirm the location of their services and advise of any future plans that might have to be taken into account during detailed design stage.

Specialist Assessments:

In order to adequately inform this process, the following specialist studies were conducted:

Study	Specialist
Ecological Impact Assessment	Mr Gideon Raath and Mr Roy de Kock (EOH CES)
Archaeological Impact Assessment	Mr Neels Kruger (EOH Exigo)

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Palaeontological Assessment	Dr Francois Durand (Independent)
Aquatic Impact Assessment	Mr Dana Grobler (BlueScience)

The findings of these reports have been included into this report where required, and into the associated EMPr. Please find copies of the reports in the Appendices to this report.

BASELINE ASSESSMENT:

The Baseline Assessment includes discussion on the following aspects.

- Climate;
- Geology & soils;
- Topography;
- Erosion Potential;
- Agricultural Potential;
- Vegetation;
- Biodiversity indicators;
- Hydrology;
- Land Use;
- Important Birding Areas; and
- Heritage and Paleontological sensitivity.

Climate

The R510 road section is situated in the Limpopo region which is typically a semi-arid region. The climate can be classified, as "moderate", with cool dry winters and hot wet summers. Thabazimbi receives approximately 529mm of rain each year, mainly during the mid-summer periods (summer rainfall region). Lowest rainfall – 0mm usually occur in June, with the maximum (rainfall occurring in January. (SAExplorer, 2017).

Mean annual temperature for the project region ranges from 21°C in June to 30.8°C in January, with the coldest temperate of 2.9°C on average during the night recorded during July.

Geology & soils

According to the published 1:250 000 scale Geological Map 2426 Thabazimbi, the proposed route of the R510 Section 2 improvement is underlain by three main geological units, viz. the Bushveld Igneous Complex, the Pretoria Group and the Chuniespoort Group.

The residual norite/gabbro soils of the Bushveld Complex, which are known to be highly active clays, will be removed and replaced with appropriate backfill material.

The design of road widenings in the Bierspruit and Crocodile River floodplains need to take into account the potential impact of soft in-situ clayey soils.

Dolomite stability investigations should be conducted along the lengths of road underlain by dolomite to classify the road in terms of risk for sinkhole development. These should include a combination of gravity surveys and percussion drilling.

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The final preliminary design report, produced by RHDV (2017), found the following for the geology in the region:

"The Bushveld Igneous Complex comprises gabbro, norites, anorthosite and localised areas of pyroxenite. This formation occurs from the start of the proposed route in the south until approximately km 16.7. The residual norite/gabbro soils of the Bushveld Complex are known to be highly active and these soils are referred to in layman's terms as 'black turf.' The black soil cover along the southern portion of the route is very distinct and has an average thickness of up to 1m.

The Magaliespoort, Daspoort and Timeball Hill sedimentary and volcanic formations form part of the larger Pretoria Group. The Magaliespoort Formation comprises quartzite and shale with localised areas of dolomitic limestone. This formation occurs at km 16.7 to km 18.9 and again from km 20.5 to km 21.0. The Daspoort Formation comprises micaceous shale, ferruginous quartzite and andesitic lava. These rocks occur at km 19.6 to km 20.5 and again at km 30.0 to km 31.3. The Timeball Hill Formation comprises quartzite and shale and occurs between km 22.4 and km 28.4; and km 31.3 and km 33.3. The Pretoria Group thus occurs from km 16.7 to km 28.4 and again at km 30.0 to km 33.3.

The Chuniespoort Group essentially consists of dolomite, chert and shale, with banded ironstone and limestone in the upper portion of the group. This group occurs at km 28.4 to km 30.0 and again at km 33.3 to the end of the route. These rocks have a notorious reputation for the development of a karst subsurface landscape, associated with a highly irregular and voided bedrock profile. The soil cover often comprises highly erodible soils, which can readily erode by downward percolating water to create leached or voided zones, which may result in the formation of sinkholes and subsidences. Several dolerite intrusions occur along the proposed route. These intrusions occur mainly in the Pretoria Group rocks.

A portion of the route in the southern portion is situated within the flood plain of the Bierspruit, which drains northwards towards the Crocodile River. Relatively thick, clayey alluvium can be expected in these zones. The area affected by soils associated with the Bierspruit extends approximately between km 18.7 to km 22.0. Similar clayey soil conditions can be expected at the Crocodile River crossing and particularly to the north thereof where the road remains in the flood plain for a distance of up to 3km. The entire dolomite area is covered by these transported soils. The area affected by the Crocodile River alluvial soils extends approximately from km 27.3 to 30.3." (Source: RHDV 2017).

The soil pattern maps indicates the project area occurs on mainly on red soils with high base status (CM), i.e. the red sections in Figure A7 – Appendix A, while the remainder occurs on strongly structured cracking soils, mainly dark coloured, dominated by swelling clays (vertic soils), i.e. the turquoise sections on Figure A8. The land types identified in the study region are 'ag' and 'db' (AGIS, 2017) (Figure A9).

Topography

The topography of the region can be separated into roughly two different sections, namely that of the northern regions (Figure 1.1 and 1.2), which is more elevated and consists of a few low-lying mountains, in comparison to the southern region (plates below), which is primarily very flat. The elevation variance throughout the project region varies greatly, due mainly to the low-lying mountains in the northern region. Regardless, the road itself was designed to deviate very little in terms of elevation, and as such seems to mostly follow the low-lying areas with little height difference. The route generally passes through flat to rolling terrain, crossing the Crocodile River at approximately km 27.5. The maximum elevation is 1000 m and the lowest at the river crossing is 946 m above mean sea level. The route follows a north easterly direction with curves along the way. Topography in the northern region (northernmost section) varies from 910 - 1240m above mean sea level, and in the southern region between 930 – 1000m above mean sea level. An elevation profile can be seen in the Figure 1.3 below.

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Figure 1.1. Northern region topography, facing northwards towards Thabazimbi.



Figure 1.2. Southern region topography, facing Northwards.

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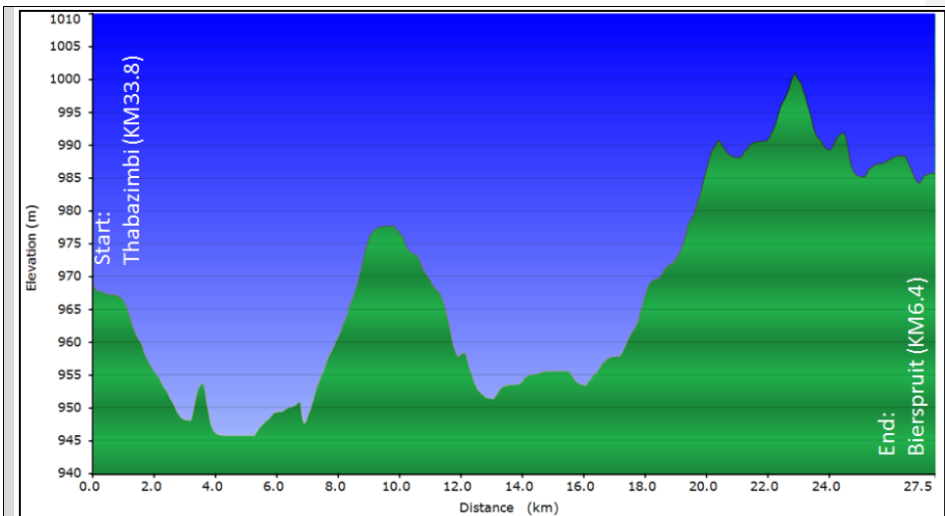


Figure 1.3. Elevation profile of the R510, section 2 (project region). (Source: RHDHV 2017).

Vegetation

Please note: vegetation is discussed in the biophysical section of this report. No further discussion on vegetation is thus offered here.

Biodiversity indicators

A variety of bioregional plans exists throughout South Africa, with the purpose informing land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. Bioregional plans are one of a range of tools provided for in the National Environmental Management: Biodiversity Act (NEMBA) (No. 10 of 2004) that can be used to facilitate biodiversity conservation in priority areas outside the protected area network. Two such plans were identified for the Limpopo Province, and used for this project.

Waterberg Bioregional Plan (2015)

The Waterberg District Bioregional Plan was compiled by the Limpopo Department of Economic Development, Environment and Tourism (LEDET), the South African National Biodiversity Institute (SANBI) and the various stakeholders within the Waterberg District in 2014/2015 and is based on analyses performed, and data sets available at that time. The objective of this revision process was to minimise conflict with identified development zones and maximise alignment with environmental zones identified in existing integrated spatial development planning tools within the District. The result is a map showing Critical Biodiversity Areas (CBA's) (terrestrial and aquatic) for the entire province.

Limpopo Conservation Plan Version 2 (2013)

The purpose of the Limpopo Conservation Plan version 2 (LCPv2) was to develop the spatial component of a bioregional plan (i.e. map of Critical Biodiversity Areas (CBA) and associated land-use guidelines)(Figure 1.4). The Limpopo Conservation Plan (v2) conservation plan is consistent with National

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Environmental Management Act (NEMA) principles and the NEMBA. It was further designed to support integrated development planning and sustainable development by identifying an efficient set of CBAs that are required to meet national and provincial biodiversity objectives, in a configuration that is least conflicting with other land uses and activities. Where alternatives are available, the CBAs were designed to avoid conflict with existing IDPs, EMFs and SDFs in the region by favouring the selection of sites that are least conflicting with other land-uses.

The conservation plan provides various CBA categories for the province with the following descriptions per category:

CBA Map Category	Description	Land Management Objective	Land Management Recommendations
Protected Areas	Formal Protected Areas and Protected Areas pending declaration under NEMPA.	Maintain in a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation. Development subject to Protected Area objectives and zoning in a NEMPAA compliant and approved management plan.	Maintain or obtain formal conservation protection.
Critical Biodiversity Areas (1)	Irreplaceable Sites. Areas required to meet biodiversity pattern and/or ecological processes targets. No alternative sites are available to meet targets.	Maintain in a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation.	Obtain formal conservation protection where possible. Implement appropriate zoning to avoid net loss of intact habitat or intensification of land use.

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CBA Map Category	Description	Land Management Objective	Land Management Recommendations
<p>Critical Biodiversity Area (2)</p>	<p>Best Design Selected Sites. Areas selected to meet biodiversity pattern and/or ecological process targets. Alternative sites may be available to meet targets.</p>	<p>Maintain in a natural state with limited or no biodiversity loss. Maintain current agricultural activities. Ensure that land use is not intensified and that activities are managed to minimize impact on threatened species.</p>	<p>Avoid conversion of agricultural land to more intensive land uses, which may have a negative impact on threatened species or ecological processes.</p>
<p>Ecological Support Areas (1)</p>	<p>Natural, near natural and degraded areas supporting CBAs by maintaining ecological processes.</p>	<p>Maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern</p>	<p>Implement appropriate zoning and land management guidelines to avoid impacting ecological processes. Avoid intensification of land use. Avoid fragmentation of natural landscape</p>

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CBA Map Category	Description	Land Management Objective
Ecological Support Areas (2)	Areas with no natural habitat that is important for supporting ecological processes.	Avoid additional / new impacts on ecological processes.
Other Natural Areas	Natural and intact but not required to meet targets, or identified as CBA or ESA	
No natural habitat remaining	Areas with no significant direct biodiversity value. Not Natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry; and human infrastructure.	

Figure 1. 4. CBA and ESA descriptions as per the Limpopo Conservation Plan v2 2013.

It is clear from the CBA map (Limpopo Conservation Plan v2 2013) (not shown), that the majority of the study area is located within the CBA 2 region. Approximately 87.5% (30.1 km) of the area occurs within this region, with the remainder (12.5% or 3.7km) occurring in the CBA 1 category. CBA 1 regions are found in the mountainous northern sections of the study area, and according to the CBA category description, this area should be managed to maintain land in a natural state, with limited or no biodiversity loss. Degraded areas must be rehabilitated to a natural or near natural state, and managed with no further degradation.

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The remainder of the study areas is found in the CBA 2 region, where the management objectives are:

- To maintain land in a natural state with limited or no biodiversity loss,
- To maintain current agricultural activities,
- Ensure that land use is not intensified
- Activities are managed to minimise impact on threatened species.

This area represents that majority of the study area, and falls predominantly to the southern region of the study area.

Based on the presence of CBA 1 and CBA 2 vegetation within the study area, a site visit was conducted to confirm biodiversity classes.

The Waterberg Bioregional Plan does not deviate much from the CBA categories discussed above, with only minor differences. The northern section of the study area is covered to a greater extent by the CBA 1 category, which in this case is classified as irreplaceable. The remainder of the study area is approximately 50% CBA 2 – (optimal), or the Ecological Support Area (ESA – natural). All of the above regions therefore have significant ecological value, and development should aim to maintain and conserve this ecological potential as far as possible.

Furthermore, the Aquatic CBA map (not shown) of the Waterberg Bioregional Plan shows that the study area intersects an aquatic CBA only where the road comes in close proximity to the Bierspruit River (towards the north of the study area). Further footprint of the project coincided with the aquatic ESA, which surround the river channels and are represented by riparian zones. The study area occurs on a small amount of the CBA zoned area only. Consideration of the impact of road construction and operation, as well as design for –, and minimisation of the impacts in this region must consequently be considered in the design planning documentation.

Hydrology

Figures A10 and A11 (Appendix A – maps) indicates the location of the rivers and wetlands within the project area. No dams within 50m of the road were found within the region, thus their exclusion. The main river in the region is the Crocodile River, and a secondary tributary named the Bierspruit River is also found in close proximity of the site (Figure A10 – hydrology map (please refer to the Appendix A, maps). The project area encompasses two river crossings, notably the Crocodile and the Bierspruit Rivers (both towards the north), with scattered wetlands found throughout. Towards the north of the project area (near the foothills of the mountainous region), road activities will occur within 500m of wetlands associated with the Crocodile and Bierspruit Rivers.

Based on a detailed culvert inspection carried out during January 2008, this project requires the upgrade or replacement of various culverts, side drains and subsurface drains across the proposed road section, which will be conducted in accordance with the Drainage Manual of the NRA from 2007, as part of this upgrade project. Blocked or defect subsurface drains shall either be cleared or replaced.

The hydrology maps (Figures A10 and A11 in Appendix A – maps) further show that the southern study area (nearer Amandelbult) does not contain any water crossings or wetlands in close proximity to the site. EIA and DWS guidelines state activities within 32m (EIA) and 50m (DWS) of watercourses, and within 500m of wetlands, require a general authorisation (for SANRAL). Based on a precautionary approach, the 50m DWS guideline will be employed for rivers in this project. These requirements are not triggered within

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the southern portion of the road, but are in the northern section (nearer Thabazimbi).

Two river crossings are found within the project area, within 50m meters of the Crocodile River (Figures A10 and A11 in Appendix A – maps). The proposed changes to the road across the Crocodile River will necessitate bridge design changes and construction within and across the river course, possibly impacting the water quality and characteristics of the river. This area, coupled with the sensitive nature of the Crocodile River, will thus require a General Application (GA) from DWS for the works, in order to authorise construction activities within a water resource.

Water uses applicable to this development, based on the project description, include the following:

- A: Taking of water from a water source;
- C: impeding or diverting the flow of water in a watercourse; and
- I: Altering the bed, banks, course or characteristics of a watercourse.

In the context of this development, a GA application was applied for, as numerous wetlands are located within close proximity (certainly closer than 500m) of various proposed works for the road upgrade, as well as construction abstraction being proposed from the Crocodile River, which is a section 21A water use. Four points were identified as drainage lines (wetlands and rivers) crossing the road section of the study area. These locations will all be included into the GA for authorisation.

Heritage and Paleontological characteristics of the site

The proposed development triggers section 38(1) of the National Heritage Resources Act (No 25 of 1999), which refers to:

- a. *The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier over 300m in length.*

A Phase I Heritage Impact Assessment was commissioned during the EIA. The findings of the heritage report were further incorporated into the draft Basic Assessment Report, general water use authorisation and submissions to DMR. Mitigation measures were also included.

The findings of the reports are detailed below:

A large number of archaeological and historical studies have been conducted in Waterberg and around Thabazimbi, most of which infer a varied and rich heritage landscape. The literature shows evidence of an archaeological heritage that spans from the Early Stone Age, Middle Stone Age to the Later- Stone, as well as evidence of pastoralism and Iron Age farmers. Specifically, Thabazimbi holds a significant Farmer and Colonial horizon with remnants of several of the Batswana tribes tracing their origins back to the Highveld and Waterberg region during the 18th century and 19th century. In terms of heritage resources, the landscape around the project area is primarily well known for the occurrence of Iron Age Farmer period and Historical Period occurrences. However, the proposed R510 National Route Upgrade Project footprint is situated along a road servitude that has been transformed as the road was constructed and modified over many years. As a consequence, much of the direct surroundings have sterilised the area of potential heritage resources - especially those dating to pre-Colonial and prehistoric times and two sites of heritage potential were identified in the project area. The following recommendations are made based on general observations in the project area and cognisant of the potential seniority of heritage remains:

- Any fossil remains such as fossil fish, reptiles or petrified wood exposed during construction

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should be carefully safeguarded and the relevant heritage resources authority (Limpopo-PHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist

- Three possible Historical Period structures (Site EXIGO-R510UG-HP01) are of medium-low significance and these features, which were probably former railway station buildings, are currently used as dwellings. The sites are located in proximity of the project area (>50m) and it is recommended that the sites and any activities in its surrounds be monitored in order to avoid impact on the site or the destruction of previously undetected heritage remains. The necessary destruction permits should be obtained from the relevant Heritage Resources Authorities prior to the possible impact or destruction of the features.
- A cemetery identified within close proximity of the road upgrade alignments (Site EXIGO-R510UGBP01) is of high significance and the site might be impacted on by the proposed project. As a primary measure, the Heritage Authorities (SAHRA) requires a 50m conservation buffer for all burials. In addition, it is recommended that the cemetery be fenced off and that access control be applied during all phases of construction. The developer should carefully liaise with the heritage specialist and SAHRA with regards to the management and monitoring of any human grave or cemetery in order to detect and manage negative impact on the sites. Should impact on any human burial prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials (see Addendum B).
- Considering the localised nature of heritage remains, the general monitoring of the development progress by an informed ECO is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.

Heritage resources occur in close proximity of alignments proposed for the R510 National Route Upgrade Project and potential peripheral impact on these heritage receptors might occur. However, this impact can be mitigated by means of avoidance and site monitoring during development. In the opinion of the author of the Archaeological Impact Assessment Report, the proposed road upgrade proceed from a culture resources management perspective, provided that mitigation measures are implemented where applicable, and provided that no subsurface heritage remains are encountered during construction.

Site Code	Short Description	Coordinate S E	Mitigation Action
Exigo-R510UG-HP01	Possible Historical Period structures	S24.76694° E27.32462°	Avoidance, 50m conservation buffer, site monitoring. Destruction permitting if impacted on.
Exigo-R510UG-BP01	Burial Site	S24.62402° E27.38809°	Avoidance to avoid the cemetery, strict 50m conservation buffer, fence burial place and apply access control, frequent site monitoring, site management plan

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			implementation. Grave Relocation Alternative: Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.
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It is essential that cognisance be taken of the larger archaeological landscape of the Limpopo Province and the Waterberg region in order to avoid the destruction of previously undetected heritage sites. Water sources such as pans, drainage lines and rivers should also be regarded as potentially sensitive in terms of possible Stone Age deposits. The possible existence of Colonial Period resources deriving from the area's more recent history should also be considered. Should any previously undetected heritage resources be exposed or uncovered during construction phases of the proposed project, these should immediately be reported to SAHRA.

Since the intrinsic heritage and social value of graves and cemeteries are highly significant, these resources require special management measures. Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

Paleontological character of the area:

The area is underlain by Vaalian aged rocks (2.65 – 2.05 Ga) which have undergone folding and have been exposed to thermal metamorphosis by igneous intrusions and the emplacement of the Bushveld Igneous Complex. Due to the very low probability of fossils occurring in the study area it is recommended that the project should be exempted from further palaeontological studies. In the unlikely event that fossils are found in the soil cover or dolomite in the study area the CEO should take the following steps:

Procedure for chance palaeontological finds:

Extracted and adapted from the National Heritage Resources Act, 1999 Regulations Reg No. 6820, GN: 548. The following procedure must be considered in the event that previously unknown fossils or fossil sites are exposed or found during the life of the project:

- Surface excavations should continuously be monitored by the ECO and any fossil material be unearthed the excavation must be halted.

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- If fossiliferous material has been disturbed during the excavation process it should be put aside to prevent it from being destroyed.
- The ECO then has to take a GPS reading of the site and take digital pictures of the fossil material and the site from which it came.
- The ECO then should contact a palaeontologist and supply the palaeontologist with the information (locality and pictures) so that the palaeontologist can assess the importance of the find and make recommendations.
- If the palaeontologist is convinced that this is a major find an inspection of the site must be scheduled as soon as possible in order to minimise delays to the development.
- From the photographs and/or the site visit the palaeontologist will make one of the following recommendations:
 - The material is of no value so development can proceed, or:
 - Fossil material is of some interest and a representative sample should be collected and put aside for further study and to be incorporated into a recognised fossil repository after a permit was obtained from SAHRA for the removal of the fossils, after which the development may proceed, or;
 - The fossils are scientifically important and the palaeontologist must obtain a SAHRA permit to excavate the fossils and take them to a recognised fossil repository, after which the development may proceed.
- If any fossils are found then a schedule of monitoring will be set up between the developer and palaeontologist in case of further discoveries.

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 734, 735 and 736	Description of project activity
EIA Regulations 2017, Listing Notice 1 (GNR 327)	
GN R. 327- No. 14: The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Hydrocarbon, of up to 80 cubic metres, may be stored on site for use.
GN R. 327- No. 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from- (i) a watercourse; (ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing, dredging, excavation, removal or moving- (a) will occur behind a development setback;	Expansion of existing bridges, stormwater outlets structures as well as infrastructure and structures will include stream flow modification, water quality characteristic changes and modification of the sediment and bank of the existing river. While this activity is anticipated to have a LOW risk rating, the exact risk level will be determined during the wetland specialist fieldwork risk assessment, and will inform the need for a full WUL or, in the case of a LOW risk rating, a General Authorisation application. A General Authorisation is anticipated currently.

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(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.	This activity will be triggered due to the use of temporary support structure/s and/or road deviations required for the construction/upgrading of the bridge(s) over the Crocodile River and other watercourses.
GN R. 327-: No. 27: The clearance of an area of 1 hectare or more, but less than 20ha 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 upgrading of the R510 is a linear project and this activity is therefore excluded, however should a construction camp be established that entails the clearance of indigenous vegetation greater than 1ha but less than 20ha, this activity will be triggered. A less sensitive area can be determined during the environmental studies. This activity is included in the BA application to ensure this option is covered should the applicant find during the design phase that a camp of greater than 20ha will in fact be required.
GN R. 327-: No. 48: The expansion of— (iii) bridges where the bridge is expanded by 100 square metres or more in size; (iv) dams, where the dam, including infrastructure and water surface area, is expanded by 100 square metres or more in size;	Expansion of existing bridges, storm water outlets structures as well as infrastructure and structures will trigger these activities.
GN R. 327-: No. 49: The expansion of - (v) infrastructure or structures where the physical footprint is expanded by 100 square metres or more;	Expansion of existing bridges, storm water outlets structures as well as infrastructure and structures will trigger these activities.
GN R. 327-: No. 56: Activity 56: The widening of a road by more than 6m, or the lengthening of a road by more than 1km— (i) where the existing reserve is wider than 13.5m; or (ii) where no reserve exists, where the existing road is wider than 8m; excluding where widening or lengthening occur inside urban areas.	Currently the road is a single carriageway in a rural area with an existing surface width of 7m with 1.5m gravel shoulders. According to the project description the carriageway is to be widened to accommodate passing lanes which will result in the new carriageway having a width that varies from 13.4m to 16.8m surface width which represents an increase between 6.4 - 9.8m width, hence the threshold will be reached. This activity is thus triggered on both length and width considerations.
EIA Regulations 2017, Listing Notice 3 (GNR 324)	
GN R. 324-Listing Notice 3. No. 10: The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. (e) In Limpopo: i. all areas	This activity is triggered should there be the storage of diesel and/or petrol on site with a combined capacity of 30m ³ but not exceeding 80m ³ . The proposed road traverses vast areas categorised as Critical Biodiversity Areas (CBAs).
GN R. 324-Listing Notice 3. No. 12: The clearance of an area of 300 square meters or	The proposed road traverses areas categorised as Critical Biodiversity Areas (CBAs). This activity

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<p>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>(e) Limpopo:</p> <p>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>ii. Within critical biodiversity areas identified in bioregional plans;</p> <p>iii. Within the littoral active zone or 100 meters inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on even in urban areas; or</p> <p>iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.</p>	<p>will be triggered for any construction activity that requires the clearance of 300m² or more of indigenous vegetation associated with the CBAs as well as indigenous riparian vegetation associated with watercourses and the Crocodile River. This activity therefore applies and is included for authorisation.</p>
<p>GN R. 324-Listing Notice 3. No. 18: The widening of a road by more than 4 meters; or the lengthening of a road by more than 1 kilometre.</p> <p>(a) In the free state, Limpopo, Mpumalanga and Northern Cape provinces:</p> <p>i. Outside urban areas, in:</p> <p>(aaa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus Areas;</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority.</p> <p>(dd) sites or areas identified in terms of an international Convention</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</p> <p>(gg) Areas within 10km from national parks or world heritage sites or 5 kilometres from any</p>	<p>According to the project description the carriageway is to be widened to accommodate passing lanes which will result in the new carriageway having a width that varies from 13.4m to 16.8m surface width which represents an increase between 6.4 - 9.8m width, hence the threshold will be reached. This activity will be triggered for areas of the road that traverses CBAs. The road mainly traverses CBAs 1 and 2 at some areas, therefore this activity is triggered and included for authorisation.</p>

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other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;	
GN R. 324-Listing Notice 3. No. 23: The expansion of – (iii) bridges where the bridge is expanded by 10 square metres or more in size; Where such development occurs – (a) within a watercourse (a) Free State, Limpopo, Mpumalanga and Northern Cape, outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The development of infrastructure, temporary or permanent e.g. bridges, support structures; piers; culverts etc. within the Crocodile River and other watercourses, meeting the 10m ² threshold will trigger this activity. Expansion of existing bridges, stormwater outlets structures as well as infrastructure and structures will also trigger Activity 23. As the proponent is required to widen the top structures, and extend culverts over minor bridges and over the Crocodile river, the collective infrastructure footprint is expected to exceed 10m ² . As such, this activity is triggered and included for authorisation.

2. FEASIBLE AND REASONABLE ALTERNATIVES

“**alternatives**”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

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a) **Site alternatives**

No site alternatives have been assessed as the upgrade takes place on an existing road. Road alignment deviations will only increase the environmental and project cost associated with the upgrade, and would thus be a less ideal solution, and were thus not considered. No road alignment deviations will occur.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Existing site is used, no alternative site required	24°37'2.05"S	27°23'19.85"E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities:

Alternative:	Latitude (S):	Longitude (E):
Alternative S1 (preferred)		
• Starting point of the activity	24°37'2.05"S	27°23'19.85"E
• Middle/Additional point of the activity	24°41'36.93"S	27°19'26.23"E
• End point of the activity	24°49'5.52"S	27°18'50.22"E
Alternative S2 (if any)		
• Starting point of the activity	Not applicable	Not applicable
• Middle/Additional point of the activity	Not applicable	Not applicable
• End point of the activity	Not applicable	Not applicable
Alternative S3 (if any)		
• Starting point of the activity	Not applicable	Not applicable
• Middle/Additional point of the activity	Not applicable	Not applicable
• End point of the activity	Not applicable	Not applicable

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

No route deviations are proposed, as the upgrade activities can only occur on an existing road. Please see table 2.1 for coordinates every 200m.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

Table 2.1. Coordinates of the 200m points along the road section.

Point	Latitude	Longitude
0	24°37'2.04"S	27°23'19.85"E
200	24°37'12.16"S	27°23'26.64"E
400	24°37'26.70"S	27°23'20.72"E

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600	24°37'36.84"S	27°23'6.82"E
800	24°37'46.95"S	27°22'52.91"E
1000	24°37'57.21"S	27°22'39.14"E
1200	24°38'12.04"S	27°22'33.21"E
1400	24°38'27.67"S	27°22'37.90"E
1600	24°38'43.15"S	27°22'43.31"E
1800	24°38'58.77"S	27°22'48.07"E
2000	24°39'15.00"S	27°22'47.63"E
2200	24°39'31.24"S	27°22'46.83"E
2400	24°39'47.13"S	27°22'43.46"E
2600	24°40'1.42"S	27°22'35.14"E
2800	24°40'12.83"S	27°22'22.57"E
3000	24°40'20.36"S	27°22'6.88"E
3200	24°40'24.91"S	27°21'49.81"E
3400	24°40'29.37"S	27°21'32.71"E
3600	24°40'33.84"S	27°21'15.62"E
3800	24°40'38.32"S	27°20'58.52"E
4000	24°40'42.79"S	27°20'41.42"E
4200	24°40'47.25"S	27°20'24.32"E
4400	24°40'51.46"S	27°20'7.15"E
4600	24°40'53.94"S	27°19'49.58"E
4800	24°40'58.66"S	27°19'32.78"E
5000	24°41'11.74"S	27°19'22.86"E
5200	24°41'27.76"S	27°19'24.01"E
5400	24°41'43.63"S	27°19'27.83"E
5600	24°41'59.50"S	27°19'31.65"E
5800	24°42'15.37"S	27°19'35.47"E
6000	24°42'31.29"S	27°19'39.02"E
6200	24°42'47.48"S	27°19'37.96"E
6400	24°43'3.66"S	27°19'36.32"E
6600	24°43'19.84"S	27°19'34.67"E
6800	24°43'36.03"S	27°19'33.31"E
7000	24°43'52.21"S	27°19'35.00"E
7200	24°44'8.39"S	27°19'36.57"E
7400	24°44'24.60"S	27°19'37.90"E
7600	24°44'40.80"S	27°19'39.26"E
7800	24°44'57.00"S	27°19'40.60"E
8000	24°45'13.08"S	27°19'39.41"E
8200	24°45'28.74"S	27°19'34.67"E
8400	24°45'44.40"S	27°19'29.91"E
8600	24°46'0.06"S	27°19'25.16"E
8800	24°46'15.71"S	27°19'20.40"E
9000	24°46'31.43"S	27°19'15.89"E
9200	24°46'46.87"S	27°19'20.25"E
9400	24°47'1.43"S	27°19'28.14"E
9600	24°47'17.26"S	27°19'28.41"E
9800	24°47'32.76"S	27°19'23.05"E
10000	24°47'48.26"S	27°19'17.73"E

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10200	24°48'3.76"S	27°19'12.39"E
10400	24°48'19.26"S	27°19'7.03"E
10600	24°48'34.71"S	27°19'1.53"E
10800	24°48'50.11"S	27°18'55.86"E
11000	24°49'5.52"S	27°18'50.20"E

b) Lay-out alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Existing layout and road alignment is utilised, no layout or routing alternatives are deemed feasible.	24°37'2.05"S	27°23'19.85"E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

No technology alternatives have been assessed as the upgrade takes place on an existing road.

Alternative 1 (preferred alternative)
No technology alternatives have been assessed as the upgrade takes place on an existing road using acceptable standard road construction technologies.
Alternative 2
Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)		
None		
Alternative 2		
Alternative 3		

e) No-go alternative

The no-go alternative refers to the cessation of the project. This would mean the benefits of the project will not materialise (i.e. no job creation, no improved safety), while the negative impacts (biodiversity impacts) will also not materialise. The expectation of increased future traffic along that route, in addition to the benefits obtained through the project, has been evaluated as greater in importance than the expected biodiversity impacts (after mitigation). The no-go alternative is thus not considered the preferred alternative in terms of this development.

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Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	Size of the activity:
Alternative A1 ¹ (preferred activity alternative)	0m ²
Alternative A2 (if any)	0m ²
Alternative A3 (if any)	0m ²

or, for linear activities:

Alternative:	Length of the activity:
Alternative A1 (preferred activity alternative)	27 420 m
Alternative A2 (if any)	0m
Alternative A3 (if any)	0m

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	Size of the site/servitude:
Alternative A1 (preferred activity alternative)	0m ²
Alternative A2 (if any)	0m ²
Alternative A3 (if any)	0m ²

4. SITE ACCESS

Does ready access to the site exist?	YES
If NO, what is the distance over which a new access road will be built	0m

Describe the type of access road planned:

N/A. No access roads are required, as the road is accessible directly. Existing side roads will be used for construction vehicles where the R510 itself will not suffice for access, however that is not anticipated.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

Please see Figure A4 - Appendix A, for a map indicating the access road to the site. Please note, the only access road possible is that of the R510 north and south, as well as the R511 (from Brits)

¹ "Alternative A.." refer to activity, process, technology or other alternatives.

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5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

Please see Figure A1 - Appendix A, for a map indicating the location of the project.

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

Please see Appendix A2, for all the route plans for all the different sections of the road.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;

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- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

The sensitivity map provided in Appendix A3, are based on the following criteria:

- I. Drainage Lines/Rivers (50m buffer) and wetlands (500m buffer) are deemed HIGH sensitivity areas; - these features are a combination of NFEPA database, and aquatic specialist identified and mapped features.
- II. CBA's were mapped HIGH, MODERATE and LOW where they correspond to in-field assessments;
- III. Ridges aren't shown – as they project area (road upgrade area) was deemed to be in the flat, contoured areas of the landscape.
- IV. No cultural or historical features are known to occur in this region.
- V. Vegetation sensitivity mapping was done on the basis of the field surveys. All vegetation within the road reserve was found to be of a LOW sensitivity.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Please find site photographs for the R510 road upgrade section in Appendix B.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

Please find site facility illustrations for the R510 road upgrade section in Appendix C.

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10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	YES		Please explain
Upgrades and maintenance on a major regional road is a South African National Roads Agency SOC Limited (SANRAL) mandate (SANRAL takes responsibility for upgrades and maintenance of regional routes). As this road is currently under their jurisdiction, it is their sole mandate to ensure the proper functioning and maintenance of this road, amongst others.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES		Please explain
Road improvements are stipulated in the Limpopo PSDF to improve quality of service on existing roads such as relieving traffic congestion, improve road safety, improve overtaking opportunities, general maintenance. The PSDF also indicated that ongoing maintenance is required in order to address the maintenance backlog of road upgrades throughout the province.			
(b) Urban edge / Edge of Built environment for the area	YES		Please explain
The activity is on an existing road and takes place within an existing road reserve.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES		Please explain
Upgrades and maintenance on a major regional road is a South African National Roads Agency SOC Limited (SANRAL) mandate (SANRAL takes responsibility for upgrades and maintenance of regional routes). This project does not conflict with the SDF and IDP for the broader region.			
(d) Approved Structure Plan of the Municipality	YES		Please explain
Upgrades and maintenance on a major regional road is a South African National Roads Agency SOC Limited (SANRAL) mandate (SANRAL takes responsibility for upgrades and maintenance of regional routes).			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)		NO	Please explain
The proposed development does not conflict with the Waterberg regional EMF, as the proposed project is an upgrade of an existing facility, and the two vegetation types impacted are both of least concern – as per the EMF.			
(f) Any other Plans (e.g. Guide Plan)		NO	Please explain
None.			

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<p>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</p>	<p>YES</p>		<p>Please explain</p>
<p>The road currently has unacceptable quality of service. Improvements are normally applied to roads to improve quality of service on existing roads such as relieving traffic congestion, improve road safety, improve overtaking opportunities, etc. The PSDF indicated that the condition of roads in the province is general fair to poor, with recognition of the increased freight traffic representing an elevated measure of usage for this section of road.</p>			
<p>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</p>	<p>YES</p>		<p>Please explain</p>
<p>Road safety improvements may result in fewer accidents, especially around urban areas where road accidents are more frequent.</p>			
<p>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	<p>YES</p>		<p>Please explain</p>
<p>The development is not a municipal competency. No water/ sewerage infrastructure is required.</p>			
<p>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	<p>YES</p>		<p>Please explain</p>
<p>Yes, the Waterberg IDP identifies infrastructure development as an ongoing area of concern in order to maintain services and transport routes, as a large number of roads have been noted in maintenance backlog, and some roads have been ceded to national (SANRAL) for maintenance, on the basis of limited funding available to the Limpopo roads authority. Upgrades and maintenance on a major regional road is a South African National Roads Agency SOC Limited (SANRAL) mandate (SANRAL takes responsibility for upgrades and maintenance of regional routes).</p>			

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7. Is this project part of a national programme to address an issue of national concern or importance?	YES		Please explain
SANRAL is currently busy with major upgrades on all national roads, including other roads within the Limpopo Province. The Waterberg IDP has identified 4 043km (numbered roads only) within the province that require maintenance and upkeep, in particular to ensure continued service to the mining areas of the province, of which Thabazimbi is one. This development is thus of national import due to the maintenance burden provincially and nationally.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES		Please explain
The project involves the upgrade of an existing national road therefore land use will not change.			
9. Is the development the best practicable environmental option for this land/site?	YES		Please explain
The development consists of the upgrade of an existing national road.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES		Please explain
The road upgrade will improve road safety and reduce road accidents, while contributing to short term employment, maintenance and development goals and assist in the provision of increasing transport requirements (for example, through road freight). The negative impacts include a minimal loss of biodiversity and some traffic disruptions during construction.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?		NO	Please explain
The development consists of the upgrade of an existing national road, which has existed for near on 30 years already. This project will not contribute to a precedent in the region that has not already been set years prior, if at all.			
12. Will any person's rights be negatively affected by the proposed activity/ies?		NO	Please explain
No. The development consists of the upgrade of an existing national road, which has been in existence for many years prior.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?		NO	Please explain
The activity is on an existing road and takes place within an existing road reserve. The road reserve will not be exceeded with the upgrade activity.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES		Please explain
The proposed activity forms part of the infrastructure – transport (ports, rail and road) SIP.			

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15. What will the benefits be to society in general and to the local communities?	Please explain
<p>There will be job creation during the construction phase for skilled and semi-skilled workers as well as skills development. Approximately 350 temporary (construction) and 20 permanent (operation) jobs will be created. The road upgrade will result in a safer and better quality road for its users. Greater road safety may increase road traffic experience on that particular road, and will allow for a greater influx of tourists and travellers through the region. This in turn may stimulate the local economy through increased expenditure from these travellers. In addition, development such as this contributes to the long-term sustainability and road use potential of the road, thus creating the necessary lanes, intersections and drainage structures to allow for anticipated future demand.</p>	
16. Any other need and desirability considerations related to the proposed activity?	Please explain
<p>The aim of the proposed R510 road upgrade is to improve the quality of the road section which may have an adequate remaining structural life but which has an unacceptable quality of service. Improvements are normally applied to roads to improve quality of service on existing roads such as relieving traffic congestion, improving road safety, improving overtaking opportunities, etc.</p>	
17. How does the project fit into the National Development Plan for 2030?	Please explain
<p>Improved road safety and quality of service of provincial routes.</p>	

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18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

The following provides an analysis of how the objectives of IEM have been considered in the current road upgrade project. The general objective of integrated environmental management is to:

(a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment:	Alignment with NEMA principles described below (see Section 19 assessment below).
(b) Identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximizing benefits, and promoting compliance with the principles of environmental management set out in section 2;	Implicit in the current EIA process.
(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;	Implicit in the current EIA process.
(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment	The current EIA process has included a comprehensive PP process, including: <ul style="list-style-type: none"> • Publicised the project through visible signage, local and regional press adverts, identification of local stakeholders through engagement with Theewaterskloof LM and other government officials and parastatals. • Engagement with public at various public meetings
(e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and	A comprehensive assessment of the significance of impacts has been conducted as part of the BAR.

BASIC ASSESSMENT REPORT

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

BASIC ASSESSMENT REPORT

2. (1) The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and:	<i>Not Applicable</i>	<i>Not Applicable</i>
(a) shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination;	The onus is on the proponent to demonstrate to the authorizing agency (DEA) that the State will not be abrogating its responsibility by authorizing the proposed development.	Complies The EIA process has been undertaken in order to provide the relevant decision-makers with the required information. The required EIA should provide sufficient information for the relevant authority to make a defensible and informed decision.
(b) serve as the general framework within which environmental management and implementation plans must be formulated;	The onus is on the proponent to demonstrate to DEA that the NEMA principles will not be compromised.	Complies It is the opinion of this review that the proposed project does not conflict with NEMA principles in such a manner that it places undue risks on the natural or socio-economic environment. Mitigation measures must be effectively implemented
(c) serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;	The onus is on the proponent to demonstrate to the authorizing agency (DEA) that in providing environmental authorisation the principles of NEMA are duly addressed.	Complies The EIA process has been undertaken in order to provide the relevant decision-makers with the required information. The required EIA should provide sufficient information for the relevant authority to make a defensible and informed decision.
(d) serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and	<i>Not Applicable</i>	<i>Not Applicable</i>
(e) guide the interpretation, administration and implementation of this Act, and any other law concerned with the protection or management of the environment.	<i>Not Applicable</i>	<i>Not Applicable</i>

BASIC ASSESSMENT REPORT

<p>(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.</p>	<p>The EIA process must demonstrate that the needs of local people will be adequately addressed and that the development will serve the interests of the public equitably.</p>	<p>Complies</p> <p>The proposed project will not result in any undue or unacceptable impacts on the local socio-economic environment. Nor will any impacts be unfairly distributed.</p> <p>Recommendations made in the BAR must be adopted</p>
<p>(3) Development must be socially, environmentally and economically sustainable.</p>	<p>The EIA process must demonstrate that the development is socially, environmentally and economically sustainable.</p>	<p>Complies</p> <p>There is no indication that the proposed project would result in undue or environmental, social and economic impacts that would place at the risk the sustainability of local natural systems or the project.</p> <p>Recommendations made in the BAR must be adopted</p>
<p>(4) (a) Sustainable development requires the consideration of all relevant factors including the following:</p>		
<p>(i) that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</p>	<p>The development should not result in a significant loss of biodiversity. Should any loss occur then the project should seek to minimise or remedy the impact or provide suitable off-sets.</p>	<p>Complies</p> <p>Disturbance of local ecosystems must be avoided or impacts must be mitigated.</p> <p>A rehabilitation plan will assist in reducing the impact and providing benefits in terms of the re-establishment of natural vegetation.</p> <p>The recommendations made in the Ecological Assessment must be adopted.</p>
<p>(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</p>	<p>Certain activities associated with the project carry risks in terms of pollution and environmental degradation. This includes:</p> <ul style="list-style-type: none"> • Storm water run-off from the new road surfaces 	<p>Complies</p> <p>The BAR notes that impacts with regard to pollution and degradation of the environment can be managed and will not result in an unacceptable impact on the local environment.</p> <p>The recommendations made in the BAR must be adopted.</p> <p>Particular focus must be given to the Environmental Management Programme with regard to:</p> <ul style="list-style-type: none"> • Monitoring of stormwater

BASIC ASSESSMENT REPORT

<p>(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;</p>	<p>The proponent would need to demonstrate that it would not impact on sites of valuable cultural and historical heritage.</p>	<p>Complies</p> <p>Phase I HIA conducted for the project.</p> <p>Recommendations made in the Heritage report must be adopted.</p>
<p>(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;</p>	<p>Certain activities associated with the project carry risks in terms of pollution and environmental degradation.</p>	<p>Complies</p> <p>The BAR notes that impacts with regard to pollution and degradation of the environment can be managed and will not result in unacceptable impact on the local environment.</p> <p>The recommendations made in the BAR must be adopted.</p> <p>Particular focus must be given to the Environmental Management Programme.</p>
<p>(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource</p>	<p>NA - the project does not involve the exploitation of non-renewable resources.</p>	<p><i>Not Applicable</i></p>
<p>(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;</p>	<p>The project should not involve the unsustainable use or renewable resources and ecosystems, nor should any related secondary impacts result in increased resource use.</p>	<p>Complies</p> <p>The proponent does not intend nor will support the over-use of groundwater as a renewable resource.</p> <p>Mitigation measures must be effectively implemented, especially on-going monitoring of groundwater levels.</p>

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act (No 107 of 1998)	The activity triggers activities listed in NEMA GN R983 (EIA regulations 2014)	Department of Environmental Affairs (DEA)	1998
Constitution Act (No. 108 of 1996)	Must comply with the principles contained therein	Constitution Assembly	1996
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	The project will require sections of vegetation to be removed which will impact on the biodiversity of the area	Department of Environmental Affairs (DEA)	2004
National Water Act (No. 36 of 1998)	The project occurs within 32 metres of a watercourse	Department of Water and Sanitation (DWS)	1998
Minerals and Petroleum Resources Development Act (No. 93 of 1996)	The project will make use of mineral resources for the upgrade of the road	Department of Mineral Resources (DMR)	2002
National Road Traffic Act (No. 93 of 1996)	The project occurs on a national road route which will have an impact on traffic	Department of Transport	1996
Limpopo Biodiversity Assessment 2013	Defines CBA, ESA and Protected Areas boundaries	LEDET	2013
Waterberg District Municipality SDF	Delineates bioregions and prioritises regional development	Waterberg District Municipality	2009
Waterberg District Municipality IDP	Prioritises regional development	Waterberg District Municipality	2016/17

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES

If YES, what estimated quantity will be produced per month?

0.04 m³

How will the construction solid waste be disposed of (describe)?

BASIC ASSESSMENT REPORT

Solid Waste

Solid waste shall be stored in an appointed area in covered, tip-proof metal drums or similar container for collection and disposal. Disposal of solid waste shall be at a licensed landfill site or at a site approved by the relevant authority in the event that an existing operating landfill site is not within reasonable distance from the project area. No waste shall be burned or buried at or near the project area.

All solid waste (inert earth material) or construction camp wastes (domestic wastes) will be collected at a central location and will be stored temporarily (less than 89 days)(storage for greater than 90 days will incur waste licence activities, and thus waste will not be stored for longer that) until it can be removed to an appropriately permitted landfill site near the construction site. Currently, the following site is envisaged: Vaalwater (Portion 2 of the farm Vaalwater 137 KR, Nylstroom District, Private bag X10108, Nylstroom, 0510). The facility is classed G:S:B. The permit number is 16/2/7/A400/D4/Z1/P295. Please note: the contractor must make all attempt to follow the waste hierarchy in dealing with wastes produced (i.e. landfilling should be the final option and not the first response to treatment of any material).

Litter

No littering by construction workers shall be allowed and particular emphasis on litter control measures shall apply at stop/go facilities. During the construction period, the various contractor's facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. At all places of work the contractor shall provide litter collection facilities for later safe disposal at approved sites.

Hazardous Waste

Hazardous waste such as oils shall be disposed of at an approved landfill site. Special care shall be taken to avoid spillage of bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating surface water.

Under no circumstances shall the spoiling of bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected bituminous products shall be returned to the supplier's production plant. Any spillage of bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the engineer.

Construction and demolition waste

The opportunity for recycling and reuse of construction and demolition waste as fill for road embankments, land reclamation and drainage control must first be explored and take priority before the option of declaring these materials a 'waste'. The contractor is encouraged to actively engage with authorities and landowners adjacent to the site and identify where such 'waste' materials can be usefully deployed to repair existing environmentally damaged areas such as erosion dongas.

Where will the construction solid waste be disposed of (describe)?

Currently, the following site is envisaged: Vaalwater (Portion 2 of the farm Vaalwater 137 KR, Nylstroom District, Private bag X10108, Nylstroom, 0510). The facility is classed G:S:B. The permit number is 16/2/7/A400/D4/Z1/P295.

Will the activity produce solid waste during its operational phase?
If YES, what estimated quantity will be produced per month?

<input checked="" type="checkbox"/>	NO
<input type="checkbox"/>	0m ³

BASIC ASSESSMENT REPORT

How will the solid waste be disposed of (describe)?

Not Applicable – No waste is produced during operation.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Not Applicable – No waste is produced during operation.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

Not Applicable – No waste is produced during operation.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA? **NO**

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility? **NO**

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? **NO**

If YES, what estimated quantity will be produced per month?

Will the activity produce any effluent that will be treated and/or disposed of on site? **NO**

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility? **NO**

If YES, provide the particulars of the facility:

Facility name:		
Contact person:		
Postal address:		
Postal code:		
Telephone:	Cell:	
E-mail:	Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Not Applicable – waste water will not be produced by this activity.

BASIC ASSESSMENT REPORT

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities? YES **NO**

If YES, is it controlled by any legislation of any sphere of government? YES **NO**

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

Nuisance dust as a result of construction activities; General smoke emissions from construction vehicles. These levels are not anticipated to exceed acceptable norms, taking into account the relatively short term of the construction period and the existing use of the site, which accommodated vehicular traffic with similar emissions.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA? YES **NO**

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise? **YES** NO

If YES, is it controlled by any legislation of any sphere of government? YES **NO**

Describe the noise in terms of type and level:

Noise generated will be typical construction noise as a result of the movement of hauling trucks and graders. The noise nuisance will be managed in terms of the CEMP and the applicable sections of the Occupational Health and Safety Act (OHSA) and relevant Construction Regulations (CR). Normal road construction equipment (trucks, graders, bulldozers, compactors etc) will be used primarily. Noise levels may reach between 80-85 dBA per 15m at an anticipated maximum. In the rural environment, such noise levels are expected to be negligible.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

<input checked="" type="checkbox"/> Municipal	<input type="checkbox"/> <i>Water-board</i>	<input type="checkbox"/> <i>Groundwater</i>	<input type="checkbox"/> River, stream, dam or lake	<input type="checkbox"/> <i>Other</i>	<input type="checkbox"/> <i>The activity will not use water</i>
--	---	---	--	---------------------------------------	---

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

165m³ (165 000 Litres) at a rate not exceeding 1 l/p/s litres

BASIC ASSESSMENT REPORT

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

YES

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

A General Authorisation (GA) has not yet been submitted to the department, although a pre-application meeting was conducted and various communication between the relevant authorities occurred. The application will be submitted after the submission of the final BAR report (this report). Proof of such submission will be submitted to the DEA when the GA has been submitted and proof obtained.

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

Not Applicable - The facility itself does not require energy for operation. Energy efficiency has been incorporated into the construction activities through the use of appropriate machinery for construction.

In addition, the contractor shall take into consideration the impacts of high energy consumption, both from a cost and emissions point of view. Energy use shall be minimised, and where possible, alternative energy sources such as solar utilised.

Furthermore, the contractor shall undertake a study of the consumption of carbon units his chosen method of construction produces in the execution of his programme. In conjunction with the engineer who will provide complete cooperation in this study, a month by month output shall be compiled and efforts made to see how these outputs can be curtailed and reduced.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Not Applicable – The facility itself does not require energy for operation.

BASIC ASSESSMENT REPORT

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section?

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Limpopo Province
District Municipality	Waterberg District Municipality
Local Municipality	Thabazimbi Local Municipality
Ward Number(s)	Wards 3,4,6,8,9,11
Farm name and number	Please see list below.
Portion number	Please see list below.
SG Code	Please see list below.

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

BASIC ASSESSMENT REPORT

21DigitKey	Parcel Type	Parcel Num	PARCE L_NO	POR TION	FARM_NAME
T0KQ00000000036800027	FP	27/368	368	27	ROODEDAM 368
T0KQ00000000038500002	FP	2/385	385	2	SCHILDPADNEST 385
T0KQ00000000036800024	FP	24/368	368	24	ROODEDAM 368
T0KQ00000000035000051	FP	51/350	350	51	WACHTEENBIETJESDRAAI 350
T0KQ00000000036800023	FP	23/368	368	23	ROODEDAM 368
T0KQ00000000036900040	FP	40/369	369	40	ZWARTKOP 369
T0KQ00000000036900036	FP	36/369	369	36	ZWARTKOP 369
T0KQ00000000036900039	FP	39/369	369	39	ZWARTKOP 369
T0KQ00000000036900037	FP	37/369	369	37	ZWARTKOP 369
T0KQ00000000036900038	FP	38/369	369	38	ZWARTKOP 369
T0KQ00000000036900031	FP	31/369	369	31	ZWARTKOP 369
T0KQ00000000035000048	FP	48/350	350	48	WACHTEENBIETJESDRAAI 350
T0KQ00000000036800026	FP	26/368	368	26	ROODEDAM 368
T0KQ00000000036900035	FP	35/369	369	35	ZWARTKOP 369
T0KQ00000000036900030	FP	30/369	369	30	ZWARTKOP 369
T0KQ00000000035000049	FP	49/350	350	49	WACHTEENBIETJESDRAAI 350
T0KQ00000000036800025	FP	25/368	368	25	ROODEDAM 368
T0KQ00000000035100007	FP	7/351	351	7	BUFFELSHOEK 351
T0KQ00000000035000050	FP	50/350	350	50	WACHTEENBIETJESDRAAI 350
T0KQ00000000035200010	FP	10/352	352	10	GROOTFONTEIN 352
T0KQ00000000035200011	FP	11/352	352	11	GROOTFONTEIN 352

Current land-use zoning as per local municipality IDP/records:

Impacted land: Road Reserve.
Surrounding land: Agriculture and urban (not impacted by the proposed road upgrade development).

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

NO

BASIC ASSESSMENT REPORT

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input type="checkbox"/>
2.2 Plateau	<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input type="checkbox"/>
2.3 Side slope of hill/mountain	<input type="checkbox"/>	2.6 Plain	<input checked="" type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>
2.10 At sea	<input type="checkbox"/>				

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	<input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Dolomite, sinkhole or doline areas	<input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Seasonally wet soils (often close to water bodies)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Unstable rocky slopes or steep slopes with loose soil	<input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Dispersive soils (soils that dissolve in water)	<input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Soils with high clay content (clay fraction more than 40%)	<input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Any other unstable soil or geological feature	<input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
An area sensitive to erosion	<input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

BASIC ASSESSMENT REPORT

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition ^E	Natural veld with scattered aliens^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “^E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	NO	UNSURE
Non-Perennial River	YES	NO	UNSURE
Permanent Wetland	YES	NO	UNSURE
Seasonal Wetland	YES	NO	UNSURE
Artificial Wetland	YES	NO	UNSURE
Estuarine / Lagoonal wetland	YES	NO	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

While the R510 does not occur within or along the Bierspruit River, it does occur in close proximity to it, and potential exists for construction impacts thereof. The Bierspruit River (A24F020000) with reach No. A82, is a third order stream of Class B - largely natural. In addition, the road crosses the Crocodile River (A24H110000) with reach No. A6, a 5th order stream of class D - largely modified. According to the NFEPA wetlands information, the R510 crosses a few unnamed, seasonal and permanent wetlands occurring generally north to south along its path. Numerous farm dams and seeps are representative of the artificial wetlands within the project region. More detail is presented in the Aquatic Impact Assessment attached to this report.

BASIC ASSESSMENT REPORT

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

The primary land use within the area is a mixture of mainly agriculture, in the forms of crops or game farms, combined with mining activity. Three different mines have been noted from the background information available, and large swathes of the surface area along the road is currently exposed and being mined, or used for transport and stockpiling of mined material. Regardless of the large mining influence in the area, thicket/dense bush and woodland/open bush dominates the area surrounding the road reserve. It was clear from the site visit and aerial imagery that ongoing maintenance activity on the road through the mowing of the road verge continues.

Other land use activities in the area, though to a much lesser extent, are the presence of mine buildings, informal settlements (especially nearer Amandelbult and Thabazimbi towns), a golf course near Thabazimbi, a few wetlands and river crossings near and underneath the road, maize farming and other crops, woodlots (milling) and an electrical substation. An important other land use is the existence of a railroad adjacent to the road, which runs parallel and near the road (Figure 6.17) for most of the study area, specifically from the south near Amandelbult to the mountainous region in the north, near Thabazimbi.

Natural area	Dam or reservoir	Old fields
Low density residential	Hospital/medical centre	Filling station ^N
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential ^A	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard^N	Mountain koppie or ridge
Heavy industrial^{AN}	Railway line^N	Museum
Power station	Major road (4 lanes or more) ^N	Historical building
Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Gravoyard
Spoil heap or slimes dam ^A	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an “^N” are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

The road section proposed for upgrade occurs immediately adjacent to a train line (for large parts of the project running north-south), and one road-over-rail crossing. The crossing will be upgraded without impeding the track or altering the schedules, and business may continue as normal. Furthermore, as the proposed road will only make use of the existing road reserve – no land acquisition will be required from the railway operator, and no impact will occur on the existing railway line. PRASA will be informed accordingly of the works as an I&AP, and their comments incorporated into the design phase planning process.

BASIC ASSESSMENT REPORT

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Numerous mines exist in the area, however, the road upgrade will not impact negatively on their movements. Their existing traffic will be able to operate with minimal interference from the stop and go's on the road during construction (only two are planned during operation), and after construction the newly upgraded road will indeed be safer for transport. Overall, the impact will be positive for mining traffic in the region.

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not applicable – no boxes with "H" ticked.

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	
Core area of a protected area?		NO
Buffer area of a protected area?		NO
Planned expansion area of an existing protected area?		NO
Existing offset area associated with a previous Environmental Authorisation?		NO
Buffer area of the SKA?		NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

Please refer to Figure A5 in Appendix A – Maps for this map.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

YES	

BASIC ASSESSMENT REPORT

Two heritage receptors were identified in the R510 National Route Upgrade Project study namely:

- Site EXIGO-R510UG-HP01 (S24.76694°; E27.32462°)

Three red brick house structures of possible Historical origin occur east of the R510 road next to the adjacent railway line, at around 12.k km of the proposed upgrade alignment. It is possible that the buildings were once used as a railway station and they are currently used as dwellings. The multi-room structures with pitched corrugated iron roofs are relatively well preserved with signs of more recent maintenance to the buildings. A clear temporal context for the structures is not known but considering its architectural style, the houses most probably date to the second part of the 20th century and, associated with the railway line at the site. The buildings might be older than 60 years, which implies that they are potentially protected heritage resources. However, the buildings occur approximately 50m away from the project impact footprint and no direct t impact on the site is anticipated.

- Site EXIGO-R510UG-BP01 (S24.62402°; E27.38809°)

A single burial site was documented in the project area subject to this assessment. The burial place holds a number graves, some of which of which are older than 60 years. This cemetery, containing at least 25 graves occurs directly north of the R510 road on a portion of the farm Wachteenbietjesdraai 350 GQ, at around 32.9km of the proposed upgrade alignment. The graves belong to members of various families, including the Mmalesego, Mosito, Ggezengele, Matthagare, Ramphofane and Ramatsokha families. Most of the burials, which are placed to an east-west orientation, are dressed with marked marble headstones and gravestones. The dates of passing on the headstones range from between the 1970's up to present day. The cemetery is currently still in use, as new tombstone was erected on a recent burial at the time of the field survey. Material culture such as enamel and glass containers was observed in association with some of the burials. The remains of a small dilapidated building occur at the site. This concrete brick structure has no roof or windows and it is in a state of dereliction. The site is enclosed in a dilapidated fence and access control is not applied. The resource is of high heritage significance, it occurs in close proximity of the project impact footprint (approximately 30m) and a peripheral impact on the site might occur.

Please note: both heritage resources and their respective buffers have been added to the sensitivity maps in the appendices of this report.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Will any building or structure older than 60 years be affected in any way?
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

NO

NO

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

BASIC ASSESSMENT REPORT

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

The Thabazimbi Local Municipality is a Category B municipality located within the Waterberg District in the south-western part of the Limpopo Province. It has Botswana as its international neighbour, and is 210km from Pretoria. It is one of five municipalities in the district municipality (Waterberg DM).

Thabazimbi is known as 'mountain of iron', which is a Setswana name referring to the highly lucrative iron ore reef first discovered in the municipality in 1919. The municipality contains the Marakele National Park, which is a subsidiary of the National Parks Board, and in the same standard as the Kruger National Park and Mapungube. It has been mined since the 1930s, when iron and steel production started. Apart from iron ore, the Thabazimbi Municipality is surrounded by platinum-producing areas. Other minerals produced in the area include andalusite.

Agriculture has also proven to be a strong economic sector in the municipality. Agricultural commodities produced are wheat, beans and maize. The municipality's goals are aligned with those of the Provincial Growth and Development Strategy in Limpopo. This will ensure that the growth trajectory also addresses the objective of poverty eradication through job creation and business opportunity stimulation.

- Cities/Towns: Amandelbult Mine Town, Thabazimbi.
- Main Economic Sectors: Mining, agriculture, tourism.

Level of unemployment:

According to StatsSA (2011), the level of unemployment within the municipality was:

- Unemployment rate (official) - 20.6%
- Youth unemployment rate (official) 15-34 - 26.9%

Economic profile of local municipality:

The Thabazimbi area is predominantly dependant on the mining industry, with Iron ore mining still ongoing, though having seen a marked decline in recent years. Currently, iron ore and platinum are being actively mined, with some of the platinum mines expected to operate until 2090.

The following statistics are offered by the Local Government Handbook (<https://www.localgovernment.co.za/>)

YEARS	2016	2011
Household Dynamics		
Households	35 463	25 080
Average household size	2.7	2.8
Female headed households	22.7%	24.7%

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Formal dwellings	68.0%	70.7%
Housing owned	47.1%	24.4%
Household Services		
Flush toilet connected to sewerage	57.9%	63.1%
Weekly refuse removal	41.7%	60.4%
Piped water inside dwelling	38.0%	47.3%
Electricity for lighting	74.9%	76.8%

Key projects within the municipality currently include the establishment of Mamba Cement Manufacturing Plant - through a partnership between Gijong and China Africa Development Fund to the value of R1,6 billion, creating 231 permanent jobs and 550 temporary jobs; development of market stalls in Thabazimbi town – process still underway to confirm funding and other related processes; organic vegetable project has been established – the cooperative has started selling their products to the local markets; Aganang Cooperative – fully functional and selling their products to local markets and surrounding villages. In addition, the tourism Information Centre is fully functional – purchasing of land for development is an ongoing process, with COGHSTA committed to supporting in terms of funding.

Level of education:

The following statistics are offered by the Local Government Handbook (<https://www.localgovernment.co.za/>):

	2016	2011
Education (aged 20 +)		
No schooling	3.7%	8.8%
Matric	31.8%	26.1%
Higher education	6.2%	8.1%

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?

R 408 Million (VAT excluded)

What is the expected yearly income that will be generated by or as a result of the activity?

Nil

Will the activity contribute to service infrastructure?

YES

Is the activity a public amenity?

YES

How many new employment opportunities will be created in the development and construction phase of the activity/ies?

Estimated:

Temporary : 350
Permanent :20

What is the expected value of the employment opportunities during the development and construction phase?

R 45 million (Vat included) - estimated

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What percentage of this will accrue to previously disadvantaged individuals?	Minimum 60% of R45 000 000.00 will go to previously disadvantaged persons
How many permanent new employment opportunities will be created during the operational phase of the activity?	+/- 20
What is the expected current value of the employment opportunities during the first 10 years?	R 10 Million
What percentage of this will accrue to previously disadvantaged individuals?	Minimum 60% of R45 000 000.00 will go to previously disadvantaged persons

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report. **- PLEASE SEE APPENDIX A – Sensitivity Maps, for such maps.**

- a) **Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)**

Systematic Biodiversity Planning Category	If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
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Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	<p>The project area falls within both CBA, ESA, ONA and NNR regions, as it passes across numerous landscapes.</p> <p>The CBA has a recommended land use management involving maintaining the biodiversity in a natural state. The objective is to rehabilitate degraded areas to a natural or near natural state and to manage to the area so as to ensure no further degradation.</p> <p>CBA regions coincide with the occurrence of rivers and wetlands, and as such would require to be managed through the water use licencing application process.</p>

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	0%	None of this type of habitat was observed on site.
Near Natural (includes areas with low to moderate level of alien invasive plants)	5%	In proportion, this area is a small percentage of the total project footprint.
Degraded (includes areas heavily invaded by alien plants)	5%	The road reserve has been heavily invaded by <i>Pennisetum cetaceum</i> (fountain grass) and shows very little diversity and abundance of native flora, with little ecological value currently.
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	90%	The majority of the project area falls between agricultural or mining activity, with the remainder consisting of game farms or private nature reserves. However, the upgrade project will only make use of the existing road reserve, and as such none of these other land uses will be impacted on. The road reserve have been heavily impacted by the maintenance mowing of the reserve, as is normal for SANRAL roads, and the current contribution to ecological functioning and

BASIC ASSESSMENT REPORT

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems								
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	<i>Critical</i>	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline			
	<i>Endangered</i>									
	<i>Vulnerable</i>									
	Least Threatened	YES	NO	UNSURE	YES	NO	YES	NO		

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- d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

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According to SANBI (Mucina and Rutherford, 2012) the vegetation types found in the area include Dwaalboom Thornveld, surrounded by Waterberg Mountain Bushveld (Figure A6 – Appendix A) (Both are part of the Savanna Biome). The grasses along the route affect the visibility of some road signs and functionality of the culverts between maintenance actions, which may affect the road safety. For this reason maintenance clearing of the entire road verge is currently practiced.

The Savanna Biome is South Africa's largest biome occurring in over 46% of the country, primarily in the lowveld and Kalahari areas (Plantzafrica 2017). The biome is characterised by a grassy ground layer, composed of mainly C-4 type grasses (where the growing season is hot – such as in the north of the country), to a lesser extent C-3 grasses (where growing seasons are colder – such as along the eastern coastline) (Plantzafrica 2017). The shrub-tree layer vary from 1 to 20 m in height. Overgrazed areas often exhibit a larger tree canopy and cover, due to skewed competition interactions prevalent (Plantzafrica 2017). The different vegetation types are summarised below. Their respective vegetation type conservation classification is also shown in Table 9.1 below.

Table 9.1. Mucina & Rutherford (2012) conservation classification for the project region vegetation types.

Project Area vegetation type	Mucina & Rutherford (2012) conservation status
Dwaalboom Thornveld	Least Threatened
Waterberg Mountain Bushveld	Least Threatened

Dwaalboom Thornveld

Distribution:

The distribution of this vegetation type is predominantly the Limpopo and North-West Provinces, between the Dwaalboom ridges and west of the Crocodile River, as well as north of the Pilaansberg to the Northam area (Mucina & Rutherford 2012). This vegetation is found on either side of the road reserve and is thus the vegetation type that will be impacted by the road upgrade activities.

Vegetation and Landscape Features:

Dwaalboom Thornveld can be found mostly on plains, and is characterised by scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species, as well as a virtually closed herbaceous under layer, composed of grass species (Mucina & Rutherford 2012). *Acacia tortilis* and *A. nilotica* are prominent on medium clayey soils.

High clay content in this vegetation type may exclude certain wood species. On the sandy clay loam soils, *A. erubescens* is the most dominant tree species (Mucina & Rutherford 2012). Soil type variances across the vegetation types create landscape scale patches of alternating vegetation dominance.

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Geology and Soils:

Dwaalboom Thornveld grows well on vertic, black, ultramafic clays produced from norite and gabbro, often along small streams. Land types under which this type grows is mainly 'Ea' and 'Ae' soil types (Mucina & Rutherford 2012).

Conservation:

This vegetation types is considered **AS LEAST THREATENED**, with a conservation target of 19% in 2006, with 6% statutorily conserved (in the Madikwe Game Reserve), with a further 14% transformed by primarily agriculture. Dwaalboom Thornveld is primarily used for extensive cattle grazing (Mucina & Rutherford 2012), though contemporary land use includes game farming.

Waterberg Mountains Bushveld

Distribution

The Waterberg Mountains Bushveld is distributed in and around the Waterberg mountains, including the foothills, escarpment and tablelands of the southern Lephale region (Mucina & Rutherford 2012). Further afield near Thabazimbi and Boshofsberge have also been found to display this vegetation type. This vegetation type occurs adjacent to the road verge nearer Thabazimbi.

Vegetation and Landscape Features

The Waterberg Mountains Bushveld is found on rugged mountains with vegetation gradings ranging from high slopes to rocky-mid and foot slope Savanna in the low-lying areas or deeper sands of the plateaus. Grass layers in this vegetation type are moderately well developed, to well developed (Mucina & Rutherford 2012).

Geology and Soils

The Waterberg Mountains Bushveld grows predominantly on sandstone, subordinate conglomerate or siltstone and shale. Soil preferences are dystrophic, acidic sandy, loamy to gravelly soil (Mucina & Rutherford 2012).

Conservation

The conservation status of this vegetation type is considered **AS LEAST THREATENED**, with a target of 19%, of which 6% is conserved in the Marakele National Park and 4% transformed by agriculture (Mucina & Rutherford 2012).

Vegetation Summary

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Of the two vegetation units mentioned above, the Dwaalboom Thornveld vegetation type is regarded as the less sensitive of the two. This type has a lowered conservation priority status, combined with fairly large areas already statutorily conserved. The Waterberg Mountains Bushveld is regarded as having a higher conservation value, due the greater sensitivity of the species contained therein and the greater species diversity and abundance as per Mucina and Rutherford (2012). , From the above indicators, vegetation concerns for this project type may be limited due to the relative widespread distribution of these vegetation types and the amount of already conserved sections. However, development within this vegetation type should aim to reduce and limit impact and to protect biodiversity, as best practice.

BASIC ASSESSMENT REPORT

SECTION C: PUBLIC PARTICIPATION

Commented [GR1]: This whole section to be revised once done

1. ADVERTISEMENT AND NOTICE

Interested and Affected Parties (I&APs) play an important role in the BA process, as many of their concerns and issues can be included in the project proposal, to ensure a development which is as environmentally and socially acceptable as possible. There are four key steps in the PPP to ensure that I&APs are informed of the proposed development and afforded sufficient opportunity to raise comments and or concerns. These include:

- a. Identifying potential I&APs;
- b. Notifying I&APs through:
 - i. Advertisement and site notices;
 - ii. Written notices;
 - iii. Public meeting;
- c. Making provision for I&APs to review and comment on all draft reports before they are finalised and submitted to the competent authority; and
- d. Compiling a record of responses to any comments and concerns provided by the I&APs and including and addressing these concerns in final reports.

Publication name		
Date published		
Site notice position	Latitude	Longitude
Date placed		

Commented [GR2]: Insert details once done

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

Please find proof of advertisements in Appendix E1.

Commented [GR3]: Complete Appendix E

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Initial PPP and BID circulation

The public participation process to date included:

- Erecting two site notices on-site (see Section C (1) above);
- Identifying property owners and sending notifications of the proposed project to such land owners via email or mail (whichever most appropriate). A database comprising of all the relevant interested persons/ organisation was compiled together with their contact details to inform them of the initiation of the project;
- One regional and one local newspaper advertisements were placed (see Section C (1) above);
- Distribution of Background Information Documents and Notification letters to I&APs in English on 5 July 2016.

A copy of the comments and responses report is included in Appendix E including all comments received to date along with responses from the EAP and applicant.

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DBAR

This Draft Basic Assessment Report (DBAR) was circulated for a 30-day comment period from **19 September 2016 – 20 October 2016** to allow all I&APs to comment. The report was made available as follows:

1. Placement of hard copies of the DBAR at the Caledon Public Library (26 Church Street, Caledon, 7230) and the Riviersonderend Public Library (Buitekant Street, Riviersonderend, 7250).
2. Hard/ electronic copies were circulated to organs of state to request comments.
3. Electronic copies were available from the link: <http://www.cesnet.co.za/public-documents.html> (under the SANRAL Caledon section).

A public meeting will also be held at the **Caledon Public Library (26 Church Street, Caledon, 7230) on 6 October 2016**, during the review period of the DBAR in order to provide feedback regarding the findings of the study. All identified I&APs will be invited to attend.

DEA Decision

All registered I&APs will be informed through written notification of the DEA decision within 14 days from the date of the notification.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Please see the I&AP database included in Appendix E.		

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
No issues have been raised to date. All issues received during the public review period will be captured and recorded within the Comments and Response Report attached as Appendix E, for inclusion into the final BAR.	

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

Please see Appendix E3. All comments received during the DBAR review period will be captured and responded to before submission of the final BAR to DEA for decision-making. A copy of the CRR

BASIC ASSESSMENT REPORT

will be circulated to all I&APs that provided comments. **All comments to date have been captured in this report (Section 3 above).**

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

All authorities identified and recorded in the I&AP database were notified of the availability of the DBAR and requested to provide comments.

Please see Appendix E for proof of notification to Authorities and for a copy of the I&AP database.

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
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Please refer to Appendix E for the contact details of all I&AP's involved in the project.

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Please see Appendix E5 for the I&AP database.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

All correspondence relating to the project have been included in Appendix E6

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

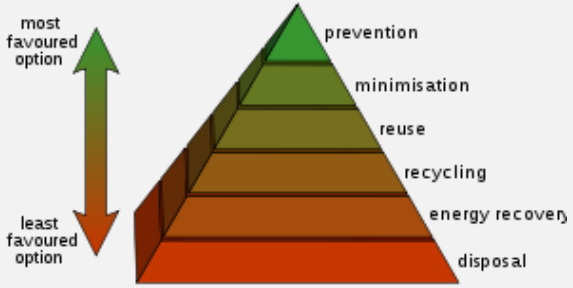
BASIC ASSESSMENT REPORT

Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
Alternative 1 (preferred alternative)				
DESIGN PHASE				
Activities associated with the design and pre construction phase pertains mostly to planning and design around the proposed development, and is done at a desktop level. In some cases site visits need to take place but the impact of these visits is negligible, if any, e.g. photographs, GPS point's etc. There are thus no Planning and Design Phase impact anticipated for this development.				
CONSTRUCTION PHASE				
General impacts				
Stormwater Management During construction, inappropriate road design will have an impact on stormwater conditions	Direct impacts: <i>Contaminants such as silt, sand and litter could be transported offsite via surface runoff and contaminate the surrounding environment.</i>	HIGH-	LOW -	<ul style="list-style-type: none"> • The site must be managed in a manner that prevents pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. • Temporary cut-off drains and berms may be required to capture storm water and promote infiltration. • The area must be monitored by an ECO on a regular basis.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Waste storage (General) During construction, the failure to plan for waste storage will have an impact on the environment	Direct impacts: <i>Construction rubble left onsite may attract vermin and encourage the growth of opportunistic alien vegetation.</i>	LOW -	LOW -	<ul style="list-style-type: none"> • Construction rubble should be disposed of in predetermined, demarcate, licenced spoil dump on a regular basis, where not possible to find a use for, as per the waste management hierarchy. • Design and implement a waste management plan. • Ensure sufficient waste disposal services are engaged for the duration of the construction phase; • Incorporate penalties and fines are imposed on contractors regarding undue litter and waste into the EMP • Provide sufficient bins at regular intervals throughout the

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>construction region and camp;</p> <ul style="list-style-type: none"> • Implement a recycling programme and employ as few plastics as feasible in the construction camp and activities; • Contractors must employ the waste management hierarchy when considering disposal of waste. In other words, contractors must ideally prevent waste production. Where not possible to prevent, contractors should minimise waste production as far as possible. Waste produced despite minimisation efforts then must be reused rather than recycled or disposed of. Recycling should then occur with the remainder of the waste, or if not possible to recycle, waste must be used for energy recovery. This may involve selling waste to third part recovery organisations. Should this not be possible, disposal is regarded as the final waste management option. The diagram below graphically illustrates how contractors and the proponent must approach construction waste. <p>Nuisance measures</p> <ul style="list-style-type: none"> • Wetting of exposed soil should be conducted to reduce dust produced during construction; • Regular collection of waste (daily from stop and go's, weekly from collection points) are to be conducted to reduce odours.

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				 <p>The diagram illustrates the waste management hierarchy as a pyramid with six levels. From top to bottom, the levels are: prevention, minimisation, reuse, recycling, energy recovery, and disposal. To the left of the pyramid is a vertical double-headed arrow. The top half of the arrow is green and points upwards, labeled 'most favoured option'. The bottom half is orange and points downwards, labeled 'least favoured option'.</p> <ul style="list-style-type: none"> • The waste management hierarchy (reduction, re-use and recycling of waste) must be implemented to ensure that the disposal of waste should only be considered as a last resort. • Any waste that cannot be re-used or recycled, must be disposed of at a licensed waste disposal facility. • Temporary stockpiles of inert material such as cut soil and builders' rubble must be stockpiled at designated storage facilities until this waste can be used elsewhere or taken to an authorised waste disposal facility. • General waste or domestic waste generated at the construction camp(s) that will be established at designated areas, will be temporarily stored until it is removed at regular intervals and disposed of. • The storage of general waste in excess of 100m³ and/ or the storage of hazardous waste in excess of 80m³, excluding the storage of waste in lagoons or the temporary storage (i.e. less than 90 days) of such waste, is not

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>permitted. Rather, the removal and disposal of such waste must be conducted prior to 80 days of storage lapsing.</p> <ul style="list-style-type: none"> No waste is allowed to be temporarily stored on site for longer than 80 days, including earth stock piled material. <p>Waste storage</p> <ul style="list-style-type: none"> General domestic waste should be stored in leak-proof containers that must be regularly emptied at least once a week to ensure that odour and vector nuisances are prevented. If wind, baboons or other scavengers can cause the spread of litter from these containers, the containers must be covered with tamper-proof devices.
	<p>Indirect impacts : Ongoing litter impacts from current use of highway will be reduced through cleaning operations by staff.</p>	LOW +	-	<ul style="list-style-type: none"> Introduce a litter clearance programme where litter is collected at the end of each working day within the immediate vicinity of all construction work for that day.
	<p>Indirect impacts : Stop and go areas will be prone to increased litter as motorists congregate there, unless specific attention to clean-up is provided.</p>	LOW -	LOW -	<ul style="list-style-type: none"> Ensure sufficient waste management is available at each stop and go to reduce and limit litter discarded at stop and go site. Ensure litter collection focusses on stop and go zones, for collection each day.
<p>Dust generation During construction, dust generated by clearing and grubbing,</p>	<p>Direct impacts: Dust impacts associated with the construction phase impacting local communities and agricultural activities</p>	MODERATE -	LOW -	<ul style="list-style-type: none"> Dust control methods must be employed during clearing and construction, using appropriate techniques such as: sprinkling, vegetation cover, calcium chloride coverings, adhesives, cyclone or filter collectors, mulch, wind breaks, tillage and stones or debris.

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
earthworks and use of temporary access roads will impair breathing for locally located fauna, as well as inhibit photosynthesis and respiration of plants under high concentration.				<ul style="list-style-type: none"> Limit vegetation clearing to areas only where and when necessary. Limit clearing and grubbing activities to days with low wind speeds; Limit vehicle speeds on-site; Encourage use of paved routes as alternatives to unpaved roads Dust generated from all activities related to the improvement of the N2 road sections must comply with the National Dust Control Regulations (GN No. R. 827) of 1 November 2013, promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).
	<i>Indirect impacts:</i> None	-	-	
	<i>Cumulative impacts:</i> None	-	-	
Elevated noise levels During construction, activities will increase local noise levels and have an impact on existing residential and business areas	Direct impacts: <i>Machinery, construction activities and staff all contribute to elevated noise levels during the construction phase</i>	LOW -	LOW -	<ul style="list-style-type: none"> Noise control methods shall be employed where possible. These may include: <ul style="list-style-type: none"> Selecting quieter equipment where feasible; Maintaining all equipment in good working order; Retro-fit selected equipment with dampening measures; Erect barriers around the construction camp or work areas; Provide all labourers with the appropriate PPE during work hours; Employ improved technology where volume gains can be achieved;

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<ul style="list-style-type: none"> Construction activity close to residential and business areas, which includes the movement of construction vehicles, should be restricted to normal working hours or daylight working hours, unless approval is obtained from the community to work later. Noise generated during construction activities must comply with the national and provincial noise control regulations.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Hazardous spillage During construction, hazardous waste that is generated, such as used bitumen, oils and offcuts could pollute surface and groundwater resources if it is not contained properly.	Direct impacts: <i>Substances used for construction may pollute soil should spillages or containment problems occur.</i>	MODERATE -	LOW -	<ul style="list-style-type: none"> Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practise must be adhered to. This applies to solvents and other chemicals possibly used during the construction process. Contaminated soil must either be excavated or treated on-site, depending on the nature and extent of the spill. The ECO must determine the precise method of treatment of polluted soil. This could involve the application of soil absorbent materials or oil-digestive powders to the contaminated soil. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in suitable containers until appropriate disposal.
	Indirect impacts: <i>A reduction in water quality as pollutants from current vehicle use is washed into rivers during rainfall events. This impact can only be mitigated during the construction phase, and is unavoidable during the operational phase.</i>	MODERATE-	LOW --	

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
	Cumulative impacts: None	-	-	
Light pollution During construction, vehicles, camps and signage will increase light levels in and around the construction region. Should elevated levels occur for prolonged periods permanent relocation of certain faunal communities may occur.	Direct impacts: <i>Construction crew, vehicles, construction camps will increase light in an around the construction area temporarily during the construction phase.</i>	LOW -	LOW -	<ul style="list-style-type: none"> Use lights only where and when required; If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs), which do not attract insects and which should be directed downwards.
	Indirect impacts: <i>Faunal disturbance from increased light associated with construction activities.</i>	LOW -	LOW -	
	Cumulative impacts: None	-	-	
Sedimentation associated with earthworks During construction, upgrading of the road as well as the bridges and culverts may cause increase levels of sedimentation and pollution into them.	Direct impacts: <i>Poor erosion control and earthworks management will result in increased runoff and siltation in adjacent streams and rivers</i>	HIGH -	MODERATE -	<ul style="list-style-type: none"> Develop a stormwater management plan to ensure compliance with regulations and prevent off-site migration of contaminated stormwater and sediment. The road engineer must ensure that appropriate stormwater structures are included in the road design to manage stormwater and to minimise erosion and sedimentation of watercourses. The road engineer must ensure that all road sections situated on slopes incorporate stormwater diversion. The road engineer must ensure that all stormwater structures are designed in line with both SANRAL and DWS requirements. Appropriate stormwater structures must be designed and implemented. All road sections situated on slopes must incorporate

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				stormwater diversions. <ul style="list-style-type: none"> Attention shall be given to the effect of the road widening on drainage, including the flow of stormwater to the railway line of Transnet Freight Rail. No storm-water will be allowed to discharge onto Transnet Freight Rail land. If storm-water is diverted to cross under the railway line through existing culverts, detailed calculations for a 1 in 50 year flood must be submitted for approval to Transnet to ascertain whether the culverts can manage the increased flow of storm-water.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Social 1. During construction, temporary and medium term employment will be created.	Direct impacts: <i>Employment will be created during construction.</i>	LOW +	-	<ul style="list-style-type: none"> Recruit local labour as far as possible; Provide skills training schemes in order to upskill staff; Provide career counselling services, to assist with CV and job profile creation for appropriate employees as far as possible.
	Indirect impacts: <i>The local economy will be stimulated through the influx of workers for the project, as well as the increase of income for those working on the project, who are thus able to spend locally to a greater degree than before.</i>	LOW +	-	
	Cumulative impacts: None	-	-	
Social 2. During construction local safety and security	Direct impacts: <i>The influx of workers and new, temporary residents generally coincide with an</i>	LOW -	LOW -	<ul style="list-style-type: none"> No open fires are to be allowed on site; Designated smoking areas are to be demarcated for construction workers; Members of the construction team should be easily

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
conditions may be affected.	<i>increase in local levels of crime. An increase in fire risk also falls within this category.</i>			identifiable (through the use of uniforms or name badges) <ul style="list-style-type: none"> No firearms, alcohol, drugs or trade should be allowed on site; Fines should be given for not adhering to rules and regulations in terms of conduct and safety. Residents should be informed of the construction activities and schedules prior to the construction workforce entering the property. Fence and access control to the construction camp site.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Traffic impacts During construction, an increase in construction vehicles will impact the flow of traffic.	Direct impacts: <i>An increase in construction vehicles, traveling at low speeds, as well as stop-and-go functions and reduced lanes will result in significant road obstructions over the construction period.</i>	MODERATE -	LOW -	<ul style="list-style-type: none"> Ensure optimal traffic management systems in place during construction Reduce traffic impedance to as little as possible Ensure all road safety signage has been placed at the correct areas A Traffic Management Plan (TMP) must be implemented during Project construction. Specific elements of the TMP could include the use of flaggers and temporary lane realignments to maintain through traffic, Concrete barriers, signage to direct traffic movements, and possible reduction of speed limits in construction zones. The contractor should contact local emergency service providers prior to the start of construction to ensure construction activities would not impede provision of emergency services within the Project area during the construction period.

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<ul style="list-style-type: none"> • Signs must be kept clean and well maintained if they are to be effective. • Press and radio releases are often a valuable means of warning drivers of what to expect at a site, thus minimising impatient and dangerous behaviour. • Workers who control traffic must be properly trained. • Traffic controllers must know where to stand, how to slow or stop traffic, and how to coordinate public and construction traffic movements. • Controllers should use two-way radio communication when visual contact between traffic controllers is not possible. Where the site is suitable and they are available, arrangements should be made to use temporary traffic signals to control traffic. • Traffic controllers and general road workers should wear suitable conspicuous clothing to ensure that they can be seen by motorists • Unnecessary traffic control signs or road markings must be removed as they tend to confuse motorists and make them careless. • Where vehicles are held up in queues, a worker might be appointed to talk with motorists, apologise for delays, estimate the length of the delay, and generally keep people informed. • Speed limits should be consistent with safe site operations and traffic movements. Compliance with reasonable speed limits will then be more likely - If motorists perceive a speed limit to be unrealistic, they are likely to disregard it. • A variety of devices and technology can provide information

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>to motorists, including brighter, bigger electronic signs. These must be employed where reasonable.</p> <ul style="list-style-type: none"> • A systematic preventative maintenance programme should be established for all trucks, plant, and vehicles. • All access points leading to the area where construction blasting works are carried out must be manned to prevent entry during blasting. • Managers should ensure that new employees are prepared to work in all types of traffic - They should feel comfortable using flagmen - workers who use flags to signal drivers and warn them that they're approaching a work site -and have enough road sense to never turn their back to oncoming traffic. • New workers should be taught how to manoeuvre around massive pieces of equipment and to safeguard a site for optimal security • Use protective equipment and personal protective gear (such as hard hats and steel-toed shoes). • Reflective clothing is also crucial, especially for night shift work. • Noise levels should be monitored at all times to prevent hearing loss - it is suggested that workers wear earmuffs or earplugs to shield their eardrums from high decibels.
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-
Heritage Impacts				

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
During construction.....impacts to possible Historical Period structures at Site EXIGO-R510UG-HP01	Direct impacts: Impacts could involve displacement or destruction of structures or features in the proposed project area.	MODERATE -	LOW -	<ul style="list-style-type: none"> The construction site must be monitored by a qualified ECO during construction.
	Indirect impacts: None	-	-	
	Cumulative impacts: None	-	-	
During construction, impacts to a burial site (Site EXIGO-R510UG-BP01)	Direct impacts: Impacts could involve displacement or destruction of burials in proximity the project area.	HIGH -	LOW -	<ul style="list-style-type: none"> Implement a heritage conservation buffer of at least 50m around the cemetery; if necessary redesign the road upgrade alignment to avoid the heritage resource and the proposed conservation buffer. Fence the burial site and apply access control. Implement a site management plan detailing strict site management conservation measures. Strict site monitoring by ECO: Regular examination of trenches and excavations in this area are required in order to avoid the destruction of previously undetected burials or heritage remains must be conducted by the ESO, or a designated person reporting to the site engineer. Grave relocation is required where impact unavoidable.
	Indirect impacts: None	-	-	
	Cumulative impacts: None	-	-	
General heritage management on site	Direct impacts: Aim: prevent unnecessary disturbance and/or destruction of previously undetected heritage receptors.	N/A	N/A	<ul style="list-style-type: none"> Any fossil remains such as fossil fish, reptiles or petrified wood exposed during construction should be carefully safeguarded and the relevant heritage resources authority (Limpopo-PHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist. The sites are located in proximity of the project area (>50m)

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>and it is recommended that the sites and any activities in its surrounds be monitored in order to avoid the destruction of previously undetected heritage remains.</p> <ul style="list-style-type: none"> • The necessary destruction permits should be obtained from the relevant Heritage Resources Authorities prior to the possible destruction of the features. • A cemetery identified within close proximity of the road upgrade alignments - a 50m conservation buffer for all burials must be maintained. • In addition, it is recommended that the cemetery be fenced off and that access control be applied during all phases of construction. • The developer should carefully liaise with the heritage specialist and SAHRA with regards to the management and monitoring of any human grave or cemetery in order to detect and manage negative impact on the sites. • Should impact on any human burial prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains • Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. • Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>construction activities, all activities should be suspended and the archaeological specialist should be notified immediately</p> <ul style="list-style-type: none"> • Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development. • If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include: <ul style="list-style-type: none"> ○ Formal Earlier Stone Age stone tools. ○ Formal MSA stone tools. ○ Formal LSA stone tools. ○ Potsherds ○ Iron objects. ○ Beads made from ostrich eggshell and glass. ○ Ash middens and cattle dung deposits and accumulations. ○ Faunal remains. - Human remains/graves. - Stone walling or any sub-surface structures. - Historical glass, tin or ceramics. - Fossils. • If such sites were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by Limpopo-PHRA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required.

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<ul style="list-style-type: none"> Cognisance should also be taken of the following: As Palaeontological remains occur where bedrock has been exposed, all geological outcrops should be regarded as sensitive. Water sources such as drainage lines, fountains and pans would often have attracted human activity in the past. As Stone Age material the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Ecological impacts				
Loss of least threatened and vulnerable vegetation During construction, clearing and grubbing, earthworks and vehicle movement will remove vegetation within the project area.	Direct impacts: <i>Clearing of vegetation for road widening will induce loss of sensitive vegetation.</i>	MODERATE -	LOW -	<ul style="list-style-type: none"> An Environmental Control Officer (ECO) must be appointed to oversee construction activities; Construction activities must be limited to the absolute necessary only in areas where fynbos vegetation is found.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Loss of habitat During construction, the loss of vegetation coincides with the loss of faunal habitat, reducing	Direct impacts: <i>Clearing of vegetation and associated earthworks will result in habitat loss</i>	LOW -	LOW -	<ul style="list-style-type: none"> Vegetation clearance and aquatic habitats must be avoided as far as possible; Should avoidance be impractical, impact to natural vegetation shall be minimised as far as possible. Employ brush cutting rather than ploughing, hoeing or herbicide for fire breaks.

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
breeding and rearing locales. Endangered or rare faunal populations may permanently disappear or diminish in size				<ul style="list-style-type: none"> Prune indigenous tree species using loppers or saws where they pose safety threats. If their presence compromises safety mandates entirely, fell and stump treat with appropriate herbicide;
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-
Loss of soil fertility During construction, loss of clay and humid fractions in topsoil from erosion during construction will alter the soil fertility potential within the region.	Direct impacts: <i>Increased soil erosion and loss of agricultural land (from land acquisitions into broader road reserve) will reduce soil fertility and yield potential</i>	MODERATE -	LOW -	<ul style="list-style-type: none"> Vegetation clearance and aquatic habitats must be avoided as far as possible; Should avoidance be impractical, impact to the natural environment shall be minimised as far as possible. Employ brush cutting rather than ploughing, hoeing or herbicide for fire breaks. Prune indigenous tree species using loppers or saws where they pose safety threats. If their presence compromises safety mandates entirely, fell and stump treat with appropriate herbicide;
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-
Encroachment and establishment of alien vegetation During construction, invasive alien species are known to colonise and establish in recently disturbed areas, due to the lessened competition and changed conditions.	Direct impacts: <i>Disturbance from construction activities will result in an increase in invasive species along the roadside</i>	HIGH -	MODERATE -	<ul style="list-style-type: none"> A Rehabilitation and Alien Management Plan must be developed and implemented during the construction phase to reduce the establishment and spread of undesirable alien plant species. Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting, etc. This must be done under the supervision of the ECO.
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
<p>Earthworks inevitably lead to an increase in invasive alien species, which reduced biodiversity and ecological functions.</p>				
<p>Soil erosion and increase in erosion potential</p> <p>During construction, topsoil loss from soil erosion during earthworks will result from construction activities.</p>	<p>Direct impacts: <i>Clearing activities will result in exposed soil, thereby increasing erosion potential throughout construction phase.</i></p> <p>Indirect impacts: <i>Decline in water quality from siltation of rivers.</i></p>	<p>HIGH -</p>	<p>MODERATE -</p>	<ul style="list-style-type: none"> • Ensure that appropriate stormwater structures are designed prior to construction and implemented during construction; • Ensure that all road sections situated on slopes incorporate stormwater diversion; • Ensure that all stormwater structures are designed in line with both SANRAL and DWS requirements; • All the relevant permits must be obtained from DWS prior to commencement of any activities onsite; this includes areas within 50m of a river/stream and areas within 500m of a wetland; • Develop and implement an Erosion Action Plan that aims to monitor and respond to erosion events. • Rehabilitate disturbed areas as soon as possible after construction; • Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance; • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and vegetation techniques; • All cleared areas (not used for the development footprint) should be vegetated with indigenous perennial shrubs and grasses from the local area as soon as possible.
		<p>LOW -</p>	<p>LOW -</p>	

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<ul style="list-style-type: none"> Natural vegetation (scrubs & trees) that was remove onsite may be uses as soil stabilizer by placing them on cleared areas if natural recovery is slow. Attention shall be given to the effect of the road widening on drainage, including the flow of stormwater to the railway line of Transnet Freight Rail. No storm-water will be allowed to discharge onto Transnet Freight Rail land. If storm-water is diverted to cross under the railway line through existing culverts, detailed calculations for a 1 in 50 year flood must be submitted for approval to Transnet to ascertain whether the culverts can manage the increased flow of storm-water.
	Cumulative impacts: None	-	-	-
Animal fatalities During construction, vehicles, crew and materials may increase animal fatalities through opportunistic hunting, collisions, accidents or baiting and trapping.	Direct impacts: <i>Interactions between construction staff, vehicle movement and laydown areas may cause animal deaths.</i>	MODERATE -	LOW -	<ul style="list-style-type: none"> Train all staff on site regarding the proper management and response should animals be encountered; Search and clear the construction region prior to work commencing, relocating animals where found; No animal shall be killed or hurt where possible; No hunting, baiting or trapping shall be allowed;
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Disturbance of local fauna During construction, vibration, noise, smell, physical disturbance and habitat alteration from	Direct impacts: <i>Construction vehicles, crew, noise, vegetation clearing and light contribute to disturbance of fauna near the construction region.</i>	LOW -	LOW -	<ul style="list-style-type: none"> Limit traffic speed on-site; Search and clear construction area prior to work commencing, relocating animals where necessary.
	Indirect impacts: None	-	-	-

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
the presence of construction vehicles and crew will disturb local fauna.	Cumulative impacts: None	-	-	-
<p>Poor rehabilitation of moderate and high sensitive areas</p> <p>During construction, poor rehabilitation of sensitive vegetation may lead to the permanent loss of these ecosystems as well as allow invading alien vegetation species to expand.</p> <p>The removal of existing natural vegetation creates conditions that favour the establishment of undesirable species in the area that are typically very difficult to eradicate and may pose a threat to neighbouring ecosystems.</p>	<p>Direct impacts: <i>Poor rehabilitation may result from bad planning or implementation, leading to ecological harm.</i></p>	MODERATE -	LOW -	<ul style="list-style-type: none"> Construction activities must be limited to the designated footprint of the road upgrade route i.e. construction materials, vehicular storage, construction camps etc., should occur in an area that has already been disturbed or of low sensitivity and is at least 50m (but preferably 100m) from a watercourse. The surveyed construction footprint must be approved by an ECO to ensure that natural vegetation is not unnecessarily damaged. Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and re-vegetation must be undertaken. A Rehabilitation and Alien Management Plan must be developed and implemented during the construction phase to reduce the establishment and spread of undesirable alien plant species. Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting, etc. This must be done under the supervision of the ECO.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Loss of animal SCC	Direct impacts:	LOW -	LOW -	<ul style="list-style-type: none"> The development area must be surveyed prior to topsoil

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
During construction, upgrading of the road section may result in the permanent loss of unidentified animal SCC, especially around the river and drainage line crossings.	<i>Habitat loss, disturbance and direct mortality may cause the loss of animal SCC in the study area.</i>			removal in order to locate and capture any animal SCC and relocate them. <ul style="list-style-type: none"> • Provide training for construction workers on the contents of the EMPr; • The contractor's workers must not poach or trap wild animals.
	Indirect impacts: <i>Chain impacts from trophic levels may induce loss of even further species beyond the SCC themselves.</i>	LOW -	LOW -	
	Cumulative impacts: None	-	-	
Loss of plant SCC During construction, activities may permanently damage or remove plant SCC species present on site.	Direct impacts: <i>Clearing of vegetation may results in the loss of plant SCC.</i>	MODERATE -	LOW -	<ul style="list-style-type: none"> • The road upgrade route must be surveyed prior to topsoil removal in order to locate plant SCC and transplant them into the neighbouring undeveloped environment. • There should be minimal disturbance to sensitive vegetation areas as successful vegetation recovery will depend on the remaining vegetation. • Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and re-vegetation must be undertaken as soon as possible;
	Indirect impacts: None	-	-	
	Cumulative impacts: None	-	-	
Aquatic impacts				
General Aquatic	Direct impacts: General measures for the management of aquatic impacts during the construction phase	N/A	N/A	<ul style="list-style-type: none"> • Any invasive alien plants occurring within the road reserve should be monitored and removed on an ongoing basis according to methods as provided by the Working for Water Programme. • Construction within the river and wetland channels should as far as possible take place during the drier months of the year. This is of particular importance where the schedule of

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>work over the three year period should be planned to avoid critical construction work during high flow events.</p> <ul style="list-style-type: none"> • Once construction is complete, the disturbed areas should be rehabilitated to resemble that of the surrounding bed and banks and where necessary vegetated with suitable local indigenous plants as occur at the site. • Rubble and debris from existing structures and construction activities should be removed after construction is complete so as not to impede flow in the rivers and wetlands. • Sufficient precaution should be applied to prevent erosion of the road embankment during high flow events in the Bierspruit. • The channel upstream of the crossings should be kept free of debris and sediment build-up, particularly at the culvert where it might impede flows. • The culvert structures should also be inspected and maintained regularly to proactively address blockages and erosion within the river channels. • The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7. • The disturbed areas will need to be monitored and managed for a period of at least 3 years post construction to ensure that alien plants do not invade these areas. • The new culvert structures should not be placed higher than the base level of the stream channel to ensure that low flows are not impeded. • The road between km 18.9 and 19.4 is in very close proximity of the river. The road expansion should preferably

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>not take place in a westerly direction in this section of the road.</p> <ul style="list-style-type: none"> The size of culverts should not be reduced. Work within the river and wetland channels or wetland areas should be limited as far as possible and the disturbed areas rehabilitated immediately afterwards.
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-
Aquatic habitat modification or loss - Limited disturbance of freshwater related habitats at the road crossing sites and near borrow areas	Direct impacts:	LOW -	LOW -	<ul style="list-style-type: none"> Work within the river channels or wetland areas should be limited as far as possible and the disturbed areas rehabilitated immediately afterwards. Construction within the river channels should as far as possible take place during the drier months of the year. Once construction is complete, the area should be rehabilitated to resemble that of the surrounding bed and banks and where necessary vegetated with suitable local indigenous plants as occur at the sites (sweet thorn <i>Vachellia karroo</i>, <i>Ziziphus mucronata</i> and common reeds <i>Phragmites australis</i>, mat sedge <i>Cyperus textilis</i> and other sedges and rushes within the instream habitat). Any invasive alien plants or waste material within the river channels at the river crossings should be removed from the channels. The widening of the road along the Crocodile River should take place in an easterly direction away from the river at the junction between the R511 and R510 roads (between km 28.4 and 28.9). The impact of the proposed road upgrade works can be

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>mitigated as long as the flow into these wetland areas and the drainage out of the wetland areas during higher flow events are not modified. The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7 (between km 26.4 and 27.5).</p> <ul style="list-style-type: none"> • The section of the R510 along the Bierspruit at km mark 19.0 and 19.2 should not be filled in towards the river as it might result in erosion of the road in the future. • In general work within the river / stream channels should be limited as far as possible and the river bed and banks rehabilitated immediately afterwards. Construction within the river channels should preferably take place during the drier months of the year. Disturbed areas should be rehabilitated once construction is complete. • The new culvert structures should not be placed higher than the base level of the stream channel to ensure that low flows are not impeded. The size of culverts should not be reduced. • The disturbed areas will need to be monitored and managed for a period of at least 3 years post construction to ensure that alien plants do not invade these areas. The culvert structures should also be inspected and maintained regularly to proactively address blockages and erosion within the river channels. •
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-
Water Quality Impacts	Direct impacts:	LOW -	Negligible	<ul style="list-style-type: none"> • Contaminated runoff from the construction site(s) should be

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<p>prevented from entering the rivers, tributaries and associated wetland areas.</p> <ul style="list-style-type: none"> • The laydown area and main construction site(s) for the road upgrade should be located away (at least 30m) from the rivers and associated wetland areas. • If the construction site(s) need to be located near the rivers/streams, all materials on the construction site(s) should be properly stored and contained. • Disposal of waste from the site(s) should also be in accordance with a waste management plan or EMP conditions. • Construction workers should be given ablution facilities at the construction works that are located away from the river systems (at least 30m) and regularly serviced. • These measures should be addressed, implemented and monitored in terms of the Environmental Management Plan for the construction phase. • Increased sedimentation or turbidity at each of the construction works within the river channels should be mitigated as far as possible by making use of sandbags, settling ponds or screens to minimise the load of sediment being washed downstream of the works. • Contaminated runoff from the construction site(s) should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained. Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located away from the river (at least 30m) and regularly serviced.

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				These measures should be addressed, implemented and monitored in terms of the EMP for the construction phase. Sediment loads to river from construction activities should be prevented or minimized.
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-
	<i>Direct impacts:</i>			
	<i>Indirect impacts:</i> None	-	-	-
	<i>Cumulative impacts:</i> None	-	-	-
Potential for Erosion	Direct impacts: There is a potential for increased erosion to take place at the river crossings and downstream of the borrow areas as a result of a change in the runoff characteristics, a loss of vegetation cover and physical disturbance of stream banks.	LOW -	Negligible	<ul style="list-style-type: none"> • The widening of the road along the Crocodile River should take place in an easterly direction away from the river at the junction between the R511 and R510 roads (between km 28.4 and 28.9). • The impact of the proposed road upgrade works can be mitigated as long as the flow into these wetland areas and the drainage out of the wetland areas during higher flow events are not modified. The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7 (between km 26.4 and 27.5). • The section of the R510 along the Bierspruit at km mark 19.0 and 19.2 should not be filled in towards the river as it might result in erosion of the road in the future. • The riparian vegetation cover associated with the watercourses should be disturbed as little as possible during the construction phase. Any disturbed areas should be rehabilitated as soon as possible after construction is completed and planted with suitable indigenous plants (sweet thorn <i>Vachellia karroo</i>, <i>Ziziphus mucronata</i> and

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
				<i>Combretum erythrophyllum</i> within the riparian zones and common reeds <i>Phragmites australis</i> , mat sedge <i>Cyperus textilis</i> and other sedges and rushes such as <i>Juncus kraussii</i> within the instream habitat) where necessary. Storm water runoff from the road into the river channels may also need to be mitigated to prevent erosion at the crossings.
	Indirect impacts: None			
	Cumulative impacts: None			
Flow modification	Direct impacts: Temporary and longer term impedance of the flow or a change to the flow characteristics in the rivers at the river crossing sites may occur as a result of construction activities. Longer term maintenance of the river channels at the structures may be required to ensure that no debris blocks the channel at the road crossings.	LOW -	LOW -	<ul style="list-style-type: none"> Activities within the river channels during the construction phase should be limited as far as possible in terms of their spatial and temporal extent. They must be demarcated and construction activities limited to this extent. Construction work within the river channel should preferably take place before the onset of the rainfall period to ensure minimal impact on flow. If flow occurs, flow in the river should be diverted around the construction works. In particular the low flow should not be impeded during construction. Rubble and debris from existing structures and construction activities should be removed after construction is complete so as not to impede flow in the rivers.
	Indirect impacts: None	-	-	-
	Cumulative impacts: Cumulative Impacts	LOW -	LOW -	<ul style="list-style-type: none"> Each site, once completed be rehabilitated. Ongoing monitoring and management of invasive alien plants within the disturbed areas along the road on an annual to twice yearly basis for a period of at least three years is recommended to ensure that the river corridor does not become invaded with alien invasive plants.

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
OPERATIONAL PHASE				
General impacts				
Control of alien plant species	Direct impacts: The lack of an effective alien vegetation management plan may lead to large scale alien plant invasion	MODERATE -	LOW -	<ul style="list-style-type: none"> • Alien plants must be regularly removed from site through appropriate methods such as hand pulling, application of chemicals, cutting, etc. • Development and implementation of a Vegetation Management Plan for all road reserves • Development and implementation of an Alien Vegetation Management Plan for all road reserves
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Increase of road safety	Direct impacts: Improved design and road capacity will improve the road safety for users	LOW +	LOW +	<ul style="list-style-type: none"> • No mitigations required
	Indirect impacts:	-	-	-
	Cumulative impacts: None	-	-	-
Ecological impacts				
Control of alien invasive species	Direct impacts: During the operational phase the lack of an effective alien vegetation management plan may lead to the large scale alien plant invasion.	MODERATE -	LOW -	<ul style="list-style-type: none"> • An Alien Management Plan must be developed and implemented during the operational phase to reduce the establishment and spread of undesirable alien plant species. • Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting etc. as in accordance to the NEMBA: Alien Invasive Species Regulations.
	Indirect impacts:	-	-	-
	Cumulative impacts: None	-	-	-

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
Aquatic impacts				
Aquatic habitat modification or loss	Direct impacts: A small risk of the possible impact on the aquatic habitats of the Bierspruit, Crocodile and Rooikulspruit Rivers, tributaries and associated wetland areas within the study area (see Table 16) can be expected during the construction phase due to the fact that the activities associated with road upgrade will need to take place where the road crosses or is adjacent to the rivers, tributaries or wetland areas. The disturbance of aquatic habitat will also provide an opportunity for invasive alien plants to proliferate in areas which are currently relatively free of invasive alien plants.	LOW -	LOW -	<ul style="list-style-type: none"> Any regrowth of invasive alien plants within the road reserve should be monitored and removed on an ongoing basis. Any signs of erosion within the river channels at the road crossings, particularly as a result of storm water runoff to the watercourse should be identified and addressed as soon as possible. Regular monitoring of the culvert structures should also be undertaken to ensure that they do not become block with sediment and debris but remain open.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Potential for erosion	Direct impacts: There is a potential for increased erosion to take place at the river crossings and downstream of	LOW -	Negligible	<ul style="list-style-type: none"> The widening of the road along the Crocodile River should take place in an easterly direction away from the river at the junction between the R511 and R510 roads (between km 28.4 and 28.9).

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
	the borrow areas as a result of a change in the runoff characteristics, a loss of vegetation cover and physical disturbance of stream banks.			<ul style="list-style-type: none"> The impact of the proposed road upgrade works can be mitigated as long as the flow into these wetland areas and the drainage out of the wetland areas during higher flow events are not modified. The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7 (between km 26.4 and 27.5). The section of the R510 along the Bierspruit at km mark 19.0 and 19.2 should not be filled in towards the river as it might result in erosion of the road in the future. The riparian vegetation cover associated with the watercourses should be disturbed as little as possible during the construction phase. Any disturbed areas should be rehabilitated as soon as possible after construction is completed and planted with suitable indigenous plants (sweet thorn <i>Vachellia karroo</i>, <i>Ziziphus mucronata</i> and <i>Combretum erythrophyllum</i> within the riparian zones and common reeds <i>Phragmites australis</i>, mat sedge <i>Cyperus textilis</i> and other sedges and rushes such as <i>Juncus kraussii</i> within the instream habitat) where necessary. Storm water runoff from the road into the river channels may also need to be mitigated to prevent erosion at the crossings.
	Indirect impacts: None	-	-	-
	Cumulative impacts: None	-	-	-
Flow modification	Direct impacts: A temporary and longer term impedance of the flow or a change to the	LOW -	LOW -	<ul style="list-style-type: none"> In the longer term, the upgraded structures and the box culverts/pipes should not impede the flow and in particular the low flow in the rivers. In particular, the new culvert

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
	flow characteristics in the rivers at the river crossing sites may occur as a result of construction activities. Longer term maintenance of the river channels at the structures may be required to ensure that no debris blocks the channel at the road crossings.			structures should not be placed higher than the base level of the river channels to ensure that low flows are not impeded. <ul style="list-style-type: none"> • In addition, the culvert structures must be placed within the natural drainage line of the rivers. The structures should also not impede the migration of biota. • The channel upstream of the river crossings should be kept free of debris, intrusive growth of invasive alien plants and sediment build-up, particularly at the culverts where it might impede flows.
	Indirect impacts:	-	-	-
	Cumulative impacts: None	-	-	-
Alternative 2				
	Direct impacts:			
	Indirect impacts:			
	Cumulative impacts:			
	Direct impacts:			
	Indirect impacts:			
	Cumulative impacts:			
Alternative 3				
	Direct impacts:			
	Indirect impacts:			

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Activity	Impact summary	Significance Pre-Mitigation	Significance Post-Mitigation	Proposed mitigation
	<i>Cumulative impacts:</i>			
	<i>Direct impacts:</i>			
	<i>Indirect impacts:</i>			
	<i>Cumulative impacts:</i>			
No-go option				
Control of alien invasive species	Direct impacts: During the operational phase the lack of an effective alien vegetation management plan may lead to the large scale alien plant invasion.	MODERATE -	LOW -	<ul style="list-style-type: none"> An Alien Management Plan must be developed and implemented during the operational phase to reduce the establishment and spread of undesirable alien plant species. Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting etc. as in accordance to the NEMBA: Alien Invasive Species Regulations.
	Indirect impacts:	-	-	-
	Cumulative impacts: None	-	-	-

SUMMARY OF SIGNIFICANT IMPACTS (all impacts that are High or Very High pre-mitigation)

The proposed development will result in a number of impacts, both positive and negative, during the Construction and Operation Phases. The following table provides a summary of the pre-mitigation impacts that were ranked as **VERY HIGH NEGATIVE** and **HIGH NEGATIVE**.

IMPACT	SIGNIFICANCE PRE-MITIGATION
Stormwater Management	HIGH -

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IMPACT	SIGNIFICANCE PRE-MITIGATION
Sedimentation associated with earthworks	HIGH -
Impacts to a burial site (Site EXIGO-R510UG-BP01)	HIGH -
Soil erosion and increase in erosion potential	HIGH -

DISTRIBUTION OF IMPACTS

The following table provides a summary of the distribution of impacts in terms of High, Medium and Low significance, pre and post mitigation.

Summary of impact assessment significance, pre- and post-mitigation [(+) = beneficial]

	PRE-MITIGATION				POST-MITIGATION			
	LOW	MODERATE	HIGH	VERY HIGH	LOW	MODERATE	HIGH	VERY HIGH
Construction	16 (3+)	10	5	0	28 (3+)	3	0	0
Operation	3 (1+)	3	0	0	6 (1+)	0	0	0
TOTAL	23	13	5	0	38	3	0	0

As can be seen, no Very High impacts were recorded. High impacts (pre-mitigation) were for the most part able to be lowered to Moderate or Low levels with the implementation of appropriate mitigation measures.

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.

Please see Appendix F for a complete impact assessment.

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2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative A (preferred alternative)

CONSIDERATION OF ALTERNATIVES

Alternative A (preferred alternative)

The following tables indicate the impact categories as determined by the specialists and the EAP after mitigation, and represent the anticipated best-case scenario impacts from this proposed development.

Assessment of the Preferred Option				
	ISSUE	NATURE OF IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE POST-MITIGATION
CONSTRUCTION PHASE	Stormwater Management	Direct	Direct impacts: Contaminants such as silt, sand and litter could be transported offsite via surface runoff and contaminate the surrounding environment.	LOW -
		Direct	Direct impacts: Construction rubble left onsite may attract vermin and encourage the growth of opportunistic alien vegetation.	LOW -
	Waste storage (General)	Indirect	Indirect impacts : Ongoing litter impacts from current use of highway will be reduced through cleaning operations by staff.	LOW -
		Indirect	Indirect impacts : Stop and go areas will be prone to increased litter as motorists congregate there, unless specific attention to clean-up is provided.	LOW -

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	Dust generation	Direct	Direct impacts: Dust impacts associated with the construction phase impacting local communities and agricultural activities	LOW -
	Elevated noise levels	Direct	Direct impacts: Machinery, construction activities and staff all contribute to elevated noise levels during the construction phase	LOW -
	Hazardous spillage	Direct	Direct impacts: Substances used for construction may pollute soil should spillages or containment problems occur.	LOW -
		Indirect	Indirect impacts: A reduction in water quality as pollutants from current vehicle use is washed into rivers during rainfall events. This impact can only be mitigated during the construction phase, and is unavoidable during the operational phase.	LOW -
	Light pollution	Direct	Direct impacts: Construction crew, vehicles, construction camps will increase light in an around the construction area temporarily during the construction phase.	LOW -
		Indirect	Indirect impacts: Faunal disturbance from increased light associated with construction activities.	LOW -

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	Sedimentation associated with earthworks	Direct	Direct impacts: Poor erosion control and earthworks management will result in increased runoff and siltation in adjacent streams and rivers	MODERATE -
	Social	Direct	Direct impacts: The influx of workers and new, temporary residents generally coincide with an increase in local levels of crime. An increase in fire risk also falls within this category.	LOW -
	Traffic impacts	Direct	Direct impacts: An increase in construction vehicles, traveling at low speeds, as well as stop-and-go functions and reduced lanes will result in significant road obstructions over the construction period.	LOW -
	Impacts to possible Historical Period structures at Site EXIGO-R510UG-HP01	Direct	Direct impacts: Impacts could involve displacement or destruction of structures or features in the proposed project area.	LOW -

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	Impacts to a burial site (Site EXIGO-R510UG-BP01)	Direct	Direct impacts: Impacts could involve displacement or destruction of burials in proximity the project area.	LOW -
	Loss of least threatened and vulnerable vegetation	Direct	Direct impacts: Clearing of vegetation for road widening will induce loss of sensitive vegetation.	LOW -
	Loss of habitat	Direct	Direct impacts: Clearing of vegetation and associated earthworks will result in habitat loss	LOW -
	Loss of soil fertility	Direct	Direct impacts: Increased soil erosion and loss of agricultural land (from land acquisitions into broader road reserve) will reduce soil fertility and yield potential	LOW -
	Encroachment and establishment of alien vegetation	Direct	Direct impacts: Disturbance from construction activities will result in an increase in invasive species along the roadside	MODERATE -
	Soil erosion and increase in erosion potential	Direct	Direct impacts: Clearing activities will result in exposed soil, thereby increasing erosion potential throughout construction phase.	MODERATE
		Indirect	Indirect impacts: Decline in water quality from siltation of rivers	LOW -
	Animal fatalities	Direct	Direct impacts:	LOW -

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			Interactions between construction staff, vehicle movement and laydown areas may cause animal deaths	
	Disturbance of local fauna	Direct	Direct impacts: Construction vehicles, crew, noise, vegetation clearing and light contribute to disturbance of fauna near the construction region.	LOW -
	Poor rehabilitation of moderate and high sensitive areas	Direct	Direct impacts: Poor rehabilitation may result from bad planning or implementation, leading to ecological harm.	LOW -
	Loss of animal SCC	Direct	Direct impacts: Habitat loss, disturbance and direct mortality may cause the loss of animal SCC in the study area.	LOW -
		Indirect	Indirect impacts: Chain impacts from trophic levels may induce loss of even further species beyond the SCC themselves.	LOW -
	Loss of plant SCC	Direct	Direct impacts: Clearing of vegetation may results in the loss of plant SCC.	LOW -
	Aquatic habitat modification or loss -	Direct	Direct impacts: Limited disturbance of freshwater related habitats at the road crossing sites and near borrow areas	LOW -
	Water Quality Impacts	Direct	Water Quality Impacts	Negligible
	Potential for Erosion	Direct	Direct impacts: There is a potential for increased erosion to take place at the river crossings and	Negligible

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			downstream of the borrow areas as a result of a change in the runoff characteristics, a loss of vegetation cover and physical disturbance of stream banks.	
	Flow modification	Direct	Direct impacts: Temporary and longer term impedance of the flow or a change to the flow characteristics in the rivers at the river crossing sites may occur as a result of construction activities. Longer term maintenance of the river channels at the structures may be required to ensure that no debris blocks the channel at the road crossings.	LOW -
		Indirect	Cumulative impacts: Cumulative Impacts	LOW -
OPERATIONAL PHASE	Control of alien plant species	Direct	Direct impacts: The lack of an effective alien vegetation management plan may lead to large scale alien plant invasion	LOW -
	Increase of road safety	Direct	Direct impacts: Improved design and road capacity will improve the road safety for users	LOW +

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	Aquatic habitat modification or loss	Direct	Direct impacts: A small risk of the possible impact on the aquatic habitats of the Bierspruit, Crocodile and Rooikuispruit Rivers, tributaries and associated wetland areas within the study area (see Table 16) can be expected during the construction phase due to the fact that the activities associated with road upgrade will need to take place where the road crosses or is adjacent to the rivers, tributaries or wetland areas. The disturbance of aquatic habitat will also provide an opportunity for invasive alien plants to proliferate in areas which are currently relatively free of invasive alien plants.	LOW -
	Potential for erosion	Direct	Direct impacts: There is a potential for increased erosion to take place at the river crossings and downstream of the borrow areas as a result of a change in the runoff characteristics, a loss of vegetation cover and physical disturbance of stream banks.	Negligible
	Flow modification	Direct	Direct impacts: A temporary and longer term impedance of the flow or a change to the flow characteristics in the rivers at the river crossing sites	LOW -

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		may occur as a result of construction activities. Longer term maintenance of the river channels at the structures may be required to ensure that no debris blocks the channel at the road crossings.	
<p>Although there are a greater number of negative impacts, the significance of the positive impacts outweighs the significance of the negative impacts. This is the only reasonable and feasible alternative considered in this application and, considering the result of the impact assessment, this preferred alternative is recommended.</p>			

Alternative B

Alternative C

No-go alternative (compulsory)

A summary of the impact categories for the No-Go Option is presented in the impacts tables in the section above. Please note that no mitigation has been provided for the No-Go Option.

ISSUE & IMPACT	IMPACT SUMMARY	SIGNIFICANCE NO-GO OPTION
Control of alien invasive species	Direct impacts: During the operational phase the lack of an effective alien vegetation management plan may lead to the large scale alien plant invasion.	LOW -

The No-Go Option is represented by the development not proceeding, and current road to persist into the indefinite future. While many of the project-related impacts will thus be absent, the notable societal benefits will also be removed. Additionally, the option of continued agriculture is not without its own impacts, stemming mainly from plant and animal SCC loss through disturbance, mortality and habitat loss, as well as creation of an environment for the proliferation of invasive alien plant species.

While this option still has less impact than the overall project related impacts (regardless of which alternative is selected), the loss of societal benefit makes this the less attractive option, especially in the light of the fact that this project proceeding will not reduce the agricultural potential and capacity already present within the project area. It is the opinion of the EAP that this option is not entered into, and rather the preferred option be implemented.

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SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

Not applicable

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

OPINION OF THE EAP:

The EAP hereby provides the following opinion concerning the proposed upgrade of R510 near Thabazimbi.

It is the opinion of EOH CES that NO FATAL FLAWS are associated with the proposed upgrade of the R510 near Thabazimbi and that all impacts can be adequately mitigated to reduce the risk or significance of impacts to an acceptable level, provided all recommendations contained in the specialist reports and Environmental Management Programme are strictly adhered to.

It is the opinion of EOH CES that the Basic Assessment Report contains sufficient information to allow the competent authority to make an informed decision.

It is the recommendation of the EAP that the SANRAL R510 Thabazimbi project can be considered acceptable from an environmental perspective provided that all mitigations as proposed in this report are implemented correctly. Based on the nature and extent of the proposed project, the potential impacts associated with the proposed project can be mitigated to an acceptable level. As such, it can be authorised for the preferred alternative (alternative 1), provided that all mitigation measures as stated below are strictly adhered to. WULA recommendations must be read in conjunction with this document, but was not available at the time of writing.

Mitigation measures:

CONSTRUCTION PHASE

- The site must be managed in a manner that prevents pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants.
- Temporary cut-off drains and berms may be required to capture storm water and promote infiltration.
- The area must be monitored by an ECO on a regular basis.
- Construction rubble should be disposed of in predetermined, demarcate, licenced spoil dump on a regular basis, where not possible to find a use for, as per the waste management hierarchy.
- Design and implement a waste management plan.
- Ensure sufficient waste disposal services are engaged for the duration of the construction phase;
- Incorporate penalties and fines are imposed on contractors regarding undue litter and

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waste into the EMPr

- Provide sufficient bins at regular intervals throughout the construction region and camp;
- Implement a recycling programme and employ as few plastics as feasible in the construction camp and activities;
- Contractors must employ the waste management hierarchy when considering disposal of waste. In other words, contractors must ideally prevent waste production. Where not possible to prevent, contractors should minimise waste production as far as possible. Waste produced despite minimisation efforts then must be reused rather than recycled or disposed of. Recycling should then occur with the remainder of the waste, or if not possible to recycle, waste must be used for energy recovery. This may involve selling waste to third part recovery organisations. Should this not be possible, disposal is regarded as the final waste management option. The diagram below graphically illustrates how contractors and the proponent must approach construction waste.
- Wetting of exposed soil should be conducted to reduce dust produced during construction;
- Regular collection of waste (daily from stop and go's, weekly from collection points) are to be conducted to reduce odours.
- The waste management hierarchy (reduction, re-use and recycling of waste) must be implemented to ensure that the disposal of waste should only be considered as a last resort.
- Any waste that cannot be re-used or recycled, must be disposed of at a licensed waste disposal facility.
- Temporary stockpiles of inert material such as cut soil and builders' rubble must be stockpiled at designated storage facilities until this waste can be used elsewhere or taken to an authorised waste disposal facility.
- General waste or domestic waste generated at the construction camp(s) that will be established at designated areas, will be temporarily stored until it is removed at regular intervals and disposed of.
- The storage of general waste in excess of 100m³ and/ or the storage of hazardous waste in excess of 80m³, excluding the storage of waste in lagoons or the temporary storage (i.e. less than 90 days) of such waste, is not permitted. Rather, the removal and disposal of such waste must be conducted prior to 80 days of storage lapsing.
- No waste is allowed to be temporarily stored on site for longer than 80 days, including earth stock piled material.
- General domestic waste should be stored in leak-proof containers that must be regularly emptied at least once a week to ensure that odour and vector nuisances are prevented.
- If wind, baboons or other scavengers can cause the spread of litter from these containers, the containers must be covered with tamper-proof devices.
- Introduce a litter clearance programme where litter is collected at the end of each working day within the immediate vicinity of all construction work for that day.
- Ensure sufficient waste management is available at each stop and go to reduce and limit litter discarded at stop and go site.
- Ensure litter collection focusses on stop and go zones, for collection each day.
- Dust control methods must be employed during clearing and construction, using appropriate techniques such as: sprinkling, vegetation cover, calcium chloride coverings, adhesives, cyclone or filter collectors, mulch, wind breaks, tillage and stones or debris.
- Limit vegetation clearing to areas only where and when necessary.
- Limit clearing and grubbing activities to days with low wind speeds;
- Limit vehicle speeds on-site;
- Encourage use of paved routes as alternatives to unpaved roads
- Dust generated from all activities related to the improvement of the N2 road sections

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must comply with the National Dust Control Regulations (GN No. R. 827) of 1 November 2013, promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).

- Noise control methods shall be employed where possible. These may include:
- Selecting quieter equipment where feasible;
- Maintaining all equipment in good working order;
- Retro-fit selected equipment with dampening measures;
- Erect barriers around the construction camp or work areas;
- Employ improved technology where volume gains can be achieved;
- Construction activity close to residential and business areas, which includes the movement of construction vehicles, should be restricted to normal working hours or daylight working hours, unless approval is obtained from the community to work later.
- Noise generated during construction activities must comply with National and Provincial noise standards.
- Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practice must be adhered to. This applies to solvents and other chemicals possibly used during the construction process.
- Contaminated soil must either be excavated or treated on-site, depending on the nature and extent of the spill.
- The ECO must determine the precise method of treatment of polluted soil. This could involve the application of soil absorbent materials or oil-digestive powders to the contaminated soil.
- If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials.
- Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in suitable containers until appropriate disposal.
- Use lights only where and when required;
- If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs), which do not attract insects and which should be directed downwards.
- Develop a stormwater management plan to ensure compliance with regulations and prevent off-site migration of contaminated stormwater and sediment.
- The road engineer must ensure that appropriate stormwater structures are included in the road design to manage stormwater and to minimise erosion and sedimentation of watercourses.
- The road engineer must ensure that all road sections situated on slopes incorporate stormwater diversion.
- The road engineer must ensure that all stormwater structures are designed in line with both SANRAL and DWS requirements.
- Appropriate stormwater structures must be designed and implemented.
- All road sections situated on slopes must incorporate stormwater diversions.
- Attention shall be given to the effect of the road widening on drainage, including the flow of stormwater to the railway line of Transnet Freight Rail. No storm-water will be allowed to discharge onto Transnet Freight Rail land. If storm-water is diverted to cross under the railway line through existing culverts, detailed calculations for a 1 in 50 year flood must be submitted for approval to Transnet to ascertain whether the culverts can manage the increased flow of storm-water.
- Recruit local labour as far as possible;
- Provide skills training schemes in order to upskill staff;
- Provide career counselling services, to assist with CV and job profile creation for appropriate employees as far as possible.

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- No open fires are to be allowed on site;
- Designated smoking areas are to be demarcated for construction workers;
- Members of the construction team should be easily identifiable (through the use of uniforms or name badges)
- No firearms, alcohol, drugs or trade should be allowed on site;
- Fines should be given for not adhering to rules and regulations in terms of conduct and safety.
- Residents should be informed of the construction activities and schedules prior to the construction workforce entering the property.
- Fence and access control to the construction camp site.
- Ensure optimal traffic management systems in place during construction
- Reduce traffic impedence to as little as possible
- Ensure all road safety signage has been placed at the correct areas
- A Traffic Management Plan (TMP) must be implemented during Project construction. Specific elements of the TMP could include the use of flaggers and temporary lane realignments to maintain through traffic,
- Concrete barriers, signage to direct traffic movements, and possible reduction of speed limits in construction zones.
- The contractor should contact local emergency service providers prior to the start of construction to ensure construction activities would not impede provision of emergency services within the Project area during the construction period.
- Signs must be kept clean and well maintained if they are to be effective.
- Press and radio releases are often a valuable means of warning drivers of what to expect at a site, thus minimising impatient and dangerous behaviour.
- Workers who control traffic must be properly trained.
- Traffic controllers must know where to stand, how to slow or stop traffic, and how to coordinate public and construction traffic movements.
- Controllers should use two-way radio communication when visual contact between traffic controllers is not possible. Where the site is suitable and they are available, arrangements should be made to use temporary traffic signals to control traffic.
- Traffic controllers and general road workers should wear suitable conspicuous clothing to ensure that they can be seen by motorists
- Unnecessary traffic control signs or road markings must be removed as they tend to confuse motorists and make them careless.
- Where vehicles are held up in queues, a worker might be appointed to talk with motorists, apologise for delays, estimate the length of the delay, and generally keep people informed.
- Speed limits should be consistent with safe site operations and traffic movements. Compliance with reasonable speed limits will then be more likely - If motorists perceive a speed limit to be unrealistic, they are likely to disregard it.
- A variety of devices and technology can provide information to motorists, including brighter, bigger electronic signs. These must be employed where reasonable.
- A systematic preventative maintenance programme should be established for all trucks, plant, and vehicles.
- All access points leading to the area where construction blasting works are carried out must be manned to prevent entry during blasting.
- Managers should ensure that new employees are prepared to work in all types of traffic - They should feel comfortable using flagmen - workers who use flags to signal drivers and warn them that they're approaching a work site -and have enough road sense to never turn their back to oncoming traffic.
- New workers should be taught how to manoeuvre around massive pieces of equipment and to safeguard a site for optimal security
- Use protective equipment and personal protective gear (such as hard hats and steel-

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toed shoes).

- Reflective clothing is also crucial, especially for night shift work.
- Noise levels should be monitored at all times to prevent hearing loss - it is suggested that workers wear earmuffs or earplugs to shield their eardrums from high decibels.
- The construction site must be monitored by a qualified ECO during construction.
- Avoidance:
 - Implement a heritage conservation buffer of at least 50m around the cemetery; if necessary redesign the road upgrade alignment to avoid the heritage resource and the proposed conservation buffer. Fence the burial site and apply access control. Implement a site management plan detailing strict site management conservation measures.
 - Site management (fencing, access control);
- Strict site monitoring by ECO:
 - Regular examination of trenches and excavations in this area are required in order to avoid the destruction of previously undetected burials or heritage remains.
- Grave relocation is required where impact unavoidable.
- Any fossil remains such as fossil fish, reptiles or petrified wood exposed during construction should be carefully safeguarded and the relevant heritage resources authority (Limpopo-PHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist.
- Three possible Historical Period structures (Site EXIGO-R510UG-HP01) are of medium-low significance and these buildings are currently used as dwellings. The sites are located in proximity of the project area (>50m) and it is recommended that the sites and any activities in its surrounds be monitored in order to avoid the destruction of previously undetected heritage remains.
- The necessary destruction permits should be obtained from the relevant Heritage Resources Authorities prior to the possible destruction of the features.
- A cemetery identified within close proximity of the road upgrade alignments (Site EXIGO-R510UG-BP01) is of high significance and the site might be impacted on by the proposed project. As a primary measure, the Heritage Authorities (SAHRA) requires a 50m conservation buffer for all burials.
- In addition, it is recommended that the cemetery be fenced off and that access control be applied during all phases of construction. The developer should carefully liaise with the heritage specialist and SAHRA with regards to the management and monitoring of any human grave or cemetery in order to detect and manage negative impact on the sites.
- Should impact on any human burial prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains.
- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.
- It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period

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occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development.

- If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:
 - ○ Formal Earlier Stone Age stone tools.
 - ○ Formal MSA stone tools.
 - ○ Formal LSA stone tools.
 - ○ Potsherds
 - ○ Iron objects.
 - ○ Beads made from ostrich eggshell and glass.
 - ○ Ash middens and cattle dung deposits and accumulations.
 - ○ Faunal remains. - Human remains/graves. - Stone walling or any sub-surface structures. - Historical glass, tin or ceramics. - Fossils.
- If such sites were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by Limpopo-PHRA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required.
- Cognisance should also be taken of the following:
- As Palaeontological remains occur where bedrock has been exposed, all geological features should be regarded as sensitive.
- Water sources such as drainage lines, fountains and pans would often have attracted human activity in the past. As Stone Age material the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits.
- An Environmental Control Officer (ECO) must be appointed to oversee construction activities;
- Vegetation clearance and aquatic habitats must be avoided as far as possible;
- Should avoidance be impractical, impact to the natural vegetation shall be minimised as far as possible.
- Employ brush cutting rather than ploughing, hoeing or herbicide for fire breaks.
- Prune indigenous tree species using loppers or saws where they pose safety threats. If their presence compromises safety mandates entirely, fell and stump treat with appropriate herbicide;
- Vegetation clearance and aquatic habitats must be avoided as far as possible;
- Employ brush cutting rather than ploughing, hoeing or herbicide for fire breaks.
- Prune indigenous tree species using loppers or saws where they pose safety threats. If their presence compromises safety mandates entirely, fell and stump treat with appropriate herbicide;
- A Rehabilitation and Alien Management Plan must be developed and implemented during the construction phase to reduce the establishment and spread of undesirable alien plant species.
- Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting, etc. This must be done under the supervision of the ECO.
- Ensure that appropriate stormwater structures are designed prior to construction and implemented during construction;
- Ensure that all road sections situated on slopes incorporate stormwater diversion;
- Ensure that all stormwater structures are designed in line with both SANRAL and DWS requirements;
- All the relevant permits must be obtained from DWS prior to commencement of any activities onsite; this includes areas within 50m of a river/stream and areas within 500m of a wetland;
- Develop and implement an Erosion Action Plan that aims to monitor and respond to

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erosion events.

- Rehabilitate disturbed areas as soon as possible after construction;
- Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance;
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and vegetation techniques;
- All cleared areas (not used for the development footprint) should be vegetated with indigenous perennial shrubs and grasses from the local area as soon as possible.
- Natural vegetation (scrubs & trees) that was remove onsite may be uses as soil stabilizer by placing them on cleared areas if natural recovery is slow.
- Attention shall be given to the effect of the road widening on drainage, including the flow of stormwater to the railway line of Transnet Freight Rail. No storm-water will be allowed to discharge onto Transnet Freight Rail land. If storm-water is diverted to cross under the railway line through existing culverts, detailed calculations for a 1 in 50 year flood must be submitted for approval to Transnet to ascertain whether the culverts can manage the increased flow of storm-water.
- Train all staff on site regarding the proper management and response should animals be encountered;
- Search and clear the construction region prior to work commencing, relocating animals where found;
- No animal shall be killed or hurt where possible;
- No hunting, baiting or trapping shall be allowed;
- Limit traffic speed on-site;
- Search and clear construction area prior to work commencing, relocating animals where necessary.
- Construction activities must be limited to the designated footprint of the road upgrade route i.e. construction materials, vehicular storage, construction camps etc., should occur in an area that has already been disturbed or of low sensitivity and is at least 50m (but preferably 100m) from a watercourse.
- The surveyed construction footprint must be approved by an ECO to ensure that natural vegetation is not unnecessarily damaged.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and re-vegetation must be undertaken.
- A Rehabilitation and Alien Management Plan must be developed and implemented during the construction phase to reduce the establishment and spread of undesirable alien plant species.
- Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting, etc. This must be done under the supervision of the ECO.
- The development area must be surveyed prior to topsoil removal in order to locate and capture any animal SCC and relocate them.
- Provide training for construction workers on the contents of the EMPr;
- The contractor's workers must not poach or trap wild animals.
- The road upgrade route must be surveyed prior to topsoil removal in order to locate plant SCC and transplant them into the neighbouring undeveloped environment.
- There should be minimal disturbance to sensitive vegetation areas as successful vegetation recovery will depend on the remaining vegetation.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and re-vegetation must be undertaken as soon as possible;
- Any invasive alien plants occurring within the road reserve should be monitored and removed on an ongoing basis according to methods as provided by the Working for Water Programme.
- Construction within the river and wetland channels should as far as possible take place

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during the drier months of the year. This is of particular importance where the schedule of work over the three year period should be planned to avoid critical construction work during high flow events.

- Once construction is complete, the disturbed areas should be rehabilitated to resemble that of the surrounding bed and banks and where necessary vegetated with suitable local indigenous plants as occur at the site.
- Rubble and debris from existing structures and construction activities should be removed after construction is complete so as not to impede flow in the rivers and wetlands.
- Sufficient precaution should be applied to prevent erosion of the road embankment during high flow events in the Bierspruit.
- The channel upstream of the crossings should be kept free of debris and sediment build-up, particularly at the culvert where it might impede flows.
- The culvert structures should also be inspected and maintained regularly to proactively address blockages and erosion within the river channels.
- The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7.
- The disturbed areas will need to be monitored and managed for a period of at least 3 years post construction to ensure that alien plants do not invade these areas.
- The new culvert structures should not be placed higher than the base level of the stream channel to ensure that low flows are not impeded.
- The road between km 18.9 and 19.4 is in very close proximity of the river. The road expansion should preferably not take place in a westerly direction in this section of the road.
- The size of culverts should not be reduced.
- Work within the river and wetland channels or wetland areas should be limited as far as possible and the disturbed areas rehabilitated immediately afterwards.
- Work within the river channels or wetland areas should be limited as far as possible and the disturbed areas rehabilitated immediately afterwards.
- Construction within the river channels should as far as possible take place during the drier months of the year.
- Once construction is complete, the area should be rehabilitated to resemble that of the surrounding bed and banks and where necessary vegetated with suitable local indigenous plants as occur at the sites (sweet thorn *Vachellia karroo*, *Ziziphus mucronata* and common reeds *Phragmites australis*, mat sedge *Cyperus textilis* and other sedges and rushes within the instream habitat).
- Any invasive alien plants or waste material within the river channels at the river crossings should be removed from the channels.
- The widening of the road along the Crocodile River should take place in an easterly direction away from the river at the junction between the R511 and R510 roads (between km 28.4 and 28.9).
- The impact of the proposed road upgrade works can be mitigated as long as the flow into these wetland areas and the drainage out of the wetland areas during higher flow events are not modified. The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7 (between km 26.4 and 27.5).
- The section of the R510 along the Bierspruit at km mark 19.0 and 19.2 should not be filled in towards the river as it might result in erosion of the road in the future.
- In general work within the river / stream channels should be limited as far as possible and the river bed and banks rehabilitated immediately afterwards. Construction within the river channels should preferably take place during the drier months of the year. Disturbed areas should be rehabilitated once construction is complete.
- The new culvert structures should not be placed higher than the base level of the

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stream channel to ensure that low flows are not impeded. The size of culverts should not be reduced.

- The disturbed areas will need to be monitored and managed for a period of at least 3 years post construction to ensure that alien plants do not invade these areas. The culvert structures should also be inspected and maintained regularly to proactively address blockages and erosion within the river channels.
- Contaminated runoff from the construction site(s) should be prevented from entering the rivers, tributaries and associated wetland areas.
- The laydown area and main construction site(s) for the road upgrade should be located away (at least 30m) from the rivers and associated wetland areas.
- If the construction site(s) need to be located near the rivers/streams, all materials on the construction site(s) should be properly stored and contained.
- Disposal of waste from the site(s) should also be in accordance with a waste management plan or EMP conditions.
- Construction workers should be given ablution facilities at the construction works that are located away from the river systems (at least 30m) and regularly serviced.
- These measures should be addressed, implemented and monitored in terms of the Environmental Management Plan for the construction phase.
- Increased sedimentation or turbidity at each of the construction works within the river channels should be mitigated as far as possible by making use of sandbags, settling ponds or screens to minimise the load of sediment being washed downstream of the works.
- Contaminated runoff from the construction site(s) should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained. Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located away from the river (at least 30m) and regularly serviced. These measures should be addressed, implemented and monitored in terms of the EMP for the construction phase. Sediment loads to river from construction activities should be prevented or minimized.
- The widening of the road along the Crocodile River should take place in an easterly direction away from the river at the junction between the R511 and R510 roads (between km 28.4 and 28.9).
- The impact of the proposed road upgrade works can be mitigated as long as the flow into these wetland areas and the drainage out of the wetland areas during higher flow events are not modified. The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7 (between km 26.4 and 27.5).
- The section of the R510 along the Bierspruit at km mark 19.0 and 19.2 should not be filled in towards the river as it might result in erosion of the road in the future.
- The riparian vegetation cover associated with the watercourses should be disturbed as little as possible during the construction phase. Any disturbed areas should be rehabilitated as soon as possible after construction is completed and planted with suitable indigenous plants (sweet thorn *Vachellia karroo*, *Ziziphus mucronata* and *Combretum erythrophyllum* within the riparian zones and common reeds *Phragmites australis*, mat sedge *Cyperus textilis* and other sedges and rushes such as *Juncus kraussii* within the instream habitat) where necessary. Storm water runoff from the road into the river channels may also need to be mitigated to prevent erosion at the crossings.
- Activities within the river channels during the construction phase should be limited as far as possible in terms of their spatial and temporal extent. They must be demarcated and construction activities limited to this extent.
- Construction work within the river channel should preferably take place before the onset of the rainfall period to ensure minimal impact on flow. If flow occurs, flow in the river

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should be diverted around the construction works. In particular the low flow should not be impeded during construction.

- Rubble and debris from existing structures and construction activities should be removed after construction is complete so as not to impede flow in the rivers.
- Each site, once completed be rehabilitated.
- Ongoing monitoring and management of invasive alien plants within the disturbed areas along the road on an annual to twice yearly basis for a period of at least three years is recommended to ensure that the river corridor does not become invaded with alien invasive plants.

OPERATIONAL PHASE

- Alien plants must be regularly removed from site through appropriate methods such as hand pulling, application of chemicals, cutting, etc.
- Development and implementation of a Vegetation Management Plan for all road reserves
- Development and implementation of an Alien Vegetation Management Plan for all road reserves
- An Alien Management Plan must be developed and implemented during the operational phase to reduce the establishment and spread of undesirable alien plant species.
- Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting etc. as in accordance to the NEMBA: Alien Invasive Species Regulations.
- Any regrowth of invasive alien plants within the road reserve should be monitored and removed on an ongoing basis.
- Any signs of erosion within the river channels at the road crossings, particularly as a result of storm water runoff to the watercourse should be identified and addressed as soon as possible. Regular monitoring of the culvert structures should also be undertaken to ensure that they do not become block with sediment and debris but remain open.
- The widening of the road along the Crocodile River should take place in an easterly direction away from the river at the junction between the R511 and R510 roads (between km 28.4 and 28.9).
- The impact of the proposed road upgrade works can be mitigated as long as the flow into these wetland areas and the drainage out of the wetland areas during higher flow events are not modified.
- The culverts may not be removed and new culverts should preferably be enlarged for wetland 6 and on both the southern and northern ends of wetland 7 (between km 26.4 and 27.5).
- The section of the R510 along the Bierspruit at km mark 19.0 and 19.2 should not be filled in towards the river as it might result in erosion of the road in the future.
- The riparian vegetation cover associated with the watercourses should be disturbed as little as possible during the construction phase. Any disturbed areas should be rehabilitated as soon as possible after construction is completed and planted with suitable indigenous plants (sweet thorn *Vachellia karroo*, *Ziziphus mucronata* and *Combretum erythrophyllum* within the riparian zones and common reeds *Phragmites australis*, mat sedge *Cyperus textilis* and other sedges and rushes such as *Juncus kraussii* within the instream habitat) where necessary.
- Storm water runoff from the road into the river channels may also need to be mitigated to prevent erosion at the crossings.
- In the longer term, the upgraded structures and the box culverts/pipes should not impede the flow and in particular the low flow in the rivers. In particular, the new culvert structures should not be placed higher than the base level of the river channels to

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ensure that low flows are not impeded.

- In addition, the culvert structures must be placed within the natural drainage line of the rivers. The structures should also not impede the migration of biota.
- The channel upstream of the river crossings should be kept free of debris, intrusive growth of invasive alien plants and sediment build-up, particularly at the culverts where it might impede flows.
- An Alien Management Plan must be developed and implemented during the operational phase to reduce the establishment and spread of undesirable alien plant species.
- Alien plants must be removed from the site through appropriate methods such as hand pulling, application of chemicals, cutting etc. as in accordance to the NEMBA: Alien Invasive Species Regulations.

MANAGEMENT PLANS TO BE DEVELOPED AND IMPLEMENTED

The following plans need to be developed as part of the final EMPr and Project monitoring, incorporating all the issues, conclusions and recommendations of this report:

- Stormwater & Contingency Management Plan;
- Waste Management Plan;
- Erosion Action Plan;
- Alien Vegetation Removal Plan (for both construction and operational phase).

EAP recommendations

- The EMPr should form part of the contract with the Contractor appointed to construct the proposed road upgrade, and must be used to ensure compliance with environmental specifications and management measures.
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr and EA for the duration of the construction period.
- An alien species monitoring and management plan should be developed for the construction phase and the first three years of operation, to ensure as little as possible establishment and maximum control of invasive species on site. This is important mainly due to the agricultural damage that spreading invasive species may have, in a predominantly agricultural setting.
- Disturbed areas should be rehabilitated as soon as possible once construction is complete in an area.
- Before construction clearing may commence, the area should be scanned for bird nesting sites or reptile and frog micro-habitats.
- The developer should obtain all necessary permits prior to the commencement of construction.
- All feasible mitigation measures recommended by the specialist's studies should be strictly adhered to.
- All feasible mitigation measures contained in the EMPr should be strictly adhered to.
- Final EMPr should be approved by DEA prior to construction.

Is an EMPr attached?

YES

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

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Please refer to Appendix H for the relevant curriculum vitae of the EAP and the project participants.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Please refer to Appendix I for specialist's declaration of interest.

Any other information relevant to this application and not previously included must be attached in Appendix J.

Mr Gideon Raath
NAME OF EAP

SIGNATURE OF EAP

DATE

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SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information