



**water & sanitation**

Department:  
Water and Sanitation  
REPUBLIC OF SOUTH AFRICA

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# PROPOSED MOKOLO AND CROCODILE RIVER (WEST) WATER AUGMENTATION PROJECT (PHASE 2A) (MCWAP-2A): BORROW PITS

## ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**DRAFT**

March 2019





**mineral resources**

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**And**  
**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**  
**(DRAFT)**

**PROPOSED MOKOLO AND CROCODILE RIVER (WEST)**  
**WATER AUGMENTATION PROJECT PHASE 2A**  
**(MCWAP-2A):**  
**BORROW PITS**

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

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## EXECUTIVE SUMMARY

### PROJECT BACKGROUND

Major developments are planned for the Waterberg Coalfields that are located in the Lephalale Area. As a direct result of the aforementioned developments, the demand for water in the Lephalale Area is expected to significantly increase into the future. Due to the limited availability of water in the Lephalale Area, the Department of Water and Sanitation (DWS) undertook a Feasibility Study (completed in 2010) of the Mokolo Crocodile River (West) Water Augmentation Project (MCWAP) to establish how the future water demands could be met. The phases of the proposed project include the following:

- ❖ Mokolo Crocodile River (West) Water Augmentation Project Phase 1 (MCWAP-1): Augment the supply from Mokolo Dam to supply in the growing water use requirement for the interim period until a transfer pipeline from the Crocodile River West can be implemented, which will form part of the Mokolo Crocodile River (West) Water Augmentation Project Phase 2A (MCWAP-2A). The solution must over the long term optimally utilise the full yield from Mokolo Dam and will be operated as a system together with the MCWAP-2A. The MCWAP-1, is however operational since June 2015.
- ❖ **Mokolo Crocodile River (West) Water Augmentation Project Phase 2A:** Transfer water from the Crocodile River (West) to the Steenbokpan and Lephalale areas, including the implementation of the River Management System (RMS) in the Crocodile River (West) and certain tributaries. The MCWAP-2A is the focus of this Environmental Impact Assessment.

The overall MCWAP-2A consists of the following components:

- ❖ Water Transfer Infrastructure, which entail an Abstraction Weir at Vlieëpoort on the Crocodile River (West), Desilting Works, Raw Water Pipeline, Balancing Reservoirs and Pump Stations in order to abstract and transfer of water from the Crocodile River (West) to Lephalale;
- ❖ **Borrow Pits** for the sourcing of construction materials as well as
- ❖ A River Management System to manage abstractions from, and the river flow in, the Crocodile River (West) between Hartbeespoort Dam and Vlieëpoort Weir, the Moretele River from Klipvoor Dam to the confluence with the Crocodile River (West), the reach of the Elands River from Vaalkop Dam up to the confluence with the Crocodile River (West), and also the required flow over (past) the Vlieëpoort Weir.

This Environmental Impact Assessment (EIA) Report specifically deals with the Borrow Pits Component.

### PROJECT LOCATION

The MCWAP-2A is located within the Western Region of the Limpopo Province. The footprint of the borrow pits required for the MCWAP-2A is situated within Thabazimbi Local Municipality (LM) and Lephalale LM, which fall within the jurisdiction of the Waterberg District Municipality (DM). The proposed borrow pits commence in the south-western point of the project area, from the Vlieëpoort Mountains at BP SS1 situated in the Crocodile River (West) Catchment. From there, the borrow pits are situated at approximately 5 km intervals in a predominantly northern direction along existing roads,

farm boundaries and a railway line until ending near Steenbokpan at the last borrow pit, which is BP 51.

The surrounding areas to the proposed borrow pits include Thabazimbi, which is situated approximately 10 km to the north-east of the first borrow pit, BP SS1. Lephalale is situated approximately 20 km to the east of the last borrow pit, BP 51.

## **PROJECT DESCRIPTION (BORROW PITS)**

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The proposed borrow pits consist of the following:

- ❖ Mining areas;
- ❖ Topsoil/overburden stockpiles;
- ❖ Access/haul roads;
- ❖ Mining equipment (screener, delivery vehicles, etc.); and
- ❖ Site offices/stores.

The proposed borrow pits are required to source suitable construction materials, in compliance with the DWS Specification DWS 1110 (specifically Section 3.16 for Backfill Material) in order to construct the MCWAP-2A project. Twenty three (23) borrow pits have been identified and are located at approximately 5 km intervals along the central line of the pipeline route, in order to limit haul distances and eliminate the need to source material from commercial sources, such as from the towns of Thabazimbi or Lephalale.

## **ENVIRONMENTAL STATUTORY FRAMEWORK**

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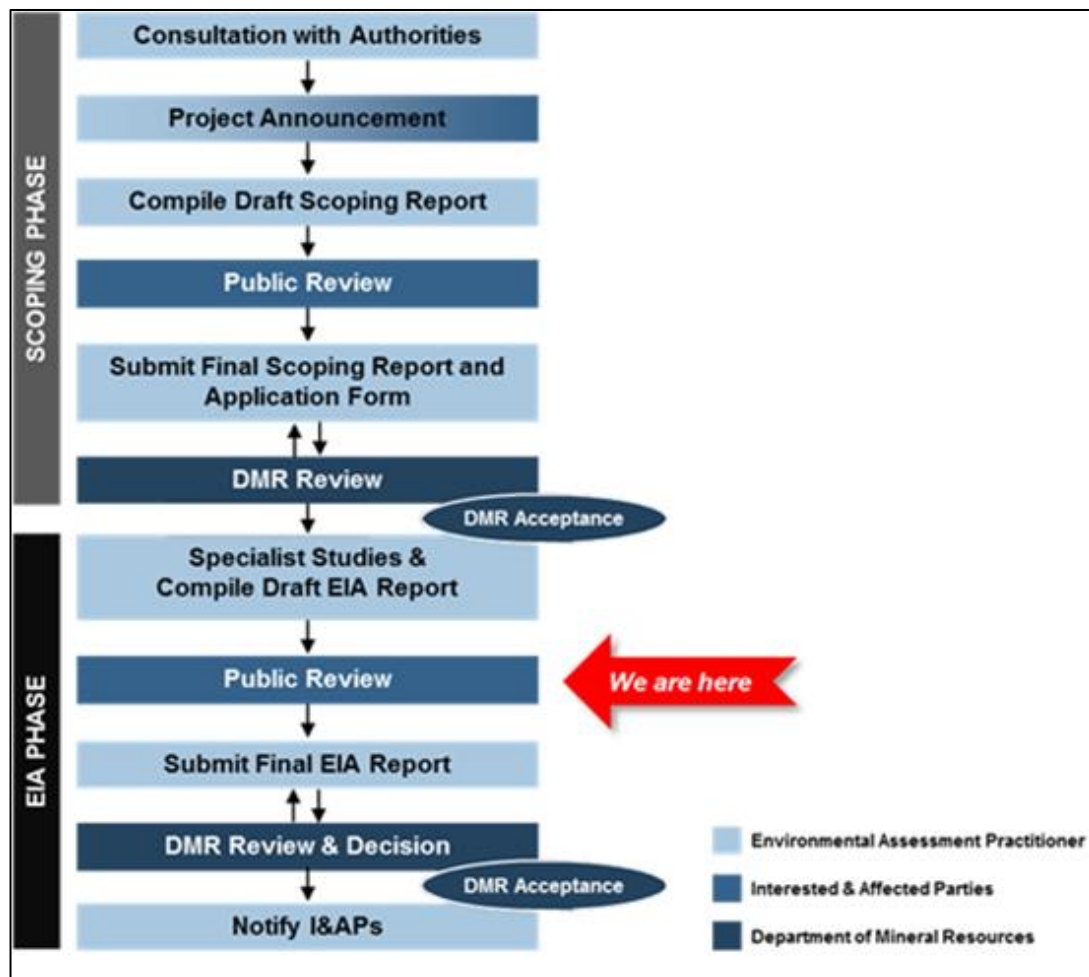
This EIA Report provides an overview of the statutory framework for the proposed MCWAP-2A: Borrow Pits. The relationship between the proposed MCWAP-2A and the key pieces of environmental legislation is also discussed.

## **SCOPING AND EIA PROCESS**

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The process for seeking authorisation under the National Environmental Management Act (No. 107 of 1998) is undertaken in accordance with Government Notice No. R. 982 of 4 December 2014 (as amended), promulgated in terms of Chapter 5 of this Act. Based on the types of activities involved the requisite EIA for the MCWAP-2A is a Scoping and EIA Process. An Outline of the Scoping and EIA Process is provided in the diagram to follow.

The lead decision-making authority for the EIA for the Borrow Pits, is the Department of Mineral Resources (DMR). Nema Consulting was appointed by the DWS and Trans Caledon Tunnel Authority (TCTA) who is the Implementing Agent for the MCWAP-2A, as the Independent Environmental Assessment Practitioner to undertake the EIA for the proposed MCWAP-2A: Borrow Pits.



Outline of the Scoping and Environmental Impact Assessment Process

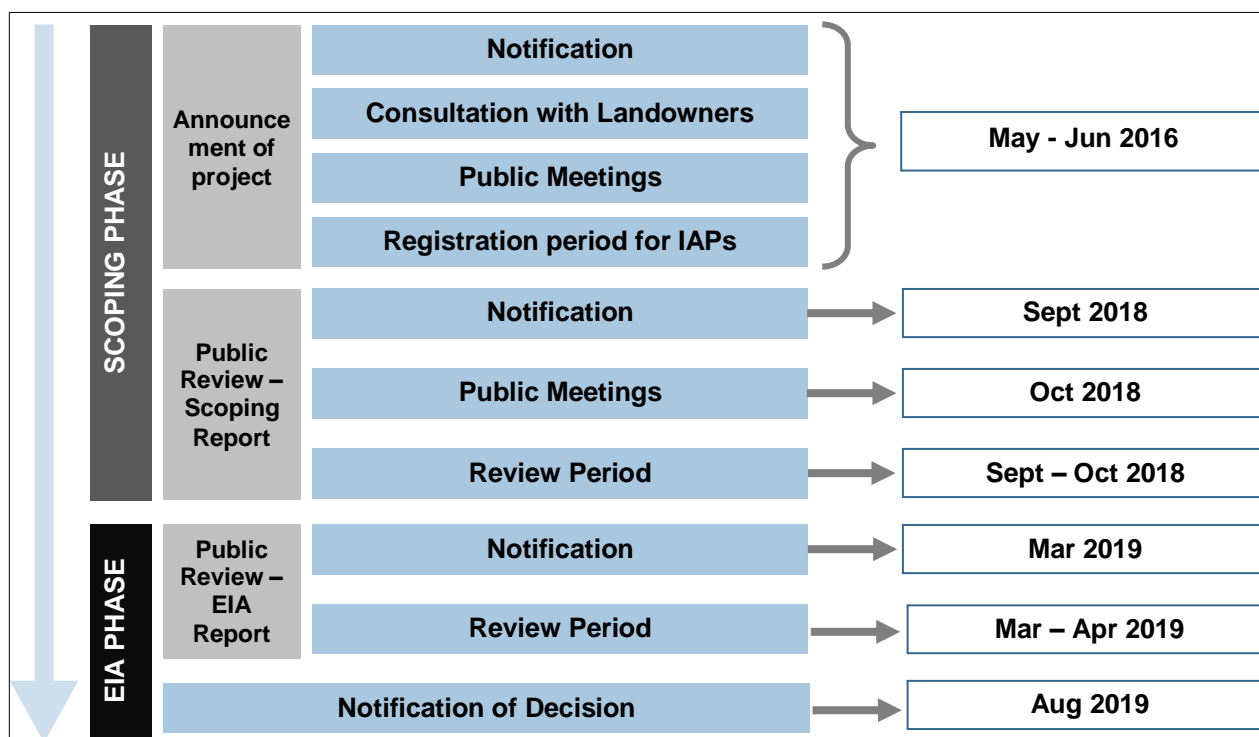
## PROFILE OF THE RECEIVING ENVIRONMENT

This EIA Report provides a general description of the status quo of the receiving environment in the project area, and also presents local, as well as site-specific conditions of those environmental features investigated by the respective specialists. This allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed MCWAP-2A. A brief overview is also provided of the manner in which the environmental features may be affected (positively or negatively) by the proposed MCWAP-2A. The receiving environment is assessed and discussed in terms of the following:

- ❖ Land Use and Land Cover;
- ❖ Climate;
- ❖ Geology;
- ❖ Geohydrology;
- ❖ Soils;
- ❖ Topography;
- ❖ Surface Water;
- ❖ Terrestrial Ecology;
- ❖ Socio-Economic Environment;
- ❖ Agriculture;
- ❖ Air Quality;
- ❖ Noise;
- ❖ Historical and Cultural Features;
- ❖ Planning;
- ❖ Existing Structures and Infrastructure;
- ❖ Transportation;
- ❖ Aesthetic Qualities; and
- ❖ Tourism.

## PUBLIC PARTICIPATION

The diagram below outlines the Public Participation Process for the Scoping and EIA (current) phases.



Outline of the Public Participation Process

## SPECIALIST STUDIES

The requisite specialist studies 'triggered' by the findings of the Scoping Process, aimed at addressing the key issues and compliance with legal obligations, include the following:

1. Baseline Aquatic and Impact Study;
2. Terrestrial Ecological Impact Assessment;
3. Heritage Impact Assessment;
4. Agricultural Impact Assessment;
5. Socio-Economic Impact Assessment; and
6. Wildlife Impact Assessment.

The information obtained from the respective specialist studies was incorporated into this EIA Report in the following manner:

1. The information was used to complete the description of the receiving environment in a more detailed and site-specific manner;
2. A summary of each specialist study is provided, focusing on the approach to the study, key findings and conclusions drawn;
3. The specialists' impacts assessment, and the identified mitigation measures, were included in the overall project impact assessment;
4. The evaluations by the specialists on the alternative options for the project components were included in the comparative analysis to identify the most favourable option;

5. Specialist input was obtained to address comments made by Interested and Affected Parties (IAPs) that related to specific environmental features pertaining to each specialist discipline; and
6. Salient recommendations made by the specialists were taken forward to this EIA's Conclusions and Recommendations.

## **IMPACT ASSESSMENT**

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This EIA Report assessed the pertinent environmental impacts that could potentially be caused by the proposed MCWAP-2A during the Pre-construction, Construction and Operational phases of the MCWAP-2A.

Impacts were identified as follows:

- ❖ An appraisal of the project activities and components;
- ❖ Impacts associated with listed activities contained in Government Notice No. R. 983, R. 984 and R. 985 of 4 December 2014, as amended, for which authorisation has been applied for;
- ❖ An assessment of the receiving biophysical, social, economic and built environment;
- ❖ Findings from specialist studies;
- ❖ Issues highlighted by environmental authorities; as well as
- ❖ Comments received during the Public Participation Process.

The impacts and the proposed management measures are discussed on a qualitative level and thereafter quantitatively assessed to ultimately determine the significance of the impacts. This assessment considered impacts before and after mitigation, where in the latter instance the residual impact following the application of the mitigation measures is evaluated. The proposed mitigation of the impacts associated with the MCWAP-2A includes specific measures identified by the technical team (including engineering solutions) and Environmental Specialists, stipulations of environmental authorities and environmental best practices. The Environmental Management Programme (EMPr) provides a comprehensive list of mitigation measures for specific elements of the project, which extend beyond the impacts evaluated in the body of this EIA Report.

## **ENVIRONMENTAL IMPACT ASSESSMENT CONCLUSIONS AND RECOMMENDATIONS**

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Attention is drawn to specific sensitive environmental features for which mitigation measures are included in the EIA Report and EMPr. An Environmental Impact Statement is provided and critical environmental activities that need to be undertaken during the project life-cycle are also presented. With the adoption of the mitigation measures included in this EIA Report and the dedicated implementation of the EMPr, it is believed that the significant environmental aspects and impacts associated with the MCWAP-2A can be suitably mitigated.

With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the MCWAP-2A and that authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions. This EIA Report is concluded with key recommendations, which may also influence the conditions of the Environmental Authorisation (where relevant), if issued.

## BESTUURSOPSOMMING

### PROJEK AGTERGROND

Groot ontwikkelings word tand beplan vir die Waterberg Steenkoolvelde in die Lephale Gebied. As 'n direkte gevolg daarvan sal die aanvraag vir water in die Lephale Gebied noemenswaardig toeneem in die toekoms. Weens die beperkte beskikbaarheid van water in die Lephale Gebied het die Departement van Water en Sanitasie (DWS) die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Uitvoerbaarheid Studie onderneem, wat in 2010 afgehandel is, watervoorvoorsieningsopsies vir die Lephale Gebied te ondersoek en sodoende in die toekomstige water behoeftes te kan voorsien. Die fases vir die voorgestelde infrastruktuur behels die volgende:

- ❖ Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 1: Aanvulling vanaf Mokolo Dam om aan die groeiende water behoeftes te voldoen vir die tussentyd totdat die oordragpylyne vanaf die Krokodilrivier (Wes) geïmplementeer kan word deur middel die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A. Die oplossing moet die volle lewering vanaf Mokolo Dam oor die langtermyn optimaal kan benut en sal as 'n stelsel bedryf word tesame met die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A. Fase 1 is reeds in bedryf sedert Junie 2015.
- ❖ **Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A** behels die oordrag van water vanaf Krokodilrivier (Wes) tot by die Steenbokpan en Lephale Gebiede, insluitende die implementering van die Rivierbedryfstelsel in die Krokodilrivier (Wes) en die rivier se sytakke. Die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A is die fokus van die Omgewingsimpakbepaling.

Die algehele Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A bestaan uit die volgende komponente:

- ❖ Water oordrag infrastruktuur (hoofonderwerp van hierdie Omgewingsimpakbepaling) wat die volgende behels: 'n Stuwal in die Krokodil Rivier (Wes) by Vlieëpoort vir die onttrekking van rouwater, Sediment Onttrekkingswerke, Rouwater Pylyne, Balanseerdamme sowel as Pompstasies vir die oordrag van water van die Krokodilrivier (Wes) na die Lephale Gebied;
- ❖ **Leengroewe** vir die verkryging van konstruksiemateriale; en
- ❖ Rivierbedryfstelsel vir die bestuur ontrekkings vanaf, asook die riviervloei in, die Krokodilrivier (Wes) tussen Hartbeespoort Dam en die Vlieëpoort, die Moretelerivier vanaf Klipvoor Dam tot by die samevloei met die Krokodilrivier (Wes), die Elandsrivier vanaf Vaalkop Dam tot by die samevloei met die Krokodilrivier (Wes), asook die vereiste vloei oor (verby) die Vlieëpoort Stuwal.

Hierdie Omgewingsimpakbepalingsverslag handel spesifiek oor die voorgestelde Leengroewe.

### LIGGING VAN DIE PROJEK

Die projekgebied is geleë in die Westelike Gedeelte van die Limpopo Provinsie. Die voorgestelde leengroewe oorkruis die Thabazimbi en Lephale Plaaslike Munisipaliteite, wat beide onder die jurisdiksie van die Waterberg Distrik Munisipaliteit val. Die voorgestelde leengroewe begin in die suid-westelike gedeelte van die projek area, in die Vlieëpoortberge by die eerste leengroef (BP SS1) in die Krokodilrivier (Wes) Opvangsgebied. Van daar af volg is die opeenvolgende leengroewe in 'n



noordelike rigting geleë, teen ongeveer 5 km intervale al langs die bestaande paaie, plaasgrense en 'n spoorlyn. Die leengroewe einde by die laaste leengroef (BP 51) naby Steenbokpan.

Thabazimbi is ongeveer 10 km noord-oos geleë vanaf die eerste voorgestelde leengroef (BP SS1) en Lephallale is ongeveer 30 km oos geleë van die laaste voorgestelde leengroef (BP 51).

## **PROJEKBESKRYWING**

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Die voorgestelde leengroewe behels die volgende:

- ❖ Mynbou areas;
- ❖ Bogrond/deklaag hope;
- ❖ Paaie vir toegang en vervoer van materiale;
- ❖ Mynbou-toerusting; asook
- ❖ Terreinkantore/Werkswinkels.

Die voorgestelde leengroewe sal die bron wees van geskikte konstruksie-materiale, in ooreenstemming met die DWS Spesifikasie DWS 1110 (spesifiek Afdeling 3.16 vir Terugvullingsmateriaal) wat vir die konstruksie van die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A benodig sal word. Drie-en-twintig (23) leengroewe sal benodig word om die nodige hoeveelhede konstruksie materiaal te verkry, en is ongeveer in 5 km intervale al langs die middellyn van die pyplynroete geleë om sodoende die afstande te beperk, asook om die verkryging van konstruksiemateriale vanaf kommersiële bronne uit te skakel, wat geleë is naby Thabazimbi en/of Lephallale.

## **OMGEWINGSREGSRAAMWERK**

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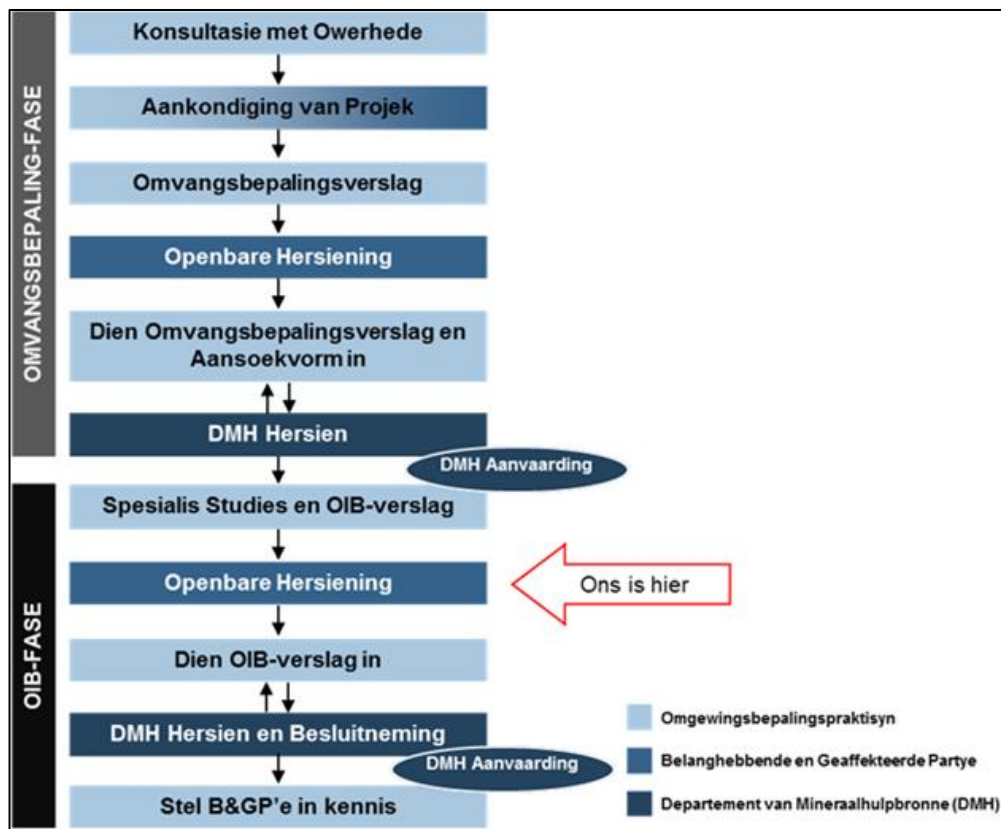
Hierdie Omgewingsimpakbepalingsverslag voorsien 'n oorsig van die omgewingsregsraamwerk vir die voorgestelde Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A se leengroewe. Dit sluit in 'n bespreking van die verband tussen die voorgestelde Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A en die omgewingswetgewing.

## **OMVANGSBEPALING EN OMGEWINGSIMPAKBEPALING-PROSES**

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Die aansoekproses vir magtiging in terme van die Wet op Nasionale Omgewingsbestuur (Wet Nr. 107 van 1998) word onderneem ingevolge die Omgewingsimpakbepalingsregulasies (Goewermentskennisgewing Nr. R. 982 van 4 Desember 2014, soos gewysig). Op grond van die gelyste aktiwiteite wat deur die voorgestelde leengroewe genoodsaak word, sal 'n Omvangsbepaling en Omgewingsimpakbepaling-proses uitgevoer word.

Die besluitnemende owerheid is die Departement van Minerale hulpbronne vir die leengroewe. Nemaï Consulting is deur die DWS en die Trans-Caledon Tunnel Owerheid, wie die Implementeringsagent is, aangestel as die onafhanklike Omgewingsimpakbepalingspraktisyn om die Omgewingsimpakbepaling-proses te onderneem vir die voorgestelde Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A: Leengroewe. 'n Oorsig van Omvangsbepaling en Omgewingsimpakbepaling-proses word in die diagramdiagram hieronder uiteengesit:



### Oorsig van die Omvangsbepaling en Omgewingsimpakbepaling-Proses

## OORSIG VAN DIE GEAFFEKTEERDE OMGEWING

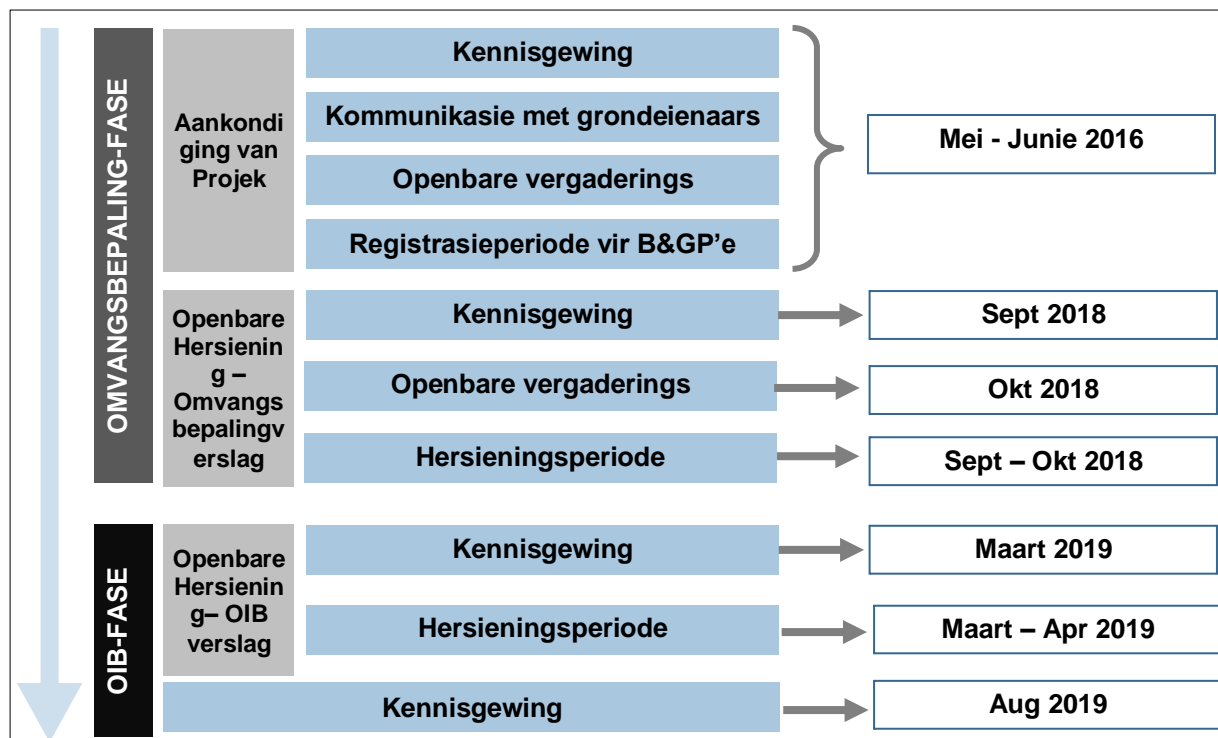
Hierdie Omgewingsimpakbepalingsverslag gee 'n algemene beskrywing van die huidige stand van die omgewing in die projekgebied, wat vir die inagneming van sensitiewe omgewingskenmerke en moontlike geaffekteerde partye van die voorgestelde projek voorsiening maak.

Die volgende aspekte van die geaffekteerde omgewing word beoordeel en bespreek in hierdie Omgewingsimpakbepalingsverslag:

- ❖ Grondgebruik en Grondbedekking;
- ❖ Klimaat;
- ❖ Geologie;
- ❖ Geohidrologie;
- ❖ Grond;
- ❖ Topografie;
- ❖ Oppervlakwater;
- ❖ Terrestriële Ekologie;
- ❖ Sosio-ekonomiese Omgewing;
- ❖ Landbou;
- ❖ Lug Kwaliteit;
- ❖ Geraas;
- ❖ Historiese en Kulturele Kenmerke;
- ❖ Beplanning;
- ❖ Bestaande Strukture en Infrastruktuur;
- ❖ Vervoer;
- ❖ Visuele Kwaliteit; asook
- ❖ Toerisme.

## OPENBARE DEELNAME

Die gepaargaande diagram hieronder gee 'n oorsig van die Openbare Deelnameproses vir die Omvangsbepaling en Omgewingsimpakbepaling fases.



### Die Openbare Deelnameproses

## SPECIALIS-STUDIES

Die spesialis-studies wat uitgevoer is tydens hierdie Omgewingsimpakbepaling, soos geïdentifiseer tydens die Omvangsbepalingsproses om moontlike sleutelkwessies aan te spreek, sluit ondermeer die volgende in:

1. Basislyn Akwatiese en Impakstudie;
2. Terrestriele Ekologiese Impakbepaling;
3. Erfenisimpakstudie;
4. Impakbeoordeling van Landbou;
5. Sosio-ekonomiese Impakevaluering; en
6. Natuurlewensimpakstudie;

Die inligting van die spesialis-studies is soos volg geïnkorporeer in hierdie Omgewingsimpakbepalingsverslag:

1. Die inligting is gebruik om die geïmpakteerde omgewing in verdere besonderhede te beskryf;
2. 'n Opsomming van elke spesialis-studie, wat fokus op die benadering tot die studie, sleutelbevindings en gevolgtrekkings wat gemaak is, word voorsien;
3. Die Impakbeoordeling van die onderskeie spesialiste, sowel as die gepaardgaande versagendemaatreëls, is in die algehele Impakbepaling ingesluit;
4. Die bevindinge van die spesialiste ten opsigte van die alternatiewe opsies vir die projek-komponente is ingesluit in die vergelykende ontleding om sodoende die mees gunstige opsie te identifiseer;
5. Insette is ontvang vanaf die spesialiste om die kommentaar vanaf Belanghebbende en Geïmpakteerde Partye in verband met spesifieke omgewingskenmerke aan te spreek; en
6. Aanbevelings gemaak deur die spesialiste is by die algehele Gevolgtrekkings en Aanbevelings van hierdie Omgewingsimpakbepaling ingesluit.

## **IMPAK BEPALING**

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Hierdie Omgewingsimpakbepalingsverslag het die tersaaklike impakte wat die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A kan veroorsaak tydens die Pre-konstruksie, Konstruksie en Bedryfsfases ontleed.

Impakte is soos volg geïdentifiseer:

- ❖ Evaluering van die projekaktiwiteit en komponente;
- ❖ Impakte geassosieer met die aktiwiteit soos vervat in Goewermentskennisgewing Nommer. R. 983, R. 984 en R. 985 van 4 Desember 2014, soos gewysig, waarvoor magtiging aansoek gedoen is;
- ❖ 'n Assessering van die ontvangende biofisiese, sosiale, ekonomiese en beboude omgewing;
- ❖ Bevindinge van die spesialisstudies; sowel as
- ❖ Impakte geïdentifiseer deur omgewingsowerhede; en
- ❖ Kommentaar wat tydens die Publieke Deelnameproses ontvang is.

Die impakte en gepaardgaande versagtingsmaatreëls word bespreek op 'n kwalitatiewe vlak en daarna gekwantifiseer om uiteindelik die betekenisvolheid van die impakte te ontleed. As deel van hierdie beoordeling word die impakte voor-en-na die versagtingsmaatreëls ontleed, en in die geval van die laasgenoemde word die oorblywende impak in ag geneem. Die voorgestelde versagtingsmaatreëls wat geassosieer word met die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A bestaan ondermeer uit spesifieke maatreëls wat geïdentifiseer is deur die Tegnieuse Span (ingesluit ingenieursoplossings) en Omgewings-Spesialiste, bepaling van omgewingsowerhede sowel as beste omgewingspraktyke. Die Omgewingsbestuurprogram voorsien 'n omvattende lys van versagtingsmaatreëls vir spesifieke projektelemente, wat wyer strek as die impakte wat beoordeel is in hierdie Omgewingsimpak Evalueringsverslag.

## **GEVOLGTREKKINGS EN AANBEVELINGS VAN DIE OMGEWINGSIMPAKBEPALING**

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Aandag word gevestig op spesifieke sensitiewe omgewingskenmerke waarvoor versagtingsmaatreëls in die Omgewingsimpakbepalingsverslag en die Omgewingsbestuurprogram ingesluit word. 'n Omgewingsimpak-verklaring word verskaf en kritiese omgewingsaktiwiteit wat tydens die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A se lewensiklus onderneem moet word, word ook aangebied.

Met die toepassing van die versagtingsmaatreëls wat ingesluit is in die Omgewingsimpakbepalingsverslag en die toegewyde implementering van die Omgewingsbestuurprogram, word geglo dat die beduidende omgewingsaspekte en impakte wat met die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A geassosieer word, na behore versag kan word. Met die voorgenoemde in gedagte kan daar tot die gevolgtrekking gekom word dat daar nie noodlottige foute is wat met die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A geassosieer word nie, en dat die Omgewingsmagtiging uitgereik kan word op grond van die bevindinge van die spesialis en die Omgewingsimpakbepaling deur die nakoming van die geïdentifiseerde omgewingsbestuursvoorsienings.

Hierdie Omgewingsimpakbepalingsverslag word afgesluit met belangrike aanbevelings, wat ook die voorwaardes van die Omgewingsmagtiging (waar van toepassing) kan beïnvloed, indien uitgereik. Die Omgewingsimpakbepalingsverslag word afgesluit met sleutelaanbevelings wat die voorwaardes van die Omgewingsmagtiging mag beïnvloed, indien dit uitgereik sou word.

## TABLE OF CONTENTS

|                                                                                                                                                                                                                                        |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| IMPORTANT NOTICE .....                                                                                                                                                                                                                 | 1   |
| OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS.....                                                                                                                                                                          | 2   |
| PART A: SCOPE OF ASSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT<br>REPORT .....                                                                                                                                                          | 3   |
| 1) Contact Person and correspondence address.....                                                                                                                                                                                      | 3   |
| a) Details of: .....                                                                                                                                                                                                                   | 3   |
| i) The EAP who prepared the report.....                                                                                                                                                                                                | 3   |
| ii) Expertise of the EAP.....                                                                                                                                                                                                          | 3   |
| b) Description of the property:.....                                                                                                                                                                                                   | 4   |
| c) Locality map .....                                                                                                                                                                                                                  | 10  |
| d) Description of the scope of the proposed overall activity.....                                                                                                                                                                      | 11  |
| i) Listed and specified activities.....                                                                                                                                                                                                | 11  |
| ii) Description of the activities to be undertaken .....                                                                                                                                                                               | 13  |
| e) Policy and Legislative Context .....                                                                                                                                                                                                | 18  |
| f) Need and desirability of the proposed activities .....                                                                                                                                                                              | 22  |
| g) Motivation for the preferred development footprint within the approved site including a full<br>description of the process followed to reach the proposed development footprint within the<br>approved site.....                    | 25  |
| i) Details of all alternatives considered .....                                                                                                                                                                                        | 25  |
| ii) Details of the Public Participation Process Followed.....                                                                                                                                                                          | 34  |
| iii) Summary of issues raised by I&APs .....                                                                                                                                                                                           | 38  |
| iv) The Environmental attributes associated with the development footprint alternatives.....                                                                                                                                           | 39  |
| (1) Baseline Environment .....                                                                                                                                                                                                         | 39  |
| (a) Type of environment affected by the proposed activity .....                                                                                                                                                                        | 39  |
| (b) Description of the current land uses.....                                                                                                                                                                                          | 86  |
| (c) Description of specific environmental features and infrastructure on the site .....                                                                                                                                                | 87  |
| (d) Environmental and current land use map .....                                                                                                                                                                                       | 88  |
| v) Impacts and risks identified including the nature, significance, consequence, extent, duration and<br>probability of the impacts, including the degree to which these impacts .....                                                 | 89  |
| vi) Methodology used in determining and ranking the nature, significance, consequences, extent,<br>duration and probability of potential environmental impacts and risks .....                                                         | 91  |
| vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and<br>alternatives will have on the environment and the community that may be affected.....                                   | 93  |
| viii) The possible mitigation measures that could be applied and the level of risk.....                                                                                                                                                | 93  |
| ix) Motivation where no alternative sites were considered .....                                                                                                                                                                        | 93  |
| x) Statement motivating the alternative development location within the overall site. ....                                                                                                                                             | 94  |
| h) Full description of the process undertaken to identify, assess and rank the impacts and risks<br>the activity will impose on the preferred site (In respect of the final site layout plan) through the life<br>of the activity..... | 96  |
| i) Assessment of each identified potentially significant impact and risk .....                                                                                                                                                         | 97  |
| j) Summary of Specialist Reports.....                                                                                                                                                                                                  | 129 |
| k) Environmental Impact Statement.....                                                                                                                                                                                                 | 135 |

|                                                                |                                                                                                                                                                                                         |            |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| (i)                                                            | Summary of the key findings of the environmental impact assessment;.....                                                                                                                                | 135        |
| (ii)                                                           | Final Site Map .....                                                                                                                                                                                    | 137        |
| (iii)                                                          | Summary of the positive and negative implications and risks of the proposed activity and identified alternatives; .....                                                                                 | 137        |
| l)                                                             | Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; .....                                                                                               | 137        |
| m)                                                             | Final proposed alternatives.....                                                                                                                                                                        | 137        |
| n)                                                             | Aspects for inclusion as conditions of Authorisation.....                                                                                                                                               | 137        |
| o)                                                             | Description of any assumptions, uncertainties and gaps in knowledge. ....                                                                                                                               | 137        |
| p)                                                             | Reasoned opinion as to whether the proposed activity should or should not be authorised                                                                                                                 | 139        |
| i)                                                             | Reasons why the activity should be authorised .....                                                                                                                                                     | 139        |
| ii)                                                            | Conditions that must be included in the authorisation.....                                                                                                                                              | 140        |
| (1)                                                            | Specific conditions to be included into the compilation and approval of the EMPr .....                                                                                                                  | 141        |
| (2)                                                            | Rehabilitation requirements .....                                                                                                                                                                       | 141        |
| q)                                                             | Period for which the Environmental Authorisation is required .....                                                                                                                                      | 143        |
| r)                                                             | Undertaking .....                                                                                                                                                                                       | 143        |
| s)                                                             | Financial Provision .....                                                                                                                                                                               | 143        |
| i)                                                             | Explain how the aforesaid amount was derived.....                                                                                                                                                       | 143        |
| ii)                                                            | Confirm that this amount can be provided for from the operating expenditure.....                                                                                                                        | 143        |
| t)                                                             | Deviations from the approved scoping report and plan of study.....                                                                                                                                      | 143        |
| i)                                                             | Deviations from the methodology used in determining the significance of potential environmental impacts and risks. ....                                                                                 | 144        |
| ii)                                                            | Motivation for the deviation. ....                                                                                                                                                                      | 144        |
| u)                                                             | Other Information required by the competent Authority .....                                                                                                                                             | 144        |
| i)                                                             | Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the -..... | 144        |
| (1)                                                            | Impact on the socio-economic conditions of any directly affected person.....                                                                                                                            | 144        |
| (2)                                                            | Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act .....                                                                                                  | 144        |
| v)                                                             | Other matters required in terms of sections 24(4)(a) and (b) of the Act.....                                                                                                                            | 144        |
| <b>PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT .....</b> |                                                                                                                                                                                                         | <b>145</b> |
| 2)                                                             | Draft environmental management programme. ....                                                                                                                                                          | 145        |
| a)                                                             | Details of the EAP, .....                                                                                                                                                                               | 145        |
| b)                                                             | Description of the Aspects of the Activity .....                                                                                                                                                        | 145        |
| c)                                                             | Composite Map .....                                                                                                                                                                                     | 145        |
| d)                                                             | Description of Impact management objectives including management statements .....                                                                                                                       | 145        |
| i)                                                             | Determination of closure objectives.....                                                                                                                                                                | 145        |
| ii)                                                            | The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity. ....                    | 145        |
| iii)                                                           | Potential risk of Acid Mine Drainage.....                                                                                                                                                               | 145        |
| iv)                                                            | Steps taken to investigate, assess, and evaluate the impact of acid mine drainage. ....                                                                                                                 | 146        |
| v)                                                             | Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.                                                                                                           | 146        |

|       |                                                                                                                                                                                      |     |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| vi)   | Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.....                                                          | 146 |
| vii)  | Volumes and rate of water use required for the mining, trenching or bulk sampling operation. ....                                                                                    | 146 |
| viii) | Has a water use licence has been applied for? .....                                                                                                                                  | 146 |
| ix)   | Impacts to be mitigated in their respective phases .....                                                                                                                             | 146 |
| e)    | Impact Management Outcomes .....                                                                                                                                                     | 147 |
| f)    | Impact Management Actions .....                                                                                                                                                      | 176 |
| g)    | Financial Provision .....                                                                                                                                                            | 176 |
| (1)   | Determination of the amount of Financial Provision.....                                                                                                                              | 176 |
| (a)   | Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.....     | 176 |
| (b)   | Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties. ....                           | 176 |
| (c)   | Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure. .... | 177 |
| (d)   | Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.....                                                                          | 177 |
| (e)   | Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline. ....                     | 177 |
| (f)   | Confirm that the financial provision will be provided as determined.....                                                                                                             | 177 |
| h)    | Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including .....                           | 178 |
| i)    | Indicate the frequency of the submission of the performance assessment report. ....                                                                                                  | 183 |
| j)    | Environmental Awareness Plan .....                                                                                                                                                   | 183 |
| (1)   | Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work. ....                                                | 183 |
| (2)   | Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.....                                                                      | 183 |
| 3)    | UNDERTAKING.....                                                                                                                                                                     | 184 |



## LIST OF FIGURES

|                                                                                                      |    |
|------------------------------------------------------------------------------------------------------|----|
| FIGURE 1: LOCALITY MAP OF PROPOSED BORROW PITS IN RELATION TO MAJOR TOWNS AND ROADS .....            | 10 |
| FIGURE 2: OVERALL MCWAP-2A .....                                                                     | 13 |
| FIGURE 3: BP ALTERNATIVE 30A LOCALITY MAP .....                                                      | 28 |
| FIGURE 4: BP ALTERNATIVE 35A LOCALITY MAP .....                                                      | 29 |
| FIGURE 5: BP ALTERNATIVE 38A LOCALITY MAP .....                                                      | 30 |
| FIGURE 6: BP ALTERNATIVE 39A LOCALITY MAP .....                                                      | 31 |
| FIGURE 7: BP ALTERNATIVE 50A LOCALITY MAP .....                                                      | 31 |
| FIGURE 8: BP ALTERNATIVE 14A LOCALITY MAP .....                                                      | 32 |
| FIGURE 9: OUTLINE OF THE PUBLIC PARTICIPATION PROCESS DURING THE SCOPING AND EIA PHASES .....        | 34 |
| FIGURE 10: GEOLOGY MAP .....                                                                         | 42 |
| FIGURE 11: SOIL CLASSES .....                                                                        | 43 |
| FIGURE 12: CONTOUR MAP (20M INTERVAL) .....                                                          | 45 |
| FIGURE 13: BP SS1 SITE BY VLIEËPOORT MOUNTAINS .....                                                 | 45 |
| FIGURE 14: LIMPOPO WATER MANAGEMENT AREA .....                                                       | 46 |
| FIGURE 15: PERENNIAL AND NON-PERENNIAL MAP .....                                                     | 47 |
| FIGURE 16: DIRECTLY AFFECTED WATERCOURSES .....                                                      | 48 |
| FIGURE 17: INDICATION OF IRRIGATION AREAS IN THE CROCODILE RIVER (WEST) (DOWNSTREAM OF BP SS1) ..... | 49 |
| FIGURE 18: EXAMPLES OF FISH SPECIES COLLECTED AS PART OF THE JUNE 2018 SURVEY .....                  | 51 |
| FIGURE 19: RIPARIAN VEGETATION ALONG THE CROCODILE RIVER (WEST) .....                                | 52 |
| FIGURE 20: WETLAND TYPES SITUATED BY BP SS1 .....                                                    | 54 |
| FIGURE 21: WETLAND TYPES SITUATED BY BP 39A .....                                                    | 54 |
| FIGURE 22: SAVANNA BIOME .....                                                                       | 55 |
| FIGURE 23: VEGETATION TYPES .....                                                                    | 56 |
| FIGURE 24: TERRESTRIAL THREATENED ECOSYSTEMS .....                                                   | 58 |
| FIGURE 25: LIMPOPO CONSERVATION PLAN (CBAs AND ESAs) .....                                           | 59 |
| FIGURE 26: PROTECTED AREAS IN PROXIMITY TO THE PROPOSED BORROW PITS .....                            | 60 |
| FIGURE 27: WATERBERG BIOSPHERE (WATERBERG DM, 213) .....                                             | 61 |
| FIGURE 28: LEADWOOD (TOP) AND MARULA TREE (BOTTOM) FOUND ON SITE .....                               | 62 |
| FIGURE 29: <i>SPIROSTACHYS AFRICANA</i> (TAMBOTI) SITUATED WITHIN BP 46 .....                        | 62 |
| FIGURE 30: IMPORTANT BIRD AREAS .....                                                                | 65 |
| FIGURE 31: GENDER IN THE LOCAL STUDY AREA .....                                                      | 67 |
| FIGURE 32: LAND CLAIMS IN DISTRICT (WATERBERG DM, 2013) .....                                        | 70 |
| FIGURE 33: AGRICULTURAL PRACTICES ALONGSIDE THE CROCODILE RIVER (WEST) DOWNSTREAM OF BP SS1 .....    | 71 |
| FIGURE 34: LAND CAPABILITY MAP .....                                                                 | 72 |
| FIGURE 35: AGRICULTURAL ACTIVITIES AFFECTED BY BP 33 .....                                           | 73 |
| FIGURE 36: SCATTER OF SLAG FOUND WITHIN BP 43 .....                                                  | 75 |
| FIGURE 37: PALAEOLOGICAL SENSITIVITY MAP (SAHRIS) .....                                              | 76 |
| FIGURE 38: LIMPOPO PROVINCE SDF .....                                                                | 78 |
| FIGURE 39: WATERBERG DM SDF .....                                                                    | 79 |
| FIGURE 40: LEPHALALE LM SDF .....                                                                    | 80 |
| FIGURE 41: THABAZIMBI LM SDF .....                                                                   | 81 |
| FIGURE 42: WATERBERG DM EMF .....                                                                    | 82 |
| FIGURE 43 : MAJOR TRANSPORTATION NETWORK .....                                                       | 83 |
| FIGURE 44: ROADS, RAILWAY LINES AND TRANSMISSION LINES IN THE STUDY AREA .....                       | 85 |
| FIGURE 45: CURRENT LAND USE AND LAND COVER .....                                                     | 87 |
| FIGURE 46: OVERALL SENSITIVITY MAP .....                                                             | 88 |

## LIST OF TABLES

|                                                                                                     |     |
|-----------------------------------------------------------------------------------------------------|-----|
| TABLE 1: BORROW PITS DESCRIPTION.....                                                               | 14  |
| TABLE 2: NEED AND DESIRABILITY OF MCWAP-2A.....                                                     | 22  |
| TABLE 3: MOTIVATION FOR THE ALTERNATIVE BP SITES .....                                              | 25  |
| TABLE 4: DETAILS OF ALTERNATIVE BP SITES .....                                                      | 33  |
| TABLE 5: LOCATIONS FOR REVIEW OF DRAFT EIA REPORT .....                                             | 37  |
| TABLE 6: DETAILS OF LANDOWNER MEETINGS – DRAFT EIA PHASE.....                                       | 38  |
| TABLE 7: AVERAGE DAILY MAXIMUM TEMPERATURE (°C) BY MONTH– THABAZIMBI STATION .....                  | 39  |
| TABLE 8: AVERAGE DAILY MINIMUM TEMPERATURE (°C) BY MONTH– THABAZIMBI STATION .....                  | 39  |
| TABLE 9: AVERAGE DAILY MAXIMUM TEMPERATURE (°C) BY MONTH– LEPHALALE STATION .....                   | 40  |
| TABLE 10: AVERAGE DAILY MINIMUM TEMPERATURE (°C) BY MONTH– LEPHALALE STATION .....                  | 40  |
| TABLE 11: MONTHLY DAILY RAIN (MM) BY MONTH– THABAZIMBI STATION.....                                 | 40  |
| TABLE 12: MONTHLY DAILY RAIN (MM) BY MONTH– LEPHALALE STATION .....                                 | 41  |
| TABLE 13: PES OF THE CROCODILE RIVER REACH (THE BIODIVERSITY COMPANY, 2018) .....                   | 49  |
| TABLE 14: FISH SPECIES COLLECTED DURING THE SURVEY, SENSITIVITIES AND FREQUENCY OF OCCURRENCE ..... | 50  |
| TABLE 15: IN SITU WATER QUALITY RESULTS FOR THE LOW FLOW SURVEY (JUNE 2018) .....                   | 52  |
| TABLE 16: INSTREAM INTERMEDIATE HABITAT INTEGRITY ASSESSMENT FOR THE CROCODILE RIVER REACH .....    | 53  |
| TABLE 17: RED DATA MAMMAL SPECIES RECORDED IN THE GRID CELLS (ADU, 2016).....                       | 63  |
| TABLE 18: RED DATA BIRD SPECIES RECORDED IN THE GRID CELLS (ADU, 2016) .....                        | 64  |
| TABLE 19: LANGUAGE IN THE LOCAL STUDY AREA.....                                                     | 67  |
| TABLE 20: LOCAL STUDY AREA ANNUAL HOUSEHOLD INCOME .....                                            | 68  |
| TABLE 21: LOCAL STUDY AREA EDUCATION LEVELS.....                                                    | 68  |
| TABLE 22: LOCAL STUDY AREA DWELLING TYPE.....                                                       | 69  |
| TABLE 23: PALAEOLOGY SENSITIVITY INDEX.....                                                         | 75  |
| TABLE 24: GEOLOGICAL SEDIMENTS UNDERLYING THE PROJECT AREA (PGS HERITAGE, 2018) .....               | 77  |
| TABLE 25: LAND COVER IN THE STUDY AREA .....                                                        | 86  |
| TABLE 26: POTENTIAL ENVIRONMENTAL IMPACT/ISSUES .....                                               | 89  |
| TABLE 27: IMPACT METHODOLOGY .....                                                                  | 92  |
| TABLE 28: RANKING OF OVERALL IMPACT SCORE .....                                                     | 93  |
| TABLE 29: BP ALTERNATIVE SITES.....                                                                 | 94  |
| TABLE 30: SUMMARY OF IMPACT ASSESSMENT .....                                                        | 135 |
| TABLE 31: IMPACT MANAGEMENT OUTCOMES AND ACTIONS .....                                              | 147 |

## LIST OF APPENDICES

**APPENDIX A : DMR ACCEPTANCE OF SCOPING REPORT AND PLAN OF STUDY**

**APPENDIX B : CURRICULA VITAE OF EAPs**

**APPENDIX C : LOCALITY AND SENSITIVITY MAPS**

**APPENDIX D : SITE PLAN**

**APPENDIX E : GEOTECHNICAL INVESTIGATIONS**

**APPENDIX F : SPECIALIST STUDIES**

APPENDIX F1 : BASELINE AQUATIC AND IMPACT STUDY

APPENDIX F2 : TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT

APPENDIX F3 : AGRICULTURAL IMPACT ASSESSMENT

APPENDIX F4 : HERITAGE IMPACT ASSESSMENT

APPENDIX F5 : WETLAND IMPACT ASSESSMENT

APPENDIX F6 : SOCIO-ECONOMIC IMPACT ASSESSMENT

APPENDIX F7 : WILDLIFE IMPACT ASSESSMENT

APPENDIX F8 : GREENHOUSE GAS EMISSIONS STUDY

**APPENDIX G : IMPACT ASSESSMENT**

**APPENDIX H : COMMENTS AND RESPONSES REPORT**

**APPENDIX I : PUBLIC PARTICIPATION – EIA PHASE**

**APPENDIX J : DATABASE OF AUTHORITIES, STAKEHOLDERS & IAPs**

**APPENDIX K : MINUTES OF LANDOWNER FOCUS GROUP MEETING**

**APPENDIX L : MEMORANDUM OF UNDERSTANDING BETWEEN DWS AND DME, 2007**

**APPENDIX M : COMMENT SHEET**

## LIST OF ACRONYMS & ABBREVIATIONS

|                  |                                                                      |
|------------------|----------------------------------------------------------------------|
| <b>ASPASA</b>    | Aggregate and Sand Producers Association of Southern Africa          |
| <b>BID</b>       | Background Information Document                                      |
| <b>BP</b>        | Borrow Pit                                                           |
| <b>BPR</b>       | Break Pressure Reservoir                                             |
| <b>CRR</b>       | Comments and Responses Report                                        |
| <b>DEA</b>       | Department of Environmental Affairs                                  |
| <b>DME</b>       | Department of Mineral and Energy                                     |
| <b>DMR</b>       | Department of Mineral Resources                                      |
| <b>DWA</b>       | Department of Water Affairs (now DWS)                                |
| <b>DWAF</b>      | Department of Water Affairs and Forestry (now DWS)                   |
| <b>DWS</b>       | Department of Water and Sanitation                                   |
| <b>EAP</b>       | Environmental Assessment Practitioner                                |
| <b>ECO</b>       | Environmental Control Officer                                        |
| <b>EIA</b>       | Environmental Impact Assessment                                      |
| <b>EMC</b>       | Environmental Monitoring Committee                                   |
| <b>EMPr</b>      | Environmental Management Programme                                   |
| <b>EWR</b>       | Ecological Water Requirements                                        |
| <b>FGD</b>       | Flue-Gas Desulphurisation                                            |
| <b>GIS</b>       | Geographical Information System                                      |
| <b>GN</b>        | Government Notice                                                    |
| <b>I&amp;APs</b> | Interested and Affected Parties                                      |
| <b>IDP</b>       | Integrated Development Plan                                          |
| <b>IPP</b>       | Independent Power Producer                                           |
| <b>IRP</b>       | Integrated Resource Plan                                             |
| <b>LDEDET</b>    | Limpopo Department of Economic Development, Environment and Tourism  |
| <b>LIHRA</b>     | Limpopo Provincial Heritage Resources Authority                      |
| <b>LM</b>        | Local Municipality                                                   |
| <b>MAR</b>       | Mean Annual Runoff                                                   |
| <b>MCWAP</b>     | Mokolo Crocodile (West) Water Augmentation Project                   |
| <b>MCWAP-2A</b>  | Mokolo Crocodile (West) Water Augmentation Project (Phase 2A)        |
| <b>MPRDA</b>     | Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) |
| <b>NEMA</b>      | National Environmental Management Act (Act No. 107 of 1998)          |
| <b>NWA</b>       | National Water Act (Act No. 36 of 1998)                              |
| <b>OHS</b>       | Occupational Health and Safety                                       |
| <b>PES</b>       | Present Ecological Status                                            |
| <b>PGDS</b>      | Provincial Growth and Development Strategy                           |
| <b>PPP</b>       | Public Participation Process                                         |
| <b>RMS</b>       | River Management System                                              |
| <b>RSA</b>       | Republic of South Africa                                             |
| <b>SAHRA</b>     | South African Heritage Resources Agency                              |

|              |                                               |
|--------------|-----------------------------------------------|
| <b>SANBI</b> | South African National Biodiversity Institute |
| <b>SDF</b>   | Spatial Development Framework                 |
| <b>SIPs</b>  | Strategic Integrated Projects                 |
| <b>SMMEs</b> | Small, Medium and Micro-sized Enterprises     |
| <b>TCTA</b>  | Trans-Caledon Tunnel Authority                |
| <b>TWQR</b>  | Target Water Quality Range                    |
| <b>ToR</b>   | Terms of Reference                            |
| <b>WMA</b>   | Water Management Area                         |
| <b>WRC</b>   | Water Research Commission                     |
| <b>WTI</b>   | Water Transfer Infrastructure                 |
| <b>WTW</b>   | Water Treatment Works                         |
| <b>WWTW</b>  | Wastewater Treatment Works                    |

**UNITS OF MEASUREMENT**

|                         |                           |
|-------------------------|---------------------------|
| <b>°C</b>               | Degrees Celsius           |
| <b>ha</b>               | Hectare                   |
| <b>km</b>               | Kilometre                 |
| <b>km<sup>2</sup></b>   | Square kilometre          |
| <b>kV</b>               | Kilovolt                  |
| <b>l</b>                | Litres                    |
| <b>l/s</b>              | Litres per second         |
| <b>m</b>                | Metre                     |
| <b>m<sup>3</sup></b>    | Cubic metre               |
| <b>m<sup>3</sup>/a</b>  | Cubic metre per annum     |
| <b>mm</b>               | Millimetre                |
| <b>Mm<sup>3</sup></b>   | Million m <sup>3</sup>    |
| <b>Mm<sup>3</sup>/a</b> | Million m <sup>3</sup> /a |
| <b>MVA</b>              | Megavolt-ampere           |
| <b>%</b>                | Percentage                |

## IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

**It is therefore an instruction that** the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

**It is furthermore an instruction that** the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

## OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

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

\_\_\_\_\_



---

## PART A: SCOPE OF ASSESMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Water requirements will increase in the Lephalale Area as a result of various planned and anticipated developments associated with the Waterberg Coalfields. The Department of Water and Sanitation (DWS) thus commissioned the Proposed Mokolo and Crocodile River (West) Water Augmentation Project (MCWAP) Feasibility Study, which was completed in 2010, to investigate the options for meeting the increased future water requirements.

Nemai Consulting was appointed by DWS and the Trans-Caledon Tunnel Authority (TCTA), who is the Implementing Agent, to undertake the Environmental Impact Assessment (EIA) for Mokolo Crocodile River (West) Water Augmentation Project Phase 2A (MCWAP-2A) in terms of Government Notice (GN) No. R. 982 of 04 December 2014 (as amended). This Document serves as the **Draft EIA Report** for the proposed **Borrow Pits**, required for the sourcing of material to be used for the construction of the **MCWAP-2A**.

### 1) Contact Person and Correspondence Address

#### a) Details of:

##### i) The Environmental Assessment Practitioner (EAP) who prepared this Report

|                           |                      |
|---------------------------|----------------------|
| Name of The Practitioner: | Donavan Henning      |
| Tel No:                   | (011) 781 1730       |
| Fax No:                   | (011) 781 1731       |
| E-mail address:           | DonavanH@nemai.co.za |

##### ii) Expertise of the EAP

###### (1) The Qualifications of the EAP

- MSc (River Ecology) from the University of Johannesburg
- Registered Professional Natural Scientist (Pr.Sci.Nat, Reg no: 400108/17)
- Refer to **Appendix B** for CVs of the Project Team.

###### (2) Summary of the EAP's Past Experience.

- Seventeen (17) years experience in Environmental Consulting
- Refer to **Appendix B** for CVs of the Project Team.

**b) Description of the Property:**

(Based on 2017 cadastral information)

**Borrow Pit SS1**

|                                                             |                                                 |
|-------------------------------------------------------------|-------------------------------------------------|
| <b>Farm Name:</b>                                           | HANNOVER RE/341 KQ;<br>MOOIVALEI RE/342 KQ      |
| <b>Application area (Ha)</b>                                | 0,3                                             |
| <b>Magisterial district:</b>                                | THABAZIMBI                                      |
| <b>Distance and direction from nearest town</b>             | 8,5 KM NORTH-EAST FROM THABAZIMBI               |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000034100000;<br>T0KQ00000000034200000 |

**Borrow Pit 25**

|                                                             |                                    |
|-------------------------------------------------------------|------------------------------------|
| <b>Farm Name:</b>                                           | MECKLENBURG RE/1/310 KQ            |
| <b>Application area (Ha)</b>                                | 14,8                               |
| <b>Magisterial district:</b>                                | THABAZIMBI                         |
| <b>Distance and direction from nearest town</b>             | 14,2 KM SOUTH-EAST FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000031000001              |

**Borrow Pit 30****Borrow Pit Alternative 30A**

|                                                             |                               |                                                             |                               |
|-------------------------------------------------------------|-------------------------------|-------------------------------------------------------------|-------------------------------|
| <b>Farm Name:</b>                                           | KAROOBULT 126 KQ              | <b>Farm Name:</b>                                           | KAROOBULT 126 KQ              |
| <b>Application area (Ha):</b>                               | 7,2                           | <b>Application area (Ha):</b>                               | 8,4                           |
| <b>Magisterial district:</b>                                | THABAZIMBI                    | <b>Magisterial district:</b>                                | THABAZIMBI                    |
| <b>Distance and direction from nearest town</b>             | 16,6 KM SOUTH FROM THABAZIMBI | <b>Distance and direction from nearest town</b>             | 16,6 KM SOUTH FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000012600000         | <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000012600000         |

**Borrow Pit 35**

|                                                             |                             |
|-------------------------------------------------------------|-----------------------------|
| <b>Farm Name:</b>                                           | LEEUBOSCH RE/1/129 KQ       |
| <b>Application area (Ha)</b>                                | 4,3                         |
| <b>Magisterial district:</b>                                | THABAZIMBI                  |
| <b>Distance and direction from nearest town</b>             | 17 KM SOUTH FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000012900001       |

**Borrow Pit 28**

|                                                             |                             |
|-------------------------------------------------------------|-----------------------------|
| <b>Farm Name:</b>                                           | TARANTAALPAN RE/132 KQ      |
| <b>Application area (Ha)</b>                                | 4,6                         |
| <b>Magisterial district:</b>                                | THABAZIMBI                  |
| <b>Distance and direction from nearest town</b>             | 24 KM SOUTH FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ0000000001320000        |

**Borrow Pit 33**

|                                                             |                             |
|-------------------------------------------------------------|-----------------------------|
| <b>Farm Name:</b>                                           | RUIGTEVLEY 5/97 KQ          |
| <b>Application area (Ha)</b>                                | 7,6                         |
| <b>Magisterial district:</b>                                | THABAZIMBI                  |
| <b>Distance and direction from nearest town</b>             | 33 KM SOUTH FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000009700005       |

**Borrow Pit 41**

|                                                             |                                                                           |
|-------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>Farm Name:</b>                                           | GROENRIVIER RE/37/95 KQ;<br>MATSULAN RE/98 KQ;<br>KALABASPAN 1/92 KQ      |
| <b>Application area (Ha)</b>                                | 5,3                                                                       |
| <b>Magisterial district:</b>                                | THABAZIMBI                                                                |
| <b>Distance and direction from nearest town</b>             | 39 KM SOUTH FROM THABAZIMBI                                               |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000009500037;<br>T0KQ00000000009800000;<br>T0KQ00000000009200001 |

**Borrow Pit 41**

|                                                             |                             |
|-------------------------------------------------------------|-----------------------------|
| <b>Farm Name:</b>                                           | HAARLEM OOST 16/51 KQ       |
| <b>Application area (Ha)</b>                                | 7,0                         |
| <b>Magisterial district:</b>                                | THABAZIMBI                  |
| <b>Distance and direction from nearest town</b>             | 44 KM SOUTH FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000005100016       |

**Borrow Pit 39****Borrow Pit Alternative 39A**

|                                                             |                                                 |                                                             |                             |
|-------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------|-----------------------------|
| <b>Farm Name:</b>                                           | RIETFontein RE/15 KQ;<br>Schoonwater 1/14 KQ    | <b>Farm Name:</b>                                           | WELGEVONDEN 16              |
| <b>Application area (Ha)</b>                                | 4,5                                             | <b>Application area (Ha)</b>                                | 8,1                         |
| <b>Magisterial district:</b>                                | THABAZIMBI                                      | <b>Magisterial district:</b>                                | THABAZIMBI                  |
| <b>Distance and direction from nearest town</b>             | 49 KM SOUTH FROM THABAZIMBI                     | <b>Distance and direction from nearest town</b>             | 48 KM SOUTH FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000001500000;<br>T0KQ00000000001400001 | <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ00000000001600000       |

**Borrow Pit 42**

|                                                             |                             |
|-------------------------------------------------------------|-----------------------------|
| <b>Farm Name:</b>                                           | INKERMANN RE/819 KQ         |
| <b>Application area (Ha)</b>                                | 3,3                         |
| <b>Magisterial district:</b>                                | THABAZIMBI                  |
| <b>Distance and direction from nearest town</b>             | 63 KM SOUTH FROM THABAZIMBI |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0KQ000000000081900000      |

**Borrow Pit 44**

|                                                             |                                 |
|-------------------------------------------------------------|---------------------------------|
| <b>Farm Name:</b>                                           | DIEPSPRUIT 386 LQ               |
| <b>Application area (Ha)</b>                                | 5,1                             |
| <b>Magisterial district:</b>                                | LEPHALALE                       |
| <b>Distance and direction from nearest town</b>             | 48 KM NORTH-EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ000000000038600000          |

**Borrow Pit 43**

|                                                             |                                 |
|-------------------------------------------------------------|---------------------------------|
| <b>Farm Name:</b>                                           | ZANDFONTEIN 2/382 LQ            |
| <b>Application area (Ha)</b>                                | 4,3                             |
| <b>Magisterial district:</b>                                | LEPHALALE                       |
| <b>Distance and direction from nearest town</b>             | 46 KM NORTH-EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ000000000038200002          |

**Borrow Pit 53**

|                                                             |                           |
|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | ROOIPAN 4/357 LQ          |
| <b>Application area (Ha)</b>                                | 2,3                       |
| <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 45 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000035700004     |

**Borrow Pit 52**

|                                                             |                           |
|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | GROOTLAAGTE RE/354 LQ     |
| <b>Application area (Ha)</b>                                | 7,2                       |
| <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 44 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000035400000     |

**Borrow Pit 50****Borrow Pit Alternative 50A**

|                                                             |                           |                                                             |                                                 |
|-------------------------------------------------------------|---------------------------|-------------------------------------------------------------|-------------------------------------------------|
| <b>Farm Name:</b>                                           | LELIEFONTEIN 1/672 LQ     | <b>Farm Name:</b>                                           | ZANDHEUVEL 1/356 LQ;<br>ZANDHEUVEL RE/356 LQ    |
| <b>Application area (Ha)</b>                                | 4,4                       | <b>Application area (Ha)</b>                                | 12,8                                            |
| <b>Magisterial district:</b>                                | LEPHALALE                 | <b>Magisterial district:</b>                                | LEPHALALE                                       |
| <b>Distance and direction from nearest town</b>             | 43 KM EAST FROM LEPHALALE | <b>Distance and direction from nearest town</b>             | 44 KM EAST FROM LEPHALALE                       |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000067200001     | <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000035600001;<br>T0LQ00000000035600000 |

**Borrow Pit 48**

|                                                             |                                                 |
|-------------------------------------------------------------|-------------------------------------------------|
| <b>Farm Name:</b>                                           | ZANDHEUVEL 1/356 LQ;<br>ZANDHEUVEL RE/356 LQ    |
| <b>Application area (Ha)</b>                                | 10,7                                            |
| <b>Magisterial district:</b>                                | LEPHALALE                                       |
| <b>Distance and direction from nearest town</b>             | 44 KM EAST FROM LEPHALALE                       |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000035600001;<br>T0LQ00000000035600000 |

**Borrow Pit 49**

|                                                             |                            |
|-------------------------------------------------------------|----------------------------|
| <b>Farm Name:</b>                                           | SCHULDPADFONTEIN RE/328 LQ |
| <b>Application area (Ha)</b>                                | 5,2                        |
| <b>Magisterial district:</b>                                | LEPHALALE                  |
| <b>Distance and direction from nearest town</b>             | 44 KM EAST FROM LEPHALALE  |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000032800000      |

**Borrow Pit 15**

|                                                             |                           |
|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | VANGPAN 1/294 LQ          |
| <b>Application area (Ha)</b>                                | 3,3                       |
| <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 46 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000029400001     |

**Borrow Pit 46**

|                                                             |                           |
|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | ZANDBULT 300 LQ           |
| <b>Application area (Ha)</b>                                | 2,5                       |
| <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 40 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000030000000     |

**Borrow Pit 59**

|                                                             |                           |
|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | PONTES ESTATES 712 LQ     |
| <b>Application area (Ha)</b>                                | 3,0                       |
| <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 34 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000071200000     |

**Borrow Pit 13**

|                                                             |                           |
|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | PONTES ESTATE 744 LQ      |
| <b>Application area (Ha)</b>                                | 7,7                       |
| <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 28 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000074400000     |

**Borrow Pit 14****Borrow Pit Alternative 14A**

|                                                             |                           |                                                             |                           |
|-------------------------------------------------------------|---------------------------|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | VERGULDE HELM 321 LQ      | <b>Farm Name:</b>                                           | VERGULDE HELM 321 LQ      |
| <b>Application area (Ha)</b>                                | 12,6                      | <b>Application area (Ha)</b>                                | 21                        |
| <b>Magisterial district:</b>                                | LEPHALALE                 | <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 24 KM EAST FROM LEPHALALE | <b>Distance and direction from nearest town</b>             | 24 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000032100000     | <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000032100000     |

**Borrow Pit 51**

|                                                             |                           |
|-------------------------------------------------------------|---------------------------|
| <b>Farm Name:</b>                                           | NAAUW ONTKOMEN 509 LQ     |
| <b>Application area (Ha)</b>                                | 3,8                       |
| <b>Magisterial district:</b>                                | LEPHALALE                 |
| <b>Distance and direction from nearest town</b>             | 17 KM EAST FROM LEPHALALE |
| <b>21 digit Surveyor General Code for each farm portion</b> | T0LQ00000000050900000     |

### c) Locality Map

(Refer to Appendix C for locality maps of each proposed and alternative borrow pit and their associated infrastructure).

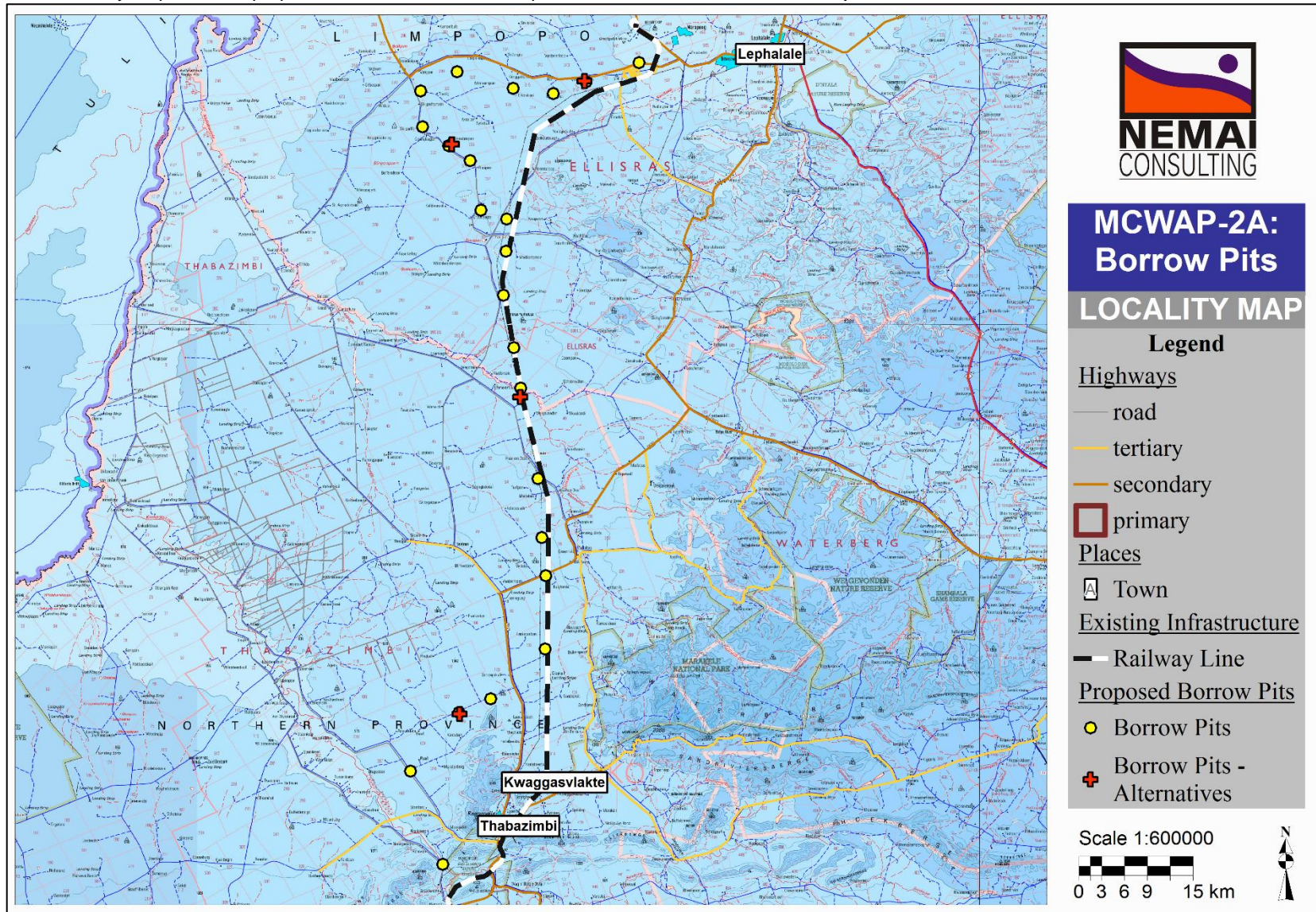


Figure 1: Locality Map of Proposed Borrow Pits in Relation to Major Towns and Roads



## d) Description of the scope of the proposed overall activity

### i) Listed and specified activities

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as **Appendix D**. An amended Application Form will be submitted with the Final EIA Report to DMR.

| NAME OF ACTIVITY<br><br>(E.g. For prospecting - drill site, site camp, ablation facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc<br>E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablation, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | AERIAL EXTENT OF THE ACTIVITY<br><br>Ha or m <sup>2</sup> |                      |                       | LISTED ACTIVITY<br><br>(Mark with an <b>X</b> where applicable or affected). | APPLICABLE LISTING NOTICE<br><br>(GNR 983, GNR 985 or GNR 985) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------|-----------------------|------------------------------------------------------------------------------|----------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Borrow Pit Name                                           | Borrow Pit Area (ha) | Management Area (ha)* |                                                                              |                                                                |
| <b>Mining - sourcing construction material for borrow areas.</b><br><br>The primary activities related to the mining of suitable construction material include the following: <ul style="list-style-type: none"> <li>• Complete detailed geotechnical investigations;</li> <li>• Complete negotiations with affected landowners;</li> <li>• Contractor to confirm the mining process and to develop a mining method statement;</li> <li>• Contractor to develop Mining Plan, which includes the layout of mining activities and features such as fencing, access arrangements, aggregate stockpiles, topsoil stockpiles, container stores, crushing and screening area, office and support facilities, haul roads, overburden placement, etc.;</li> <li>• Understand site drainage and manage stormwater (e.g. construct sediment holding basins and divert up-slope water around the mining area);</li> <li>• Construction of access and haul roads;</li> <li>• Site preparation, including clearing and grubbing;</li> <li>• Remove and safe storage (temporary stockpiles) of topsoil and remaining</li> </ul> |                                                           |                      |                       | Activity No.12(ii)(a)<br><b>X</b>                                            | <b>G.N. R 983</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No.14<br><b>X</b>                                                   | <b>G.N. R 983</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No.19<br><b>X</b>                                                   | <b>G.N. R 983</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No. 24(ii)<br><b>X</b>                                              | <b>G.N. R 983</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No. 27<br><b>X</b>                                                  | <b>G.N. R 983</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No. 30<br><b>X</b>                                                  | <b>G.N. R 983</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No. 56(ii)<br><b>X</b>                                              | <b>G.N. R 983</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       |                                                                              |                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No. 4<br><b>X</b>                                                   | <b>G.N. R 984</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No. 15<br><b>X</b>                                                  | <b>G.N. R 984</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       |                                                                              |                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No.4 (e)(i)(ee)(gg)<br><b>X</b>                                     | <b>G.N. R 985</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No.10 (e)(i)<br><b>X</b>                                            | <b>G.N. R 985</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No.12 (e)(ii)<br><b>X</b>                                           | <b>G.N. R 985</b>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                      |                       | Activity No.14 (ii)(a)(e)(i)(ff)<br><b>X</b>                                 | <b>G.N. R 985</b>                                              |

\* Management area = the allowance of 10% of Borrow Pit area for topsoil stockpile and 1ha for working space.

| <b>NAME OF ACTIVITY</b><br><br>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc<br>E.g. for mining, - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>AERIAL EXTENT OF THE ACTIVITY</b><br><br><b>Ha or m<sup>2</sup></b> | <b>LISTED ACTIVITY</b><br><br>(Mark with an <b>X</b> where applicable or affected). | <b>APPLICABLE LISTING NOTICE</b><br><br>(GNR 983, GNR 985 or GNR 985) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <p>overburden material for post-mining rehabilitation;</p> <ul style="list-style-type: none"> <li>• Manage borrow pits, including side slopes and floor of mined area;</li> <li>• Process the borrowed material (crushing and screening) for use in earthworks;</li> <li>• Load the borrow material into tipper trucks and haul material to pipeline trench, as well as other areas where the material is required;</li> <li>• Inert and spoil material to be used to fill old borrow areas (as necessary);</li> <li>• Post-mining –               <ul style="list-style-type: none"> <li>▪ Grading of site;</li> <li>▪ Removal of all facilities associated with mining activities; and</li> <li>▪ Stabilise, reinstate and rehabilitate borrow areas.</li> </ul> </li> </ul> <p>The mining equipment to be used includes the following:</p> <ul style="list-style-type: none"> <li>• Excavators</li> <li>• Bull-dozers, front-end loaders, backactors;</li> <li>• Tipper trucks;</li> <li>• Graders</li> <li>• Water trucks; and</li> <li>• Lowbed truck (transporting machines on and off site).</li> </ul> |                                                                        | Activity No.18(e)(i)(ee)(gg)<br><b>X</b>                                            | <b>G.N. R 985</b>                                                     |

ii) Description of the activities to be undertaken

Scope of the Mokolo Crocodile River (West) Water Augmentation Project Phase 2A:

The overall MCWAP-2A consists of the following components:

- ❖ Water Transfer Infrastructure, which entail an Abstraction Weir at Vlieëpoort on the Crocodile River (West); Desilting Works, Raw Water Pipeline, Balancing Reservoirs and Pump Stations in order to abstract and transfer of water from Crocodile River (West) to Lephalale;
- ❖ **Borrow Pits** for the sourcing of construction materials, as well as
- ❖ A River Management System to manage abstractions from, and the river flow in, the Crocodile River (West) between Hartbeespoort Dam and Vlieëpoort Weir, the Moretele River from Klipvoor Dam up to the confluence with the Crocodile River (West), the reach of the Elands River from Vaalkop Dam up to the confluence with the Crocodile River (West), and also the required flow over (past) the Vlieëpoort Weir.

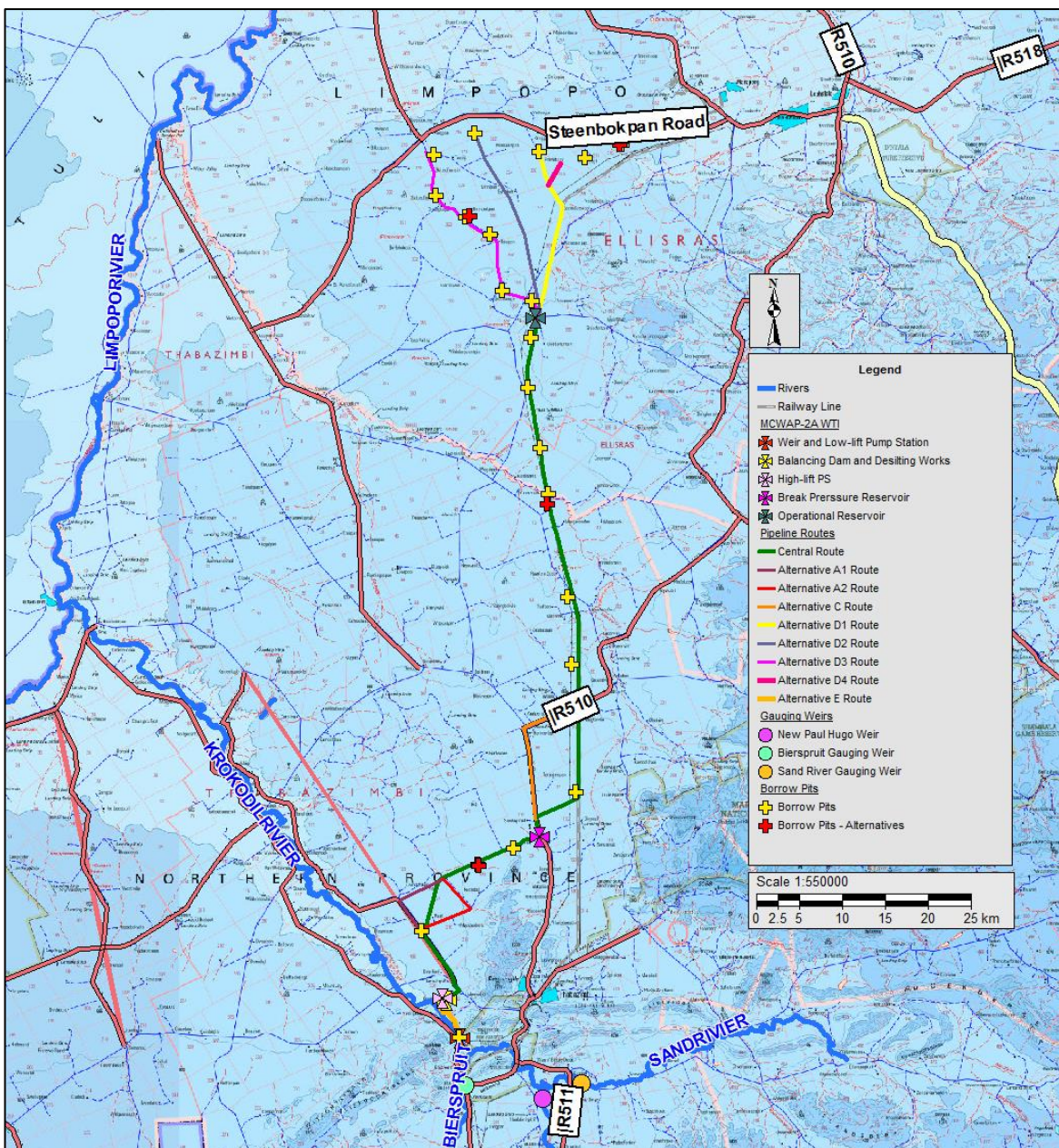


Figure 2: Overall MCWAP-2A

This EIA Report deals specifically with the proposed borrow pits that are required to source suitable construction materials in compliance with the DWS Specification DWS 1110 (specifically Section 3.16 for Backfill Material) to be used for the construction of the MCWAP-2A.

Twenty three (23) borrow pits have been identified and are located at approximately 5 km intervals along the centre line of the pipeline route, in order to limit haul distances and eliminate the need to source material from commercial sources, such as from the towns of Thabazimbi or Lephalale.

### Borrow Pits:

The twenty three (23) proposed Borrow Pits (BPs) and their associated infrastructure (refer to the locality maps contained in **Appendix C**) that are required for the MCWAP-2A are described in the subsections to follow. **Table 1** below provides a description of the twenty three (23) proposed BPs in terms of their areas size, volumes and required depths.

**Table 1: Borrow Pits Description**

| Name   | Borrow Pit Area (ha) | Management Area (ha)* | Volume (m <sup>3</sup> ) | Average Required Depth (m) |
|--------|----------------------|-----------------------|--------------------------|----------------------------|
| BP SS1 | 0,3                  | 1,3                   | 8 000                    | 2,7                        |
| BP 25  | 14,8                 | 17,3                  | 370 000                  | 2,5                        |
| BP 30  | 7,2                  | 8,9                   | 170 000                  | 2,4                        |
| BP 35  | 4,3                  | 5,7                   | 65 000                   | 1,5                        |
| BP 28  | 4,6                  | 6,1                   | 105 000                  | 2,3                        |
| BP 33  | 7,6                  | 9,4                   | 223 500                  | 2,9                        |
| BP 41  | 5,3                  | 6,8                   | 180 000                  | 3,4                        |
| BP 38  | 7,0                  | 8,7                   | 100 000                  | 1,4                        |
| BP 39  | 4,5                  | 6,0                   | 105 000                  | 2,3                        |
| BP 42  | 3,3                  | 4,6                   | 150 000                  | 4,5                        |
| BP 44  | 5,1                  | 6,6                   | 140 000                  | 2,7                        |
| BP 43  | 4,3                  | 5,7                   | 110 000                  | 2,6                        |
| BP 53  | 2,3                  | 3,5                   | 60 000                   | 2,6                        |
| BP 52  | 7,2                  | 8,9                   | 100 000                  | 1,4                        |
| BP 50  | 4,4                  | 5,8                   | 100 000                  | 2,3                        |
| BP 48  | 10,7                 | 12,8                  | 100 000                  | 0,9                        |
| BP 49  | 5,2                  | 6,7                   | 100 000                  | 1,9                        |
| BP 15  | 3,3                  | 4,6                   | 100 000                  | 3,0                        |
| BP 46  | 2,5                  | 3,8                   | 100 000                  | 4,0                        |
| BP 59  | 3,0                  | 4,3                   | 100 000                  | 3,3                        |
| BP 13  | 7,7                  | 9,5                   | 100 000                  | 1,3                        |
| BP 14  | 12,6                 | 14,9                  | 100 000                  | 0,8                        |
| BP 51  | 3,8                  | 5,2                   | 100 000                  | 2,6                        |

\*\* Management area = the allowance of 10% of Borrow Pit area for topsoil stockpile and 1ha for working space.

### Access Roads:

Access/haul roads will be required to gain access to BPs and the pipeline construction servitude of the MCWAP-2A Water Transfer Infrastructure (WTI). The access/haul roads primarily follow existing farm roads or dirt roads, or the sites will be accessed from the pipeline servitude. However, due to the

remote location of some of the BPs, access/haul roads will have to be constructed to allow the transportation of required construction materials from the BPs to the necessary construction sites along the pipeline route.

### **Management Area:**

The Management Area (1ha) of all the BPs includes the associated mining infrastructure and equipment listed below:

- Topsoil stockpile (10% of the borrow area);
- Screeners (if necessary);
- Site office/store;
- Waste storage facilities (hazardous and general waste); and
- Excavators, dozer, tipper trucks, front-end loader.

### **Construction / Pre-Mining Phase:**

The activities associated with the Pre-mining Phase of the BPs (ASPASA, 2013) include amongst others:

- ❖ Determine pre-existing drainage patterns and concentration of flow on the potential site;
  - Surface-water flow;
  - Groundwater conditions;
- ❖ Site preparation;
  - Construction of access and haul roads;
  - Fencing of BP, associated management area and access/haul roads; and
  - Signage.
- ❖ Land Clearing;
- ❖ Stripping of topsoil/overburden and temporary stockpiling.

### **Operational / Mining Phase:**

Activities associated with the Operational phase of the BPs, are described below:

- ❖ Excavation of required material:
  - The material will be excavated from the BP by the use of an excavator in order to remove required volumes of construction material.
- ❖ Blasting (where necessary):
  - Should blasting be required, the landowner as well as the adjacent landowners would have to be notified well in advance and appropriate precautionary measures must be taken.
- ❖ Processing of material (screener):
  - Excavated material will be placed in a screener (if necessary), where the processed material will be stockpiled.
- ❖ Stockpiling of material:
  - All material will have demarcated stockpiling sites, to be used during mining operations at the BP. Specific stockpiles for overburden and topsoil removed during the pre-mining and mining phase, will be stored separately and used a backfilling during the rehabilitation and closure of the BP.

- ❖ Transferring of material to tipper trucks:
  - All required material for construction, will be loaded onto haul vehicles (i.e. tipper trucks) by a front end loader, where the material will then be transported to the necessary construction sites within the pipeline servitude.
- ❖ Haul roads:
  - Existing farm roads will be used as far as possible to transport required material to the construction sites. Where the BP is situated in close proximity to the pipeline servitude, access will be via the servitude. Dust suppression will be undertaken via a water tanker.
- ❖ Stormwater management:
  - Due to the BPs falling on relatively flat terrain, ponding of water during summer rainfall events is probable. A stormwater management procedure will thus be required on site. Measures to manage stormwater will be provided in the EMPr (refer to Part B Section 2).

### **Closure / Post-Mining Phase:**

The following activities will occur during the Closure Phase of the BPs:

- ❖ All fences, infrastructure (site office/store), mining equipment (screener, haul vehicles), and waste/rubble on site will be removed;
- ❖ Overburden stockpiles from the mining phase will be used for the filling of mined BPs; and
- ❖ Site stabilisation:
  - The mined BPs will be graded, re-vegetated and grassed with indigenous grasses in order to blend with surrounding environment. Hydro-seeding and fertilisation will be applied to the mined BPs.
- ❖ Closure of borrow area:
  - A Closure Plan will also be required for the proposed borrow pits. The closure plan will ensure that the borrow area is rehabilitated, and that after closure of the area, vegetation establishes effectively. Measures for rehabilitation of the borrow areas during closure will be provided in the EMPr.

### **Resources Required for Borrow Pits:**

#### Water

During the Mining Phase, water will be required for various purposes, such as washing of plant and equipment in dedicated areas, dust suppression, potable water for construction workers, etc. Water for construction purposes will be sourced directly from watercourses on site and groundwater sources (boreholes) will also be utilised. Water tankers will also supply water to the site and be used for dust suppression. All water uses triggered in terms of Section 21 of the National Water Act (Act No. 36 of 1998) (NWA) will comply with DWS' requirements. Further provisions for water uses will be included in the EMPr, as part of the EIA Report.

#### Sanitation

Sanitation services will be required for the construction workers in the form of chemical toilets, which will be serviced at regular intervals by the supplier. Conservancy tanks will be provided at the residential labour camps and site offices. Further provisions will be included in the EMPr as part of this EIA Report.

### Waste

Solid waste generated during the Mining Phase will be temporarily stored at suitable locations on site and will be removed at regular intervals and disposed of at approved waste disposal sites within each of the local municipalities that are affected by the MCWAP-2A. All the waste disposed of will be recorded. Based on the Integrated Waste Management Plan for the Thabazimbi LM (2016), the Thabazimbi Landfill and the Northam Landfill are both licenced. According to the Integrated Development Plan (IDP) for the Lephalale LM (2016), there is a permitted landfill within the municipality. All storage of general or hazardous waste in a waste storage facility (e.g. onsite waste containers, skips) will comply with the national norms and standards (GN R. 926 of 29 November 2013). The waste storage facility will be established at the camp where waste from site will be collected, sorted, weighed and placed in skips and recycling containers for removal to service providers and appropriate registered landfill sites (hazardous and general sites, as required). Wastewater, which refers to any water adversely affected in quality through mining-related activities and human influence, will include the following:

- Sewage;
- Water used for washing purposes (e.g. equipment, staff); and
- Drainage over contaminated areas (e.g. cement batching / mixing areas, workshop, equipment storage areas).

All wastewater discharges will comply with legal requirements associated with the NWA, including the General Authorisation that specifically deals with Section 21(f) and Section 21(g) of the NWA. Suitable measures will be implemented to manage all wastewater generated during the Mining Phase. Further provisions for the handling of waste, will be included in the EMPr as part of this EIA Report.

### Roads

Temporary access and haul roads will need to be constructed for the Mining Phase of the BPs, which are remote with no existing roads. Where the BPs pits are located next to the MCWAP-2A pipeline servitude, or have existing dirt or farm roads, those roads will be used as far as possible.

### Fencing

All the proposed BPs, and associated access/haul roads, will be temporarily fenced off until the MCWAP-2A is completed, and the sites have been completely rehabilitated.

### Electricity

The power requirements during the Pre-mining and Mining phases of the MCWAP-2A, will be sourced from the proposed substation and transformer yard, which will supply all the power requirements of the MCWAP-2A. Eskom will submit a separate application to the Department of Environmental Affairs (DEA) to seek approval for the bulk power required for the MCWAP-2A. Other sources of electricity on site will be in the form of generators.

### Associated Facilities

It is anticipated that provision will be made for the following facilities within the management area of the BP:

- Site offices;
- Workshops and stores;

- Demarcated topsoil, sand and crushed stone stockpile areas;
- Areas for the handling of hazardous substances;
- An explosives storage magazine;
- Wash bays for machinery and vehicles; and
- Ablution facilities.

### Labour

The appointed Contractor will make use of skilled labour where necessary. In those instances where casual labour is required, the DWS will request that such persons are recruited from local communities within each affected municipality, as far as possible.

## **e) Policy and Legislative Context**

| LEGISLATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | REFERENCE WHERE APPLIED                                                                                                                                                                                                                                                       |
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| <p><u>Constitution of the Republic of South Africa, (No. 108 of 1996)</u></p> <ul style="list-style-type: none"> <li>• Chapter 2 – Bill of Rights.</li> <li>• Everyone has the right: <ul style="list-style-type: none"> <li>○ to an environment that is not harmful to their health or well-being; and</li> <li>○ to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that <ul style="list-style-type: none"> <li>i. prevent pollution and ecological degradation;</li> <li>ii. promote conservation; and</li> <li>iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social</li> </ul> </li> </ul> </li> <li>• Section 24 – Environmental Rights.</li> </ul> | <p>The EIA Process for the proposed borrow pits focusses on the minimisation of environmental impacts resulting from the pre-mining, mining and closure phases of the proposed project, in order to fulfil the requirements stipulated in Section 24 of the Constitution.</p> |
| <p><u>National Environmental Management Act (NEMA) (No. 107 of 1998)</u></p> <ul style="list-style-type: none"> <li>• Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment).</li> <li>• Section 28 – Duty of care and remediation of environmental damage.</li> <li>• Environmental management principles.</li> <li>• Authorities – Department of Mineral Resources (DMR) due to proposed mining activities.</li> </ul>                                                                                                                                                                                                                                                                                                                              | <p>An application and EIA Process for Environmental Authorisation (EA) is being undertaken in terms of Section 24 of NEMA. Environmental management principles were also used as guidelines for the impact assessment.</p>                                                    |
| <p><u>GN No. R 982 of 4 December 2014, as amended</u></p> <ul style="list-style-type: none"> <li>• Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise</li> </ul>                                                                                                                                                                                                                                                                                                                      | <p>A Scoping and EIA Process is required in terms of the 2014 EIA Regulations, as amended, GNR 982 to 985. This report forms part of the EIA phase of the EIA Process currently being undertaken.</p>                                                                         |



| LEGISLATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | REFERENCE WHERE APPLIED                                                                                     |
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| positive environmental impacts, and for matters pertaining thereto.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                             |
| <p><u>GN No. R. 983 of 4 December 2014, as amended (Listing Notice 1)</u></p> <ul style="list-style-type: none"> <li>• Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA.</li> <li>• The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment Process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014. However, according to Regulation 15(3) of GN No. R 982, S&amp;EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&amp;EIR must already be applied in respect of any of the activities.</li> </ul>                                         |                                                                                                             |
| <p><u>GN No. R. 984 of 4 December 2014, as amended (Listing Notice 2)</u></p> <ul style="list-style-type: none"> <li>• Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA.</li> <li>• The investigation, assessment and communication of potential impact of activities must follow a Scoping and EIA Process, as prescribed in regulations 21 - 24 of GN No. R 982 of 4 December 2014.</li> </ul>                                                                                                                                                                                                                                                                                                                  |                                                                                                             |
| <p><u>GN No. R. 985 of 4 December 2014, as amended (Listing Notice 3)</u></p> <ul style="list-style-type: none"> <li>• Purpose - list activities and identify competent authorities under sections 24(2), 24(5) and 24D of NEMA, where environmental authorisation is required prior to commencement of that activity in specific identified geographical areas only.</li> <li>• The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment Process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014. However, according to Regulation 15(3) of GN No. R 982, S&amp;EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&amp;EIR must already be applied in respect of any of the activities.</li> </ul> |                                                                                                             |
| <p><u>National Water Act (Act No. 36 of 1998)</u></p> <ul style="list-style-type: none"> <li>• Chapter 3 – Protection of water resources.</li> <li>• Section 19 – Prevention and remedying effects of pollution.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The proposed BP SS1 falls within a watercourse/500m from a wetland (Crocodile River West) therefore a Water |

| LEGISLATION                                                                                                                                                                                                                                                                                                                                                                                                             | REFERENCE WHERE APPLIED                                                                                                                                                                                                                                                                                                                                      |
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| <ul style="list-style-type: none"> <li>• Section 20 – Control of emergency incidents.</li> <li>• Chapter 4 – Water use.</li> <li>• Authority – Department of Water and Sanitation (DWS).</li> </ul>                                                                                                                                                                                                                     | Use Licence will be required for Sections 21 (c) and (i) water uses.                                                                                                                                                                                                                                                                                         |
| <p><u>National Environmental Management Air Quality Act (Act No. 39 of 2004)</u></p> <ul style="list-style-type: none"> <li>• Air quality management</li> <li>• Section 32 – Dust control.</li> <li>• Section 34 – Noise control.</li> <li>• Authority – Department of Environmental Affairs (DEA).</li> </ul>                                                                                                          | The principles and measures provided in Section 23 and 34 of NEMA:QA, will be incorporated into the EMPr in order to manage and minimise dust and noise activities generated by the pre-mining and mining phases of the project.                                                                                                                             |
| <p><u>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</u></p> <ul style="list-style-type: none"> <li>• Management and conservation of the country's biodiversity.</li> <li>• Protection of species and ecosystems.</li> <li>• Authority – DEA.</li> </ul>                                                                                                                                | All threatened terrestrial ecosystems were identified in order to assess the possible impacts and baseline conditions of the project area. Due to the proposed borrow pits requiring clearance of vegetation, a terrestrial ecological impact assessment was undertaken in order to confirm the status of fauna and flora and indigenous vegetation on-site. |
| <p><u>National Environmental Management: Protected Areas Act (Act No. 57 of 2003)</u></p> <ul style="list-style-type: none"> <li>• Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.</li> </ul>                                                                                                                                    | This Act was considered when completing the desktop baseline environmental screening for protected areas/reserves in the study area. No proposed borrow pits are situated within any identified protected areas in the study area.                                                                                                                           |
| <p><u>National Environmental Management: Waste Act (Act No. 59 of 2008)</u></p> <ul style="list-style-type: none"> <li>• Chapter 5 – licensing requirements for listed waste activities - GN No. R. 921 of 29 November 2013.</li> <li>• Authority – Minister (DEA) or MEC (provincial authority).</li> </ul>                                                                                                            | No waste management licence is required, however the Environmental Management Programme (EMPr) makes suitable provisions for waste management, including the storage, handling and disposal of general and hazardous waste.                                                                                                                                  |
| <p><u>National Forests Act (No. 84 of 1998)</u></p> <ul style="list-style-type: none"> <li>• Section 15 – Authorisation required for impacts to protected trees.</li> <li>• Authority – Department of Agriculture, Forestry and Fisheries (DAFF).</li> </ul>                                                                                                                                                            | Where protected trees occur on site, the principles provided in this Act apply, and mitigation measures stipulated in the terrestrial ecological study were incorporated into the EMPr, in order to ensure the protection of protected trees on site during the pre-mining and mining phases.                                                                |
| <p><u>Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA)</u></p> <ul style="list-style-type: none"> <li>• The MPRDA makes provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. The recent amendment MPRDA resulted in changes to align specific environmental legislation associated with mining activities and aligned</li> </ul> | DWS is exempted from applying for a Mining Right, however is not exempted from applying for an EA, as confirmed in the DMR pre-application meeting. An application has therefore been lodged for EA in terms of the NEMA, in respect of listed activities that have been triggered by                                                                        |

| LEGISLATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | REFERENCE WHERE APPLIED                                                                                                                                                                                                                                                                                                                                             |
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| <p>sections of NEMA and MPRDA to provide for one environmental management system.</p> <ul style="list-style-type: none"> <li>Approval of all 23 proposed borrow pits and associated infrastructure.</li> <li>Authority – DMR.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>applications in terms of the MPRDA (as amended).</p>                                                                                                                                                                                                                                                                                                             |
| <p><u>Occupational Health &amp; Safety Act (Act No. 85 of 1993)</u></p> <ul style="list-style-type: none"> <li>Provisions for Occupational Health &amp; Safety.</li> <li>Authority – Department of Labour.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Principles provided in this Act were incorporated into the EMP, in order to manage activities that can impact health and safety on-site.</p>                                                                                                                                                                                                                     |
| <p><u>National Heritage Resources Act (Act No. 25 of 1999)</u></p> <ul style="list-style-type: none"> <li>Section 34 – protection of structure older than 60 years.</li> <li>Section 35 – protection of heritage resources.</li> <li>Section 36 – protection of graves and burial grounds.</li> <li>Section 38 – Heritage Impact Assessment for linear development exceeding 300 m in length; development exceeding 5 000 m<sup>2</sup> in extent, etc.</li> <li>Authority – Limpopo Provincial Heritage Resources Authority (LIHRA); and South African Heritage Resources Agency (SAHRA)</li> </ul>                                                                                                                        | <p>The proposed development exceeds 5000 m<sup>2</sup> in extent and thus a Heritage Impact Assessment is required. All principles regarding the protection of heritage resources were incorporated into the EMP. Should the proposed project impact on any heritage resources, an application to LIHRA/SAHRA will be required to obtain the necessary permits.</p> |
| <p><u>National Road Traffic Act (Act No. 93 of 1996)</u></p> <ul style="list-style-type: none"> <li>Authority – Limpopo Department of Public Works, Roads and Infrastructure.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Access roads might require the use of existing road servitudes.</p>                                                                                                                                                                                                                                                                                              |
| GUIDELINES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Integrated Environmental Management Information Series, in particular Series 2 – Scoping (DEAT, 2002);</li> <li>Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&amp;DP, 2010a);</li> <li>Guideline on Need and Desirability, EIA Guideline and Information Document Series (DEA&amp;DP, 2010b);</li> <li>Integrated Environmental Management Guideline Series 5: Companion to the EIA Regulations 2010 (DEA, 2010a);</li> <li>Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010b); and</li> <li>Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).</li> </ul> | <p>All guidelines were considered when compiling the need and desirability of the proposed project (Section 1f). The guidelines were further used in identifying the necessary public participation requirements for the proposed project.</p>                                                                                                                      |
| NATIONAL AND REGIONAL PLANS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Municipal Spatial Development Frameworks (SDFs) (where available);</li> <li>Municipal Integrated Development Plans (IDPs);</li> <li>Relevant national, provincial, district and local policies, strategies, plans and programmes;</li> <li>Environmental Management Framework (EMF) for the Waterberg District Municipality (2010);</li> <li>Limpopo Provincial Conservation Plan version 2, September 2013;</li> </ul>                                                                                                                                                                                                                                                              | <p>All national and regional plans were considered when completing the baseline environmental, physical, socio-economic and existing infrastructure conditions, as well as providing input in the impact assessment.</p>                                                                                                                                            |

| LEGISLATION                                                                                                                                                                                                                                                                                                                                                                                                  | REFERENCE WHERE APPLIED |
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| <ul style="list-style-type: none"> <li>• Limpopo Environmental Management Act (Act 7 of 2003)</li> <li>• Limpopo Provincial Growth and Development Strategy (PGDS);</li> <li>• Department of Energy's Integrated Resource Plan (IRP) 2010-30;</li> <li>• Lephhalale LM Water Services Development Plan (WSDP); and</li> <li>• Crocodile River (West) Water Supply System Reconciliation Strategy.</li> </ul> |                         |

#### f) Need and desirability of the proposed activities

The format contained in the Guideline on Need and Desirability (Department of Environmental Affairs, 2017) was used for **Table 2**. Need (time) and desirability (place) relates to, amongst others, the nature, scale and location of development being proposed, as well as the wise use of land.

**Table 2: Need and Desirability of MCWAP-2A**

| No.                    | Question                                                                                                                                                                                                                                                                                                                                       | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NEED ('timing')</b> |                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1.                     | Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (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 IDP). | <p>The IDP for the Lephhalale LM (2016) acknowledges the need for MCWAP and specifically states the following: <i>"It is imperative to note that the outcome of the MCWAP project need to be implemented to address expected water shortages before any development in node area 1 will be viable, as currently the area does not have sufficient water resources to sustain any new development"</i>. MCWAP-2A is also included as one of the strategic projects in terms of Key Performance Area 2: Basic Services and Infrastructure investment.</p> <p>It is noted that Thabazimbi LM's water supply is from Magalies Water. According to the spatial vision presented in the IDP for the Thabazimbi LM (2017), the proposed footprint of MCWAP-2A falls primarily within the activity and government corridor, which extends northwards from the town of Thabazimbi (similar to Zone 11 of the Waterberg District Municipality EMF).</p> |
| 2.                     | Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?                                                                                                                                                        | <ul style="list-style-type: none"> <li>• The timing of the project is driven by the water demands associated with the development of the Waterberg Coalfields, where the water users include power generation, coal mining to support power generation, other industrial / mining activities and urban use by the Lephhalale LM.</li> <li>• Several possible weir sites along the Crocodile River (West) were evaluated for suitability with respect to topography, access, founding conditions and river morphology. This led to the selection of two possible sites, namely the Vlieëpoort Upper Site and the Boschkop Lower Site. The choice of the final abstraction point</li> </ul>                                                                                                                                                                                                                                                     |

| No. | Question                                                                                                                                                                                                                                                                         | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|     |                                                                                                                                                                                                                                                                                  | <p>was largely determined by the extent of river losses and additional costs associated with river management actions, as well as the need for and benefit of implementing a phased approach to deliver water to the end users.</p> <ul style="list-style-type: none"> <li>• To minimise impacts, the proposed pipeline route and associated borrow pits attempt to remain alongside existing linear-type infrastructure, such as roads (main roads and dirt roads), the railway line (i.e. section of approximately 56km), transmission lines, industrial corridors and farm boundaries where the environment is regarded as less sensitive.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3.  | <p>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> | <ul style="list-style-type: none"> <li>• MCWAP-2A features prominently on SIP 1, which aims to unlock SA's northern mineral belt in one of the poorest provinces (Limpopo).</li> <li>• The assurance of water supply to the current power stations near Lephalale is not acceptable and places the country's power supply at risk.</li> <li>• The concerns raised by Interested and Affected Parties (I&amp;APs) with regards to the proposed project primarily fall into the following categories: <ul style="list-style-type: none"> <li>○ Concerns related to the footprint of the physical infrastructure and associated impacts to land use as well as existing structures and infrastructure;</li> <li>○ Concerns related to water availability in the Crocodile River (West); and</li> <li>○ Concerns related to the cumulative impacts associated with the various developments that are linked to the Waterberg Coalfields.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 4.  | <p>Are the necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?</p>                                                                                               | <ul style="list-style-type: none"> <li>• Water for construction purposes will be sourced directly from watercourses on site and groundwater (boreholes) will also be utilised. Water tankers will also supply water to the site. Water for operational purposes will include domestic supply to the operational control centre. All water uses triggered in terms of Section 21 of the NWA will comply with DWS' requirements.</li> <li>• Conservancy tanks will be provided at the residential labour camps and site offices. Ablution facilities will also be provided as part of the permanent infrastructure for the operational control centre. The locations of the tanks will be selected to minimise environmental impacts. The tanks will be properly maintained by the operator.</li> <li>• Solid waste generated during the construction phase will be temporarily stored at suitable locations (e.g. at construction camps) and will be removed at regular intervals and disposed of at approved waste disposal sites within each of the local municipalities that are affected by the project. All the waste disposed of will be recorded.</li> <li>• All wastewater discharges will comply with legal requirements associated with the NWA, including the General Authorisation that specifically deals with Section 21(f) and Section 21(g) water uses.</li> </ul> |

| No.                             | Question                                                                                                                                                                                                                              | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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|                                 |                                                                                                                                                                                                                                       | <p>Suitable measures will be implemented to manage all wastewater generated during the construction period.</p> <ul style="list-style-type: none"> <li>Eskom has confirmed that the proposed MCWAP-2A substation can be accommodated into the network without any capacity constraints. The proposed substation will be supplied from the new planned Thabatshipi – Thabazimbi Combined 132kV Power Line. A separate application will be submitted by Eskom to seek approval for the bulk power required for MCWAP-2A.</li> </ul>                                                                                                                                           |
| 5.                              | 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)?                 | <p>The project aims to supply bulk water to a number of strategic end users. The Lephalale LM, as one of the intended water users, will need to ensure that it is able to optimally utilise this water as part of infrastructure planning.</p> <p>See the response in item no. 1 above in terms of the reference to MCWAP-2A contained in the IDP for the Lephalale LM.</p>                                                                                                                                                                                                                                                                                                 |
| 6.                              | Is this project part of a national programme to address an issue of national concern or importance?                                                                                                                                   | MCWAP-2A features prominently on SIP 1, which aims to unlock SA's northern mineral belt in one of the poorest provinces (Limpopo).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>DESIRABILITY ('placing')</b> |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 7.                              | Is the development the best practicable environmental option (BPEO) for this land/site?                                                                                                                                               | Geotechnical investigations (Mokolo Crocodile Consultants, 2012) confirmed the locations of the required borrow pits with the use of an on-site test pit investigation. The proposed sites were identified for suitability of material and provide the required volumes that would have to be excavated and used as construction material for MCWAP-2A. The environmental sensitivities that occur on site will be assessed by specialist investigations, and will be evaluated in the EIA phase                                                                                                                                                                            |
| 8.                              | Would the approval of this application compromise the integrity of the existing approved municipal IDP and SDF as agreed to by the relevant authorities?                                                                              | It is not anticipated that the proposed project will contradict or be in conflict with the municipal IDPs and SDFs (refer to response provided above to item no. 1).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 9.                              | Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations? | <p>In terms of the EMF for the Waterberg District Municipality (Environomics &amp; NRM Consulting, 2010b), the project falls within the following Environmental Management Zones:</p> <ul style="list-style-type: none"> <li>Zone 4: Game and cattle farming (including hunting) areas with commercial focus;</li> <li>Zone 5: Mining and industrial development focus areas;</li> <li>Zone 6: Restricted mining focus areas in aesthetic and/or ecological resource areas; and</li> <li>Zone 11: Major infrastructure corridors.</li> </ul> <p>It is noted that Zone 11 facilitates the routing of bulk infrastructure, such as the pipeline associated with MCWAP-2A.</p> |
| 10.                             | 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).                          | All proposed borrow pits fall in close proximity to the MCWAP-2A pipeline servitude, in order to minimise the need for new access/haul roads. Most borrow pits fall on fallow/grazing land. The specialist studies                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| No. | Question                                                                                                                                                              | Response                                                                                                                                                                                                                                                                              |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                       | investigated the location based on sensitive environmental features and receptors.                                                                                                                                                                                                    |
| 11. | How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)? | Refer to the significant environmental impacts and issues associated with the proposed project, contained in Section 1(g)(v).                                                                                                                                                         |
| 12. | How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?                         | Refer to Section 1(g)(iv)(1) for a status quo environmental features within the project areas, as well as a description of the environmental sensitivities and land use on site. Refer to the sensitivity map in Section 1(g)(iv)(c).                                                 |
| 13  | Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?                                        | The affected land is rural in nature and primarily used for agricultural and game farming purposes. Opportunity costs, which are associated with the net benefits forgone for the development alternative, were considered in the Socio-economic and Agricultural Impact Assessments. |
| 14  | Will the proposed land use result in unacceptable cumulative impacts?                                                                                                 | All cumulative impacts that occur from the proposed project were evaluated.                                                                                                                                                                                                           |

**g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.**

**i) Details of all alternatives considered**

**(a) The property on which or location where it is proposed to undertake the activity;**

Initially, no alternatives were assessed for the proposed BPs, as previous geotechnical investigations (Mokolo Crocodile Consultants, 2012) contained in **Appendix E**, confirmed the location and layout of the required BPs through on-site test pit investigations. The proposed sites were identified for suitability of material and provided the required volumes that would have to be used for the construction of the MCWAP-2A. However, during the public participation process, comments were received from directly affected landowners motivating for the relocation of the proposed BP sites to an alternative location. The alternatives sites provided by the landowners were situated either at an alternative location on the same property, or on neighbouring properties.

Refer to the **Table 3** for a summary of the correspondence and motivation received from landowners with regards to the relocation of the proposed BP site on their properties, to an alternative location:

**Table 3: Motivation for the Alternative BP Sites**

| BP Name     | Property Description      | Motivation for relocation (based on correspondence from affected landowners)                                  |
|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>BP30</b> | Karoobult 126 KQ          | The current location is too close to the farm entrance and too close to Buffelsvley. It must be out of sight. |
| <b>BP35</b> | Leeuwbosch 129 KQ<br>RE/1 | Move BP out of sight from road.                                                                               |

| BP Name     | Property Description         | Motivation for relocation (based on correspondence from affected landowners)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BP38</b> | Haarlem Oost 51 KQ Ptn<br>16 | <p>1. The present borrow pit location is situated within 200m of a dwelling and the access road proposed is the existing access to that dwelling and passes within 30m of the dwelling and associated outbuildings.</p> <p>2. Haarlem Oost is conducting business in hunting and Eco Tourism and has paying clients making use of these facilities on a regular basis. The dust and disruption to this business will mean we would have to shut down operations during construction period resulting in large losses of income and potential future bookings.</p> <p>3. The proposed borrow pit is situated within 200m of the existing skinning, cold room and carcass preparation area which are part of the income generated by the business. As you would be aware the dust and disruption generated by traffic carting fill material to the site would not be conducive to this type of activity.</p> <p>4. The access to this proposed borrow pit area would also have a negative effect on our ability to carry out our day to day business activities; especially hunting. This would have a disruptive effect on the behavior of the animals being hunted. This might also propose an element of risk as far as safety due to the use of hunting firearm being used in the area.</p> <p>5. The area affected by the establishment of the Borrow Pit on the proposed location would effectively render 30% of the land plus the accommodation and other facilities unusable. A large portion of guests visiting the farm for hunting are international clients and our season is from March to November as we have exemption for hunting. Hunting operations are 7 days per week and cannot be adjusted without loss of business. This present proposed Borrow Pit location is shown alongside on Eskom servitude and would involve major earthworks in order to manage the stormwater due to existing contours. We would be submitting a claim for loss of income and disruption due to the inability to carry out our normal income generating activities.</p> |
| <b>BP39</b> | Schoonwater 14 KQ Ptn 1      | <ul style="list-style-type: none"> <li>• Schoonwater and Rietfontein is one of our pristine areas for conservation and tourism activities.</li> <li>• This area hosts Lions and Elephants, which will pose a major risk for the contractors.</li> <li>• We have a 5 star lodge 2.5km from the proposed area.</li> <li>• Access to this site via the servitude is impossible when the river is in full flood. (as the bridge at the crossing is under water)</li> <li>• Access to the new proposed site is much easier for the contractors, as it is located much closer to the Maaitjiesfontein main road.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



| BP Name     | Property Description      | Motivation for relocation (based on correspondence from affected landowners)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                           | <ul style="list-style-type: none"> <li>• Compensation for the new proposed site, will not be a fraction of the compensation for the pristine Schoonwater and Rietfontein.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>BP50</b> | Leliefontein 672 LQ Ptn 1 | <ul style="list-style-type: none"> <li>• The breeding camps on our farm occur along the first 2000m, adjacent to the road. It cost us approximately R2 million to prepare this area. The game fence is brand new and cost approximately R30 000 per km. The approximately 12km on the eastern side of the farm. The sable camp was identified by specialists as the most suitable for breeding purposes. The surrounding camp serves as breeding camps for golden wildebeest, black impalas, etc. The back end of our farm is used for hunting. The sable camp in on Leliefontein and the golden wildebeest and black impalas are on Zandfontein, along the side of the road.</li> <li>• The borrow pit is located at our entrance, less than 400m from our workers' homes. The historical baobab is located in this camp. I also planted a lane of baobab trees towards the lodge.</li> <li>• The lodge alone cost R1 500 000 to upgrade it to a five star lodge. No international tourist will stay there with such noise and dust.</li> <li>• Security cameras were installed. The fence was electrified. Hides were built which cost approximately R500 000. And so I can go on. In the last few years I've spent millions to develop the farm. We have only now started to earn profit and hence I cannot accept that a borrow pit is planned on Leliefontein.</li> </ul> |
| <b>BP14</b> | Vergulde Helm 321 LQ      | Rather move BP to old cultivated land. Your proposed site affects natural bush.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Alternative sites were received from landowners. A geotechnical team was appointed in order to undertake a Geotechnical Investigation to assess the alternative BP sites provided by landowners.

Refer to **Appendix E** for the memorandum of the Geotechnical Investigations conducted for the alternative sites (SMEC, 2019).

The Geotechnical assessment included the following methodology:

- The site investigation comprised of machine excavated test pits and indicative laboratory sampling to identify the index properties of the on-site soils and highlight their limitations and concerns with regards to the application for the proposed application (pipe bedding and backfill); and
- Based on the findings of the investigations, a pre-feasibility level geotechnical report was compiled with emphasis on generalised in-situ material characteristics, depth (as can be visually determined) to groundwater and materials utilisation potential.

The test pits were excavated across the alternative sites. The section to follow was sourced from the pre-feasibility assessment (SMEC, 2019) and provides locality maps indicating the test pits conducted on site for each alternative BP. The preliminary assessment and recommendation for each alternative site is also provided.

#### BP Alternative 30A

Six test pits were excavated across the proposed relocation site, as shown in **Figure 3**:



**Figure 3: BP Alternative 30A Locality Map**

The location of the BP is to the south of BP 30 and the observed profile within the test pits is similar to that of the investigations for BP 30. Therefore, on this basis it is assumed that the materials have similar properties and the relocated site is a suitable source.

The area of BP 30A is approximately 84 000m<sup>2</sup> and the estimated average excavation of the suitable materials will be 1.5m, indicating a potential source of selected backfill material of 125 000m<sup>3</sup>.

Based on the test pit observations and material volume estimates, the proposed relocated site for BP 30 is a potentially suitable source of selected backfill material (SMEC, 2019a).

#### BP Alternative 35A

Four test pits were excavated across the proposed relocation site, as shown in **Figure 4**:



**Figure 4: BP Alternative 35A Locality Map**

The location of the BP is to the immediate south of the BP 35 and the observed profile within the test pits is similar to that of the investigations for the BP 35. Therefore, on this basis it is assumed that the materials have similar properties and the relocated site is a marginal source.

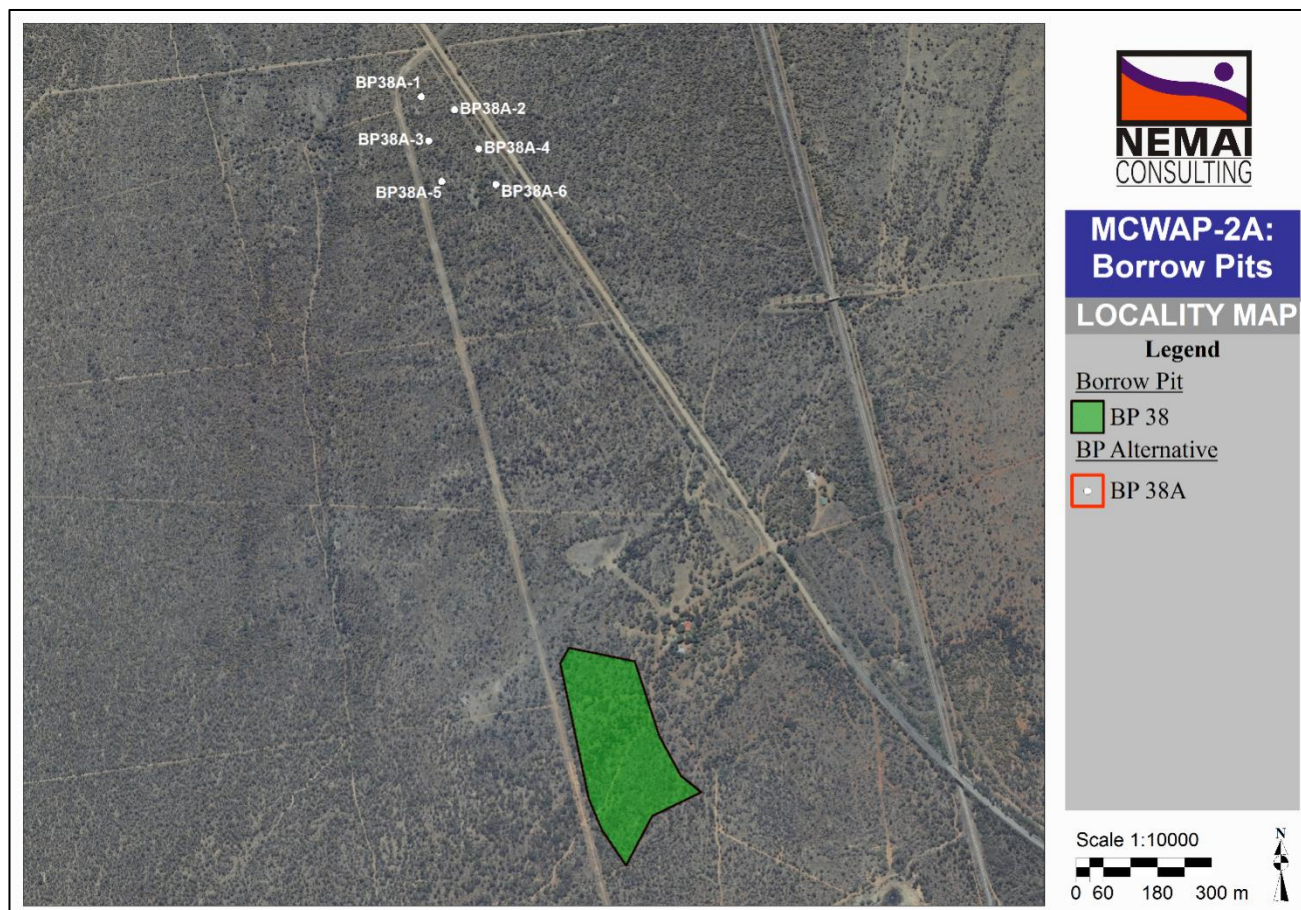
The area of the BP 35A is approximately 32 000m<sup>2</sup> and the estimated average excavation of the suitable materials will be 1.5m, indicating a potential source of selected backfill material of 48 000m<sup>3</sup>. The area could be extended to the east and west, but, due to the thick trees, the investigation was limited to the access gravel road.

Based on the test pit observations and material volume estimates, the proposed relocated site for BP 35 is a potentially marginal source of selected backfill material.

It was noted however by the landowner that the proven location of BP 35 was acceptable, provided that it could not be seen from the gravel road to the north, and thus would have to be repositioned slightly south of the proposed location. Given the relative ease of access and location closer to the proposed pipeline alignment of BP 35, it was recommended to include additional detailed investigations for this source prior to establishing the borrow pit to the proposed relocated area (SMEC, 2019b).

#### BP Alternative 38A

Four test pits were excavated across the proposed relocation site, as shown in **Figure 5**:



**Figure 5: BP Alternative 38A Locality Map**

The profile within the test pits generally comprised a nominal depth of topsoil overlying shale or diabase, which was occasionally overlain by a thin gravel layer. The TLB refused on the rock at depths of less than 1m.

Based on the findings on site, the proposed relocation of BP 38 is not viable as there are no suitable materials at BP 38A (SMEC, 2019c).

#### BP Alternative 39A

Seven test pits were excavated across the proposed relocation site, BP 39A, as shown in **Figure 6**.

The location of the borrow pit is to the south of the proven source and the observed profile within the test pits is similar to that of the investigations for BP 39. Therefore, on this basis it is assumed that the materials have similar properties and the relocated site is a suitable source. The area of the proposed alternative BP 39A is approximately 81 000m<sup>2</sup> and the estimated average excavation of the suitable materials will be 2m, indicating a potential source of selected backfill material of 160 000m<sup>3</sup>.

Based on the test pit observations and material volume estimates, the proposed relocated site for BP 39 is a potentially suitable source of selected backfill material. Furthermore, the northern boundary of the alternative borrow pit will have to be determined by the floodlines of the Matlabas River (SMEC, 2019d).

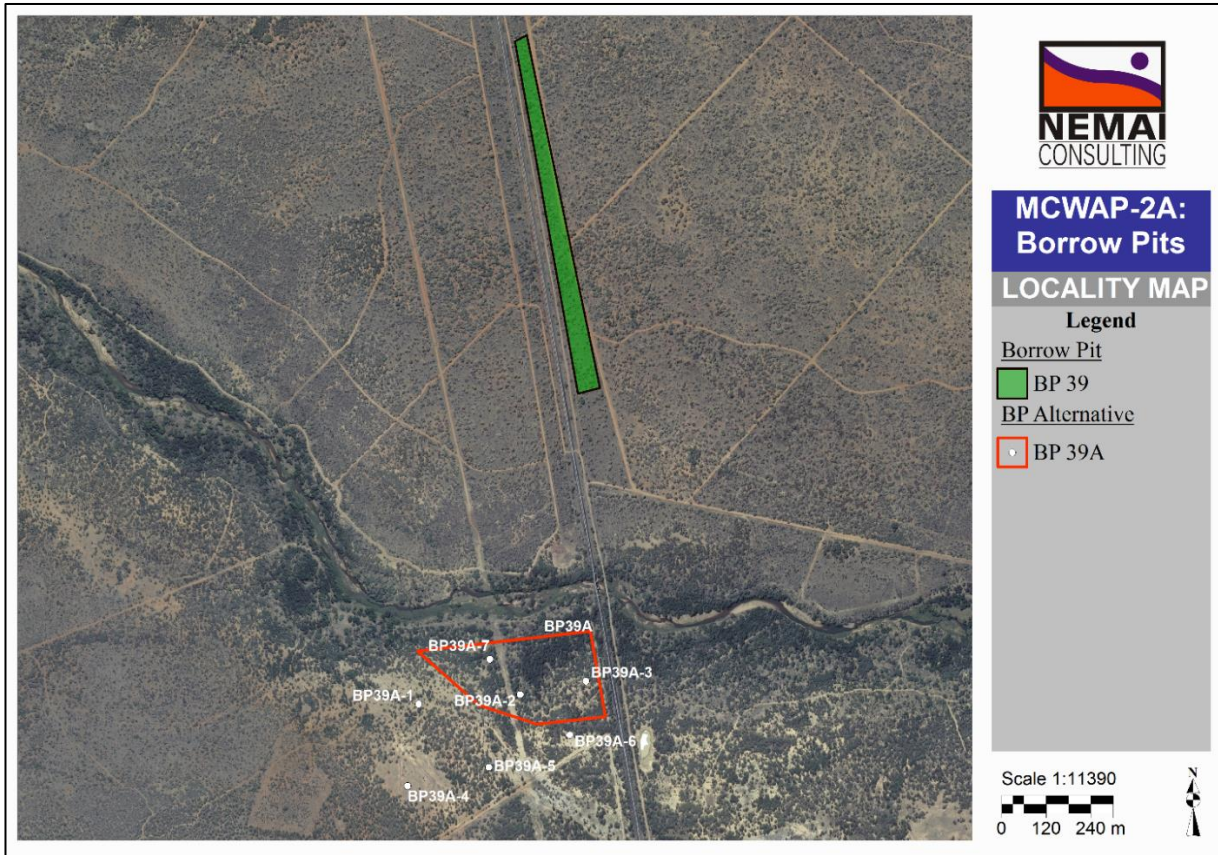


Figure 6: BP Alternative 39A Locality Map

BP Alternative 50A

Six test pits were excavated across the proposed relocation site, as shown in **Figure 7**:

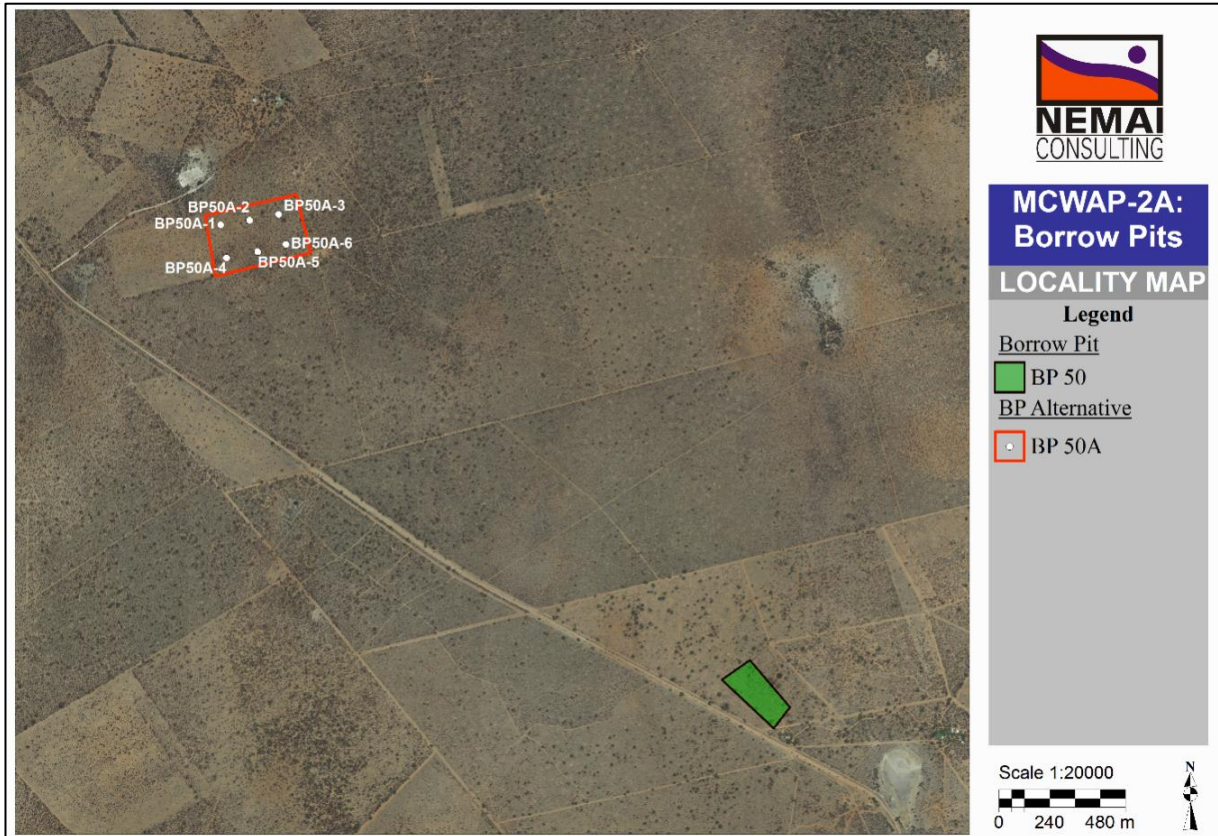


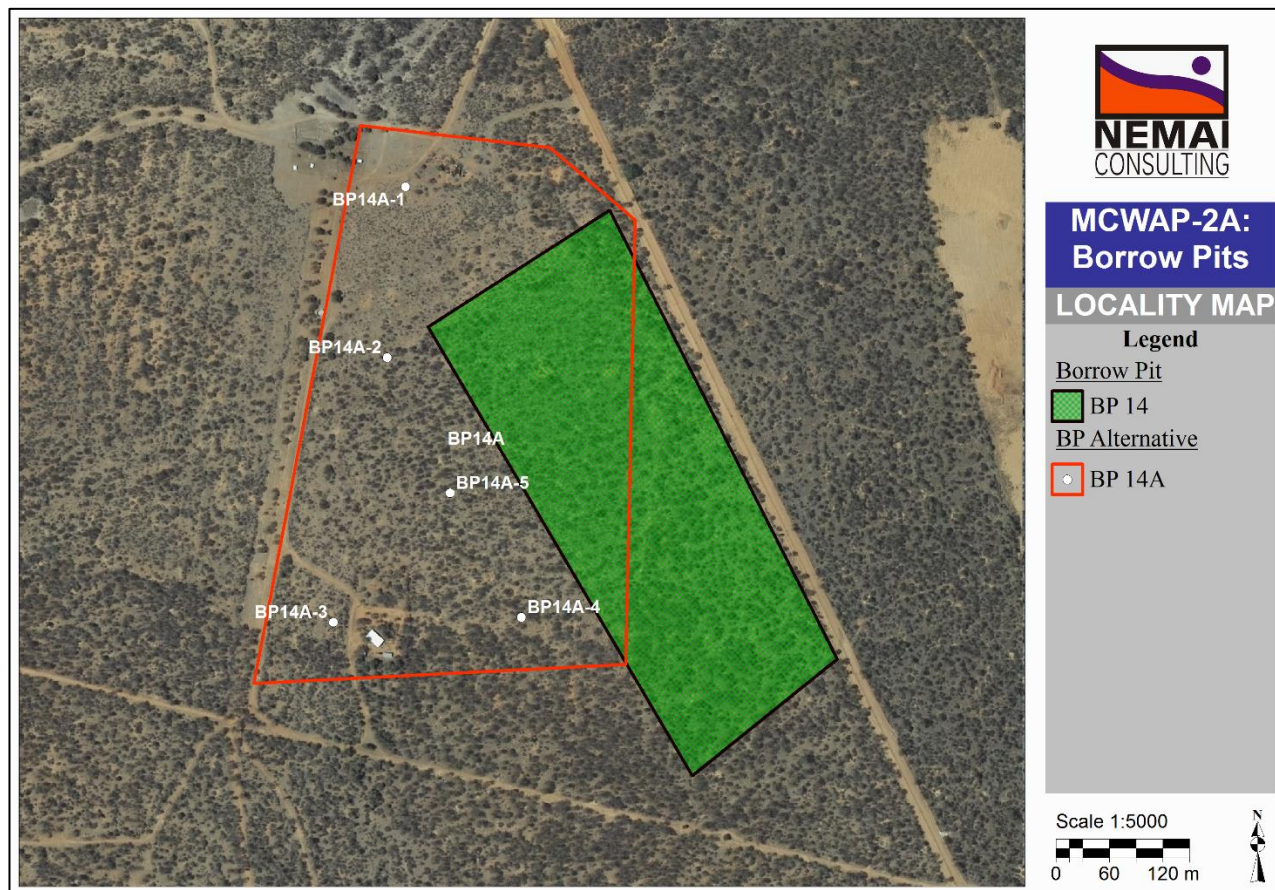
Figure 7: BP Alternative 50A Locality Map

The location of the alternative BP 50A is to the east of BP 48 and the observed profile within the test pits is similar to that of the investigations for BP 48. Therefore, on this basis it is assumed that the materials have similar properties and the relocated site is a suitable source. The area of the proposed BP 50A is approximately 128 000m<sup>2</sup> and the estimated average excavation of the suitable materials will be 1m, indicating a potential source of selected backfill material of 128 000m<sup>3</sup>.

Based on the test pit observations and material volume estimates, the proposed relocated site for BP 50 is a potentially suitable source of selected backfill material (SMEC, 2019e).

#### BP Alternative 14A

Five test pits were excavated across the proposed relocation site, as shown in **Figure 8**:



**Figure 8: BP Alternative 14A Locality Map**

The location of the alternative BP 14A overlaps with BP 14, and the observed profile within the test pits is similar to that of the investigations for BP 14. Therefore, on this basis it is assumed that the materials have similar properties and the relocated site is a suitable source.

The area of BP 14A is approximately 210 000m<sup>2</sup> and the estimated average excavation of the suitable materials will be 1m, indicating a potential source of bedding and selected backfill material of 210 000m<sup>3</sup>.

Based on the test pit observations and material volume estimates, the proposed relocated site for BP 14 is a potentially suitable source of pipe bedding and selected backfill material (SMEC, 2019f).

In summary, **Table 4** indicates the approximate size, volume and depth of the Alternative BP sites:

**Table 4: Details of Alternative BP Sites**

| Name   | Borrow Pit Area (ha) | Volume (m <sup>3</sup> ) | Average Depth (m) |
|--------|----------------------|--------------------------|-------------------|
| BP 30A | 8.4                  | 125 000                  | 1.5               |
| BP 39A | 8.1                  | 160 000                  | 2.0               |
| BP 50A | 12.8                 | 128 000                  | 1.0               |
| BP 14A | 21                   | 210 000                  | 1.0               |

Based on the findings of the Geotechnical Investigations, the BP Alternatives tabulated above were found as being potentially suitable sources of pipe bedding and selected backfill material, and will be assessed further in this EIA Report. BP 38A was deemed not viable as there were no suitable materials at the alternative site. BP 35 was acceptable, provided that it could not be seen from the gravel road to the north, and thus would have to be repositioned slightly south of the proposed location. Additional detailed investigations would thus be required for BP 35 prior to establishing the borrow pit to the BP 35A site. The Alternatives BP 35A and BP 38A were thus not assessed further in this EIA Report.

- (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**

The implications of not proceeding with the MCWAP-2A Borrow Pits are as follows:

- ❖ If the BPs cannot be created and mined then no construction materials can be sourced for the MCWAP-2A WTI. Suitable construction material may then need to be sourced from commercial sources, which may have significant negative financial implications.
- ❖ The “no-go option” (i.e. should the MCWAP-2A WTI not proceed) will have the following implications:
  - Underutilisation of the Waterberg Coal Reserves;
  - The development of new power stations is of high strategic importance with tight timeframes. Without a suitable source of water, the new power stations will not be possible, with potential future energy shortages;
  - The absence of water will suppress development, with associated macro-economic implications on a national scale; and
  - Without MCWAP-2A Eskom will not be able to implement the Flue-Gas Desulphurisation (FGD) technology at the Medupi Power Station to reduce sulphur emissions, which will violate the related condition in Eskom’s World Bank loan with devastating economic impacts on the economy of the Republic of South Africa (RSA).

In contrast, should the proposed MCWAP-2A and the required BPs not go ahead, any potentially significant environmental issues associated with the MCWAP-2A would be irrelevant and the status quo of the local receiving environment would not be affected by the borrow pits. The objectives of the project would, however, not be met.

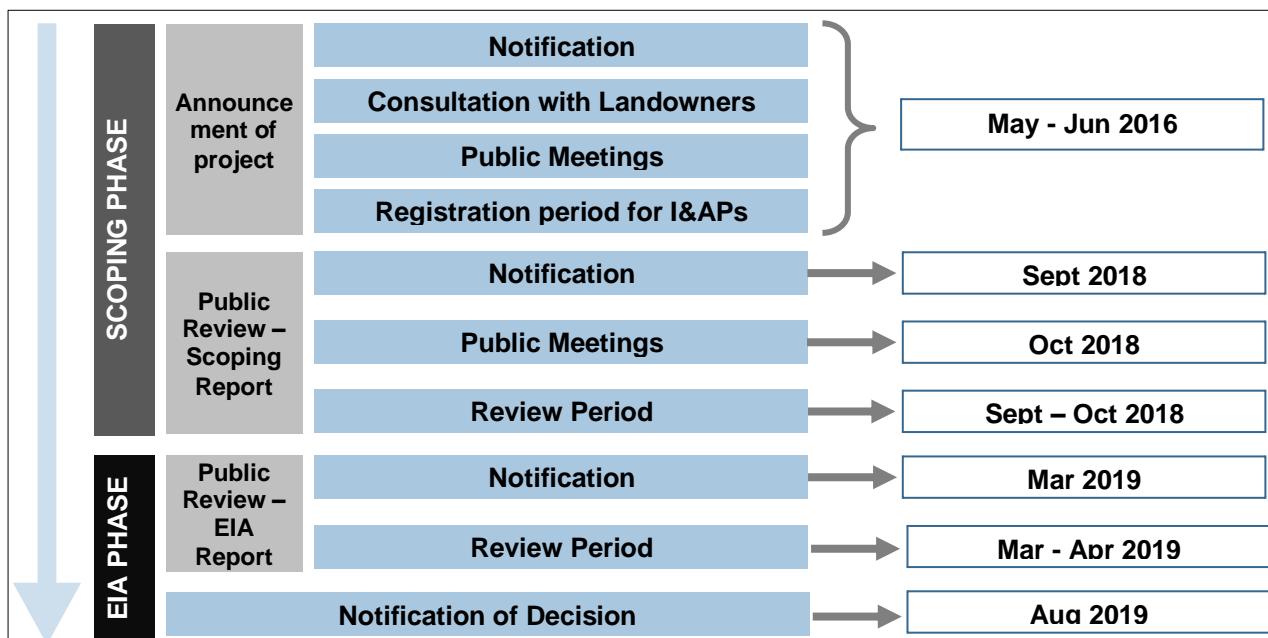
## ii) Details of the Public Participation Process Followed

The purpose of public participation includes:

1. Providing I&APs with an opportunity to obtain information about the MCWAP-2A;
2. Allowing I&APs to express their views, issues and concerns with regard to the MCWAP-2A;
3. Granting I&APs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the MCWAP-2A; and
4. Enabling the DWS, TCTA and the Project Team to incorporate the needs, concerns and recommendations of I&APs into the MCWAP-2A, where feasible.

The Public Participation Process (PPP) that was followed for the proposed BPs for the MCWAP-2A is governed by NEMA and GN No. R 982 of 4 December 2014 (as amended).

**Figure 9** outlines the PPP for the Scoping Phase and EIA Phase (current). Note that the dates may change due to the dynamic nature of the EIA Process.



**Figure 9: Outline of the Public Participation Process during the Scoping and EIA Phases**

The PPP for the MCWAP-2A borrow pits consists of the following three (3) phases:

1. Project Announcement Phase;
2. Scoping Phase; and
3. EIA Phase (current).

As part of the Project Announcement Phase for the MCWAP-2A EIA Process, the following tasks were undertaken:

### 1. Compile a Database of Potential I&APs, which included –

- a. Landowners, occupiers and/or persons in control of land affected by or adjacent to the footprint of the MCWAP-2A's physical infrastructure;
- b. Organs of state having jurisdiction in respect of any aspect of the activity;



- c. The municipality which has jurisdiction in the area (Waterberg District Municipality, Thabazimbi Local Municipality and Lephalale Local Municipality);
- d. The municipal councillors of the wards in which the project footprint site is situated;
- e. Ratepayers Associations (as relevant);
- f. Custodians of infrastructure that will be affected by the MCWAP-2A's components (including inter alia Eskom and Transnet);
- g. Formal agricultural groups,
- h. Specific interest groups (e.g. environmental, socio-economic; education); and
- i. Other.

**2. Placed Legal Notices in the following Newspapers –**

- a. Beeld (Afrikaans; regional);
- b. The Star (English; regional);
- c. The Daily Sun (English; regional);
- d. Die Kwêvoël (Afrikaans, local); and
- e. Mogol Pos (English; local).

**3. Distributed a Background Information Document (BID) and Reply Form to all I&APs identified and included in the project database.**

**4. Erected onsite notices (English and Afrikaans) at various locations along the project footprint. The sites were chosen to be conspicuous to and accessible by the public at the boundary or along the project component.**

**5. Placed Public Notices at the following locations -**

- a. Thabazimbi Municipal Office;
- b. Thabazimbi Library;
- c. Agri-SA Ellisras;
- d. Steenbokpan Shop;
- e. Koedoeskop Shop; and
- f. Sentrum Agricultural Union Auctioning Kraals.

**6. Notified I&APs via bulk SMS.**

**7. Notified directly affected landowners and adjacent properties.**

**8. Convened Public Meetings in:**

- a. Thabazimbi;
- b. Lephalale; and
- c. Steenbokpan

**9. Convened an Environmental Authorities Meeting.**

**10. Maintained a Comments and Responses Report (CRR).**

**Public Participation Tasks completed during the Scoping Phase for the MCWAP-2A BPs included the following:**

1. The Draft Scoping Report was placed in the public domain (including an electronic copy on the project website and hardcopies at public venues such as Thabazimbi, Lephalale and Marapong Public Libraries);
2. The I&APs were notified of the public review period of the Draft Scoping Report (via emails, SMS, on site notices and newspaper adverts);
3. A Focus Group Meeting, Public Meetings and Authorities Meeting were held in order to present the Draft Scoping Report; and
4. The CRR was updated based on all comments received during the review period of the Draft Scoping Report. All comments received from I&APs and an updated CRR were included in the Final Scoping Report, which was submitted to DMR for review.

**Tasks conducted during the EIA Phase:**

The Scoping Report and Plan of Study for the EIA were accepted by DMR on 5 November 2018 (**Appendix A**). This allowed the process to advance to the EIA Phase.

*Compilation of EIA Report*

This EIA Report contains information that is necessary for DMR to consider and to make a decision on the application. As a minimum, the EIA Report contains the information stipulated in Appendix 3 of GN No. R 982 of 4 December 2014 (as amended). The following critical components of the EIA Report are highlighted:

- ❖ A description of the policy and legislative context;
- ❖ A detailed description of the proposed development (full scope of activities);
- ❖ A detailed description of the proposed development site, which will include a plan that locates the proposed activities applied for as well as the associated structures and infrastructure;
- ❖ A description of the environment that may be affected by the activity and the manner in which physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed development;
- ❖ The methodology of the stakeholder engagement process;
- ❖ The CRR and IAPs Database are provided as appendices to the EIA Report;
- ❖ A description of the need and desirability of the proposed development and the identified potential alternatives to the proposed activity;
- ❖ A summary of the methodology used in determining the significance of potential impacts;
- ❖ A description and comparative assessment of the project alternatives;
- ❖ A summary of the findings of the specialist studies;
- ❖ A detailed assessment of all identified potential impacts;
- ❖ A list of the assumptions, uncertainties and gaps in knowledge;
- ❖ An environmental impact statement;
- ❖ Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;

- ❖ A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- ❖ An opinion by the consultant as to whether the development is suitable for approval within the proposed site;
- ❖ An EMPr that complies with Appendix 4 of GN No. R 982 of 4 December 2014 (as amended);
- ❖ Copies of all specialist reports are appended to the EIA report; and
- ❖ Any further information that will assist in decision making by the authorities.

#### Notification of Review of Draft EIA Report

In accordance with Regulation 43(1) of GN No. R 982 of 4 December 2014 (as amended), registered IAPs were granted an opportunity to review and comment on this Draft EIA Report. The following notifications were provided with regards to the review of this Draft EIA Report:

- ❖ Landowners, authorities and registered I&APs were notified via email and SMS.
- ❖ Notices were placed in the following newspapers:
  - The Star (Regional);
  - Beeld (Regional); and
  - The Daily Sun (Regional);

#### Accessing the Draft EIA Report

The review period for this Draft EIA Report will take place from **20 March 2019 until 25 April 2019**. Copies of the document were placed at the locations provided in **Table 5** below.

**Table 5: Locations for review of Draft EIA Report**

| Copy | Location                  | Address                                                         | Tel. No.     |
|------|---------------------------|-----------------------------------------------------------------|--------------|
| 1.   | Lephalale Public Library  | Lephalale Civic Centre, c/o Joe Slovo & Dou Water St, Lephalale | 014 762 1453 |
| 2.   | Thabazimbi Public Library | 4 <sup>th</sup> Ave, next to Police station in Thabazimbi       | 014 777 1525 |

Copies of this Draft EIA Report were provided to the following regulatory and commenting authorities:

- ❖ DMR;
- ❖ DEA;
- ❖ LDEDET;
- ❖ DWS Limpopo Regional Office;
- ❖ DAFF;
- ❖ LIHRA;
- ❖ SAHRA;
- ❖ Waterberg District Municipality, Thabazimbi Local Municipality and Lephalale Local Municipality.

An electronic copy of the Draft EIA Report was placed on the following website - <http://www.nemai.co.za/documents.html>.

Focus Group Meeting

A Specific Focus Group Meeting was held with various landowners directly affected by the BPs, on 12 January 2019, in order to capture their main concerns. A copy of the minutes of the focus group meeting is contained in **Appendix K**.

Landowner Meetings

The details of the meetings scheduled to present this Draft EIA Report to directly and adjacently affected landowners, are provided in **Table 6**. All the minutes of the meetings held during the review period of the Draft EIA Report, will be appended to the Final EIA Report, which will be submitted to DMR for review.

**Table 6: Details of Landowner Meetings – Draft EIA Phase**

| Date  | 16 April 2019                   | 17 April 2019                                     |
|-------|---------------------------------|---------------------------------------------------|
| Area  | Thabazimbi                      | Lephalale                                         |
| Time  | 13:30 – 16:30                   | 9:00 – 12:00                                      |
| Venue | Kumba Bioscope Hall, Thabazimbi | Mogol Club, Grootgeluk Conference Room, Lephalale |

Maintenance of I&AP Database

The I&AP Database will be updated as and when necessary during the execution of the EIA. The current I&AP Database is contained in **Appendix J**.

Comments and Responses Report

The CRR is contained in **Appendix H**. The CRR records the date that issues were raised, a summary of each issue, and the response of the team to address the issue. In addition, any unattended comments from the Scoping Phase or where the status of the previous responses has changed, were addressed in the CRR in the EIA Phase.

Notification of DMR Decision

All I&APs will be notified via email, fax or post after having received written notice from the DMR on the final decision on the application. Advertisements will also be placed in local and regional newspapers. These notifications will include the appeal procedure to the decision.

**iii) Summary of issues raised by I&APs**

The CRR (Refer to **Appendix H**) contains all correspondence and comments received from Authorities, Stakeholders and I&APs. The CRR will continuously be updated with all comments received during the review period of this Draft EIA Report, and will be appended to the Final EIA Report, which will be submitted to DMR.

For remarks on the Draft EIA Report, the reviewer can complete a Comment Sheet, which is included in **Appendix M**. These completed Comment Sheets need to be forwarded to Nemai Consulting by **25 April 2019**.

iv) The Environmental attributes associated with the development footprint alternatives.

(1) Baseline Environment

(a) Type of environment affected by the proposed activity

## CLIMATE

The information to follow, was obtained from the South African Weather Service for the weather stations situated in Thabazimbi and Lephalale.

### Temperature

#### Thabazimbi

Average daily maximum and minimum temperatures for the last ten years measured at the weather station in Thabazimbi, are shown in **Tables 7** and **8**, respectively.

**Table 7: Average Daily Maximum Temperature (°C) by month– Thabazimbi station**

| Year | JAN  | FEB   | MAR  | APR  | MAY   | JUN  | JUL  | AUG  | SEP  | OCT   | NOV   | DEC   |
|------|------|-------|------|------|-------|------|------|------|------|-------|-------|-------|
| 2006 | 29,8 | 29,5  | 27,2 | 27   | 23,2  | 22,6 | 24,8 | 24,7 | 29,5 | 32,9  | 30,8  | 33,6  |
| 2007 | 33,9 | 35,5  | 34,1 | 29,2 | 24,4= | 23,7 | 22,9 | 27   | 32,2 | 29,2  | 31,3  | 29,6  |
| 2008 | 29,2 | 31    | 28,8 | 27,6 | 26,2  | 24,2 | 23,8 | 28,2 | 31,6 | 34,7  | 32,1= | 33,2= |
| 2009 | 31,9 | 30,5= | 28,8 | 29,1 | 26    | 23,4 | 21,6 | 25,6 | 31,3 | 30,8= | 31,5  | 33,3  |
| 2010 | 31,6 | 32,7  | 32,6 | 26,2 | 25,7  | 22,6 | 22,8 | 27,1 | 32,6 | 34,5  | 32,9  | 31,9  |
| 2011 |      | 31,4  | 31,5 | 26,4 | 25,3  | 23   | 22   | 26,5 | 31   | 29,6= | 33,1= | 31,1  |
| 2012 | 32,2 | 34    | 31,9 | 28,4 | 27,9  | 23,7 | 24,7 | 27,9 | 29,9 | 31,9  | 33,2  | 31    |
| 2013 | 32,9 | 34    | 32,1 | 28,4 | 26,4  | 24,9 | 23,8 | 26,6 | 31,4 | 31,8  | 34,4  | 31    |
| 2014 | 33,3 | 32,2  | 28,1 | 27   | 26,4  | 23,8 | 23,4 | 26,6 | 31,5 | 32,1  | 31,3  | 31,9  |
| 2015 | 33   | 35,3  | 32,9 | 29   | 29,1  | 23,4 | 24,4 | 29,4 | 31,1 | 35,3  | 34,8  | 37,5  |

= indicates that the average is unreliable due to missing daily values

**Table 8: Average Daily Minimum Temperature (°C) by month– Thabazimbi station**

| Year | JAN  | FEB   | MAR  | APR  | MAY  | JUN | JUL | AUG | SEP  | OCT   | NOV   | DEC   |
|------|------|-------|------|------|------|-----|-----|-----|------|-------|-------|-------|
| 2006 | 20,2 | 19,1  | 16,8 | 11,5 | 4,5  | 1,6 | 2,4 | 6,3 | 10,3 | 16,5  | 17,6  | 20,1  |
| 2007 | 18,6 | 18,5  | 17,9 | 13,4 | 2,7= | 3,6 | 1,9 | 5,4 | 14   | 16,1  | 17,5  | 18,1  |
| 2008 | 19   | 18,2  | 17   | 9,5  | 7,4  | 3,2 | 2,8 | 7,1 | 11,7 | 18,6  | 19,9= | 21,1= |
| 2009 | 20,7 | 19,6= | 16,1 | 11,3 | 7,8  | 5,6 | 1,1 | 5,2 | 13,1 | 16,8= | 18,3  | 19,3  |
| 2010 | 20,6 | 19,2  | 18,8 | 15,4 | 9,5  | 2,3 | 4,9 | 5,3 | 11,3 | 18,1  | 19,1  | 19,1  |
| 2011 |      | 19,1  | 17,9 | 14,5 | 7,8  | 2   | 1,3 | 5,5 | 13   | 13,1= | 17,5= | 20,2  |
| 2012 | 19,8 | 20,1  | 16,9 | 11,5 | 7    | 3,5 | 3,7 | 7,4 | 12,3 | 16,6  | 18,4  | 18,5  |
| 2013 | 20,4 | 20    | 18   | 12,5 | 6    | 3,2 | 4,6 | 6,4 | 14,1 | 17,6  | 19,4  | 20,2  |
| 2014 | 20,6 | 20,5  | 18,8 | 12,4 | 6,9  | 2,8 | 3,1 | 8   | 13,1 | 17,2  | 18,9  | 20,5  |
| 2015 | 20,4 | 20,2  | 19,3 | 14,4 | 7,8  | 4,3 | 5,6 | 8   | 15,4 | 19,6  | 19,3  | 21,9  |

= indicates that the average is unreliable due to missing daily values

## Lephalale

Average daily maximum and minimum temperatures for the last ten years measured at the weather station in Lephalale are shown in **Tables 9 and 10**, respectively.

**Table 9: Average Daily Maximum Temperature (°C) by month– Lephalale station**

| Year | JAN  | FEB  | MAR  | APR  | MAY  | JUN  | JUL  | AUG  | SEP  | OCT  | NOV  | DEC  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2006 | 31,1 | 30,9 | 27,2 | 27,6 | 24,5 | 23,9 | 25,3 | 25,2 | 29,4 | 33   | 31,9 | 34,1 |
| 2007 | 32,6 | 35,3 | 33,2 | 28,5 | 26,1 | 24   | 23,2 | 27,3 | 31,9 | 28,8 | 30,3 | 28,8 |
| 2008 | 29,7 | 33,4 | 30,6 | 29,2 | 27,4 | 25,3 | 24,1 | 28,4 | 31,5 | 33,9 | 31,5 | 32,4 |
| 2009 | 31,6 | 30,8 | 28,9 | 29,4 | 26,5 | 24,3 | 22,5 | 26,3 | 31,2 | 31,9 | 33,3 | 35,8 |
| 2010 | 35,5 | 36,6 | 36,3 | 29,3 | 28,5 | 23,8 | 24   | 27,5 | 32,4 | 35,1 | 32,8 | 33,1 |
| 2011 | 31,2 | 32,5 | 34,1 | 28,2 | 27,9 | 24,8 | 23,7 | 27   | 32,6 | 32,7 | 33,5 | 31,2 |
| 2012 | 33,2 | 35   | 33,8 | 29,6 | 28,9 | 25,3 | 25,6 | 28,3 | 30,2 | 31   | 32,4 | 31,3 |
| 2013 | 32,1 | 33,8 | 31,3 | 28,8 | 27   | 26   | 24,9 | 27,1 | 32,1 | 32,1 | 34,8 | 30,8 |
| 2014 | 32,4 | 31,9 | 28,7 | 27,3 | 26,7 | 24,8 | 24,3 | 27,4 | 31,6 | 32,2 | 31,4 | 31,3 |
| 2015 | 33   | 35,2 | 33,3 | 29,8 | 30,6 | 25,3 | 26,2 | 30,5 | 31,7 | 36,3 | 34,9 | 36,7 |

**Table 10: Average Daily Minimum Temperature (°C) by month– Lephalale station**

| Year | JAN  | FEB  | MAR  | APR  | MAY  | JUN | JUL | AUG  | SEP  | OCT  | NOV  | DEC  |
|------|------|------|------|------|------|-----|-----|------|------|------|------|------|
| 2006 | 20,3 | 20   | 17,2 | 13,1 | 6,9  | 5,4 | 5,7 | 7,1  | 11,5 | 17,1 | 18,1 | 19,8 |
| 2007 | 18,6 | 19   | 17,6 | 13,4 | 6,1  | 4,4 | 2,7 | 6,4  | 13,6 | 15,2 | 15,8 | 17,3 |
| 2008 | 19,2 | 18,7 | 17,9 | 11,8 | 10,4 | 6,4 | 5,8 | 8,9  | 12   | 17,6 | 19,3 | 19,9 |
| 2009 | 20,5 | 19,3 | 17   | 12,3 | 9,8  | 6,8 | 4,1 | 6,9  | 13,9 | 17,6 | 19,5 | 21,9 |
| 2010 | 22,9 | 23   | 22,3 | 19,2 | 14,2 | 6,5 | 7,3 | 8,4  | 13,6 | 18,3 | 19,8 | 20,2 |
| 2011 | 20,7 | 19,6 | 20,1 | 16,4 | 11,3 | 5,1 | 4,8 | 8,1  | 13,3 | 17,3 | 19,7 | 20,2 |
| 2012 | 20,6 | 21   | 18,9 | 13,9 | 10,3 | 7,1 | 6,6 | 8,8  | 14,2 | 17,5 | 18,5 | 19,9 |
| 2013 | 21   | 20,3 | 18,2 | 14,4 | 9,2  | 6,4 | 7,4 | 8,7  | 14,8 | 17   | 20   | 20,3 |
| 2014 | 21,1 | 20,6 | 19,3 | 14,7 | 9,9  | 6,3 | 5,9 | 9,1  | 14   | 16,7 | 18,9 | 20   |
| 2015 | 20,7 | 22   | 20,4 | 16,7 | 11,7 | 8,5 | 9   | 11,3 | 16,3 | 20,3 | 20,1 | 23   |

## Precipitation

The study area is classified as semi-arid. Precipitation occurs mainly in the summer, where the maximum rainfall is normally experienced between the months of November - March.

## Thabazimbi

The monthly daily rainfall for the last ten years for Thabazimbi is shown in **Table 11**.

**Table 11: Monthly Daily Rain (mm) by month– Thabazimbi station**

| Year | JAN   | FEB   | MAR   | APR  | MAY  | JUN  | JUL  | AUG  | SEP  | OCT  | NOV   | DEC   |
|------|-------|-------|-------|------|------|------|------|------|------|------|-------|-------|
| 2006 | 23    | 239,8 | 96,2  | 2    | 3,6  | 0,8  | 0    | 3,6  | 0    | 55,6 | 71,6  | 64,8  |
| 2007 | 32,4  | 11,4  | 0,4   | 22,2 | 0    | 17,8 | 4,4  | 0    | 58   | 65,4 | 42,2  | 83,2  |
| 2008 | 186,4 | 6,4=  | 79,0= | 2,4  | 11,2 | 2,4  | 3,6  | 0    | 0    | 0,2  | 63,6= | 24,2= |
| 2009 | 50,6  | 0,0=  | 16,8  | 0    | 5,2  | 41   | 0    | 0    | 0    | 5,6= | 0,4   | 9,4   |
| 2010 | 1,2   | 0     | 26,6  | 71   | 39,2 | 0    | 0    | 0    | 0    | 0    | 0     | 0,0=  |
| 2011 |       |       |       | 0,2  | 0,2  | 0,0= | 0,0= | 0,0= | 0    | 0,0= | 0,2=  | 0     |
| 2012 | 36,8  | 11    | 1     | 0    | 0    | 0    | 0    | 0    | 0    | 24   | 5,4   | 19    |
| 2013 | 14,2  | 12,8  | 92    | 22,6 | 0    | 0    | 0    | 0,6  | 29,4 | 41,2 | 11,8  | 89,4  |
| 2014 | 36,6  | 31,2  | 146,6 | 12,2 | 2,2  | 0    | 0    | 0    | 1,4  | 15,8 | 36,4  | 95,4  |
| 2015 | 75,6  | 40,6  | 54,2  | 37,8 | 0    | 0    | 0,6  | 0    | 16,2 | 12,4 | 46,4  | 67,4  |

= indicates that the average is unreliable due to missing daily values

## **Lephalale**

The monthly daily rainfall for the last ten years for Lephalale is shown in **Table 12**.

**Table 12: Monthly Daily Rain (mm) by month– Lephalale station**

| Year | JAN   | FEB  | MAR   | APR  | MAY | JUN | JUL | AUG | SEP  | OCT  | NOV   | DEC   |
|------|-------|------|-------|------|-----|-----|-----|-----|------|------|-------|-------|
| 2006 | 143,6 | 68,8 | 52,2  | 12,4 | 11  | 0   | 0   | 2   | 1,6  | 3,2  | 42    | 81,4  |
| 2007 | 11,8  | 24,2 | 47,4  | 36,6 | 0   | 0,2 | 1,4 | 0   | 30,2 | 90,2 | 113,4 | 74,6  |
| 2008 | 142,4 | 0    | 60,8  | 1,2  | 11  | 0   | 1   | 0   | 0    | 15,2 | 166,2 | 80,8  |
| 2009 | 116,8 | 62   | 69,8  | 0,6  | 4,8 | 8,4 | 0,2 | 0   | 0    | 42,6 | 74,6  | 85,4  |
| 2010 | 77,8  | 19,6 | 18,8  | 75,2 | 51  | 0   | 0   | 0   | 0    | 36   | 52,4  | 61,4  |
| 2011 | 150,4 | 3,4  | 3,6   | 2,4  | 0   | 0   | 0   | 0   | 0    | 73   | 51,8  | 82,8  |
| 2012 | 66    | 52   | 29,2  | 0    | 0   | 0   | 0   | 0   | 4    | 93,6 | 61,4  | 167,2 |
| 2013 | 118   | 9,2  | 21    | 55   | 0   | 0   | 0   | 0   | 0    | 21,2 | 19,2  | 122,8 |
| 2014 | 29,8  | 20,6 | 218,8 | 27,4 | 0,4 | 0,2 | 0   | 0   | 0    | 23,4 | 24,6  | 162,4 |
| 2015 | 24,6  | 48   | 29,4  | 21,6 | 0   | 1,6 | 2,2 | 0   | 12,2 | 29,8 | 57,6  | 63,8  |

## **GEOLOGY**

The information to follow is a summary taken from the Geotechnical Investigations (Mokolo Crocodile Consultants, 2012), which was conducted in July 2012. Test pits were excavated at a nominal 200 m spacing along the pipeline route and at a nominal spacing of 30 m at proposed borrow pit locations. This was the basis of the geotechnical investigation for the MCWAP-2A project. Due to the amount of borrow areas required, geotechnical investigations for the borrow areas were conducted at different stages (Stage 1 - 4).

The specific stages and borrow areas which fall within each stage, are shown in the **Figure 10** below, and their findings are provided in the subsections to follow. The findings for the borrow areas are presented in order, starting from the first borrow area, BP SS1 in the south, moving in a north easterly direction up to the last borrow area, BP 15 in the north-east.

### **BP SS1 to BP 35**

The geology of the pipeline route commences in the south on Pretoria Group strata (dolomite, chert, shale, quartzite and andesite), passes onto Ventersdorp Supergroup strata (lava, quartzite, conglomerate), then onto Basement Granite (1G). The route then swings north-eastwards and passes back onto Pretoria Group strata before crossing onto the Lebowa Granite Suite (3G1), which has been intruded by diabase (probably in the form of sills), with patches of Waterberg sandstone. Deposits of Quaternary sand occur to the north and west of Thabazimbi, blanketing the older rocks (Mokolo Crocodile Consultants, 2012a).

### **BP 28 to BP 43**

The geology of the area comprises Waterberg sandstone over most of the route, with limited exposures of granite in the south. Diabase is intruded into the Waterberg and granite over the southern half (essentially south of the Matlabas River). North of the Matlabas River, extensive occurrences of Quaternary sand occur, blanketing the sandstone. Calcrete and ferricrete (with occasional silcrete) occur at the base of the sand (Mokolo Crocodile Consultants, 2012b).

BP 43 to BP 15

The geology of the area comprises Waterberg sandstone, which occurs over the whole of the route. Extensive deposits of Quaternary sand are present, blanketing the sandstone. Calcrete and ferricrete (with occasional silcrete) occur at the base of the sand (Mokolo Crocodile Consultants, 2012c).

BP 15 to BP 51

Karoo sediments (sandstone, mud rocks, coal) are present to the north of the east-west trending Eenzaamheid Fault. The Karoo sediments are downthrown into contact with older Waterberg sandstone, which are present along the southern side of the fault. Extensive deposits of Quaternary sand are present, blanketing the underlying geology, particularly in the west. Calcrete and ferricrete frequently occur at the base of the sand (Mokolo Crocodile Consultants, 2012d).

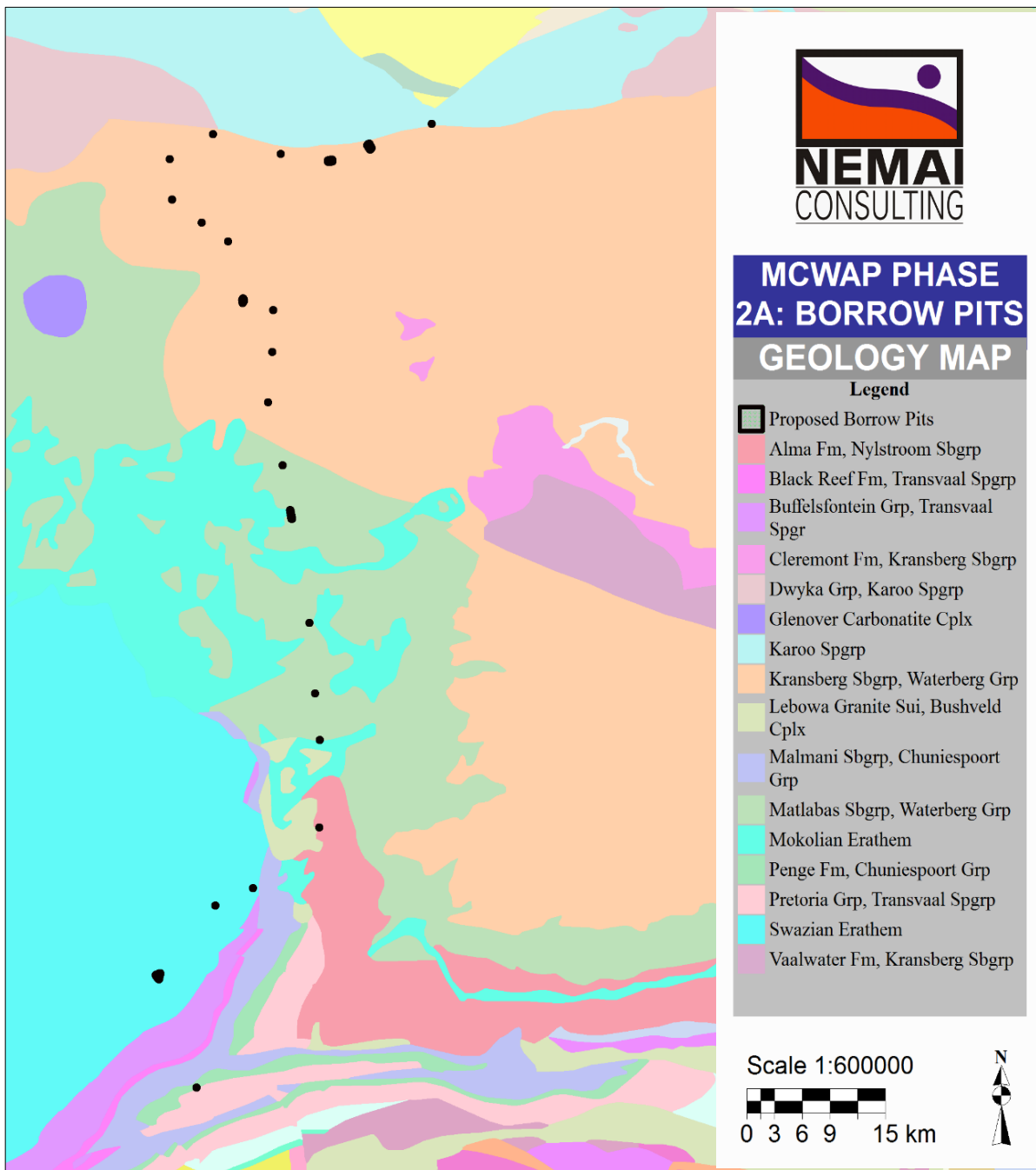
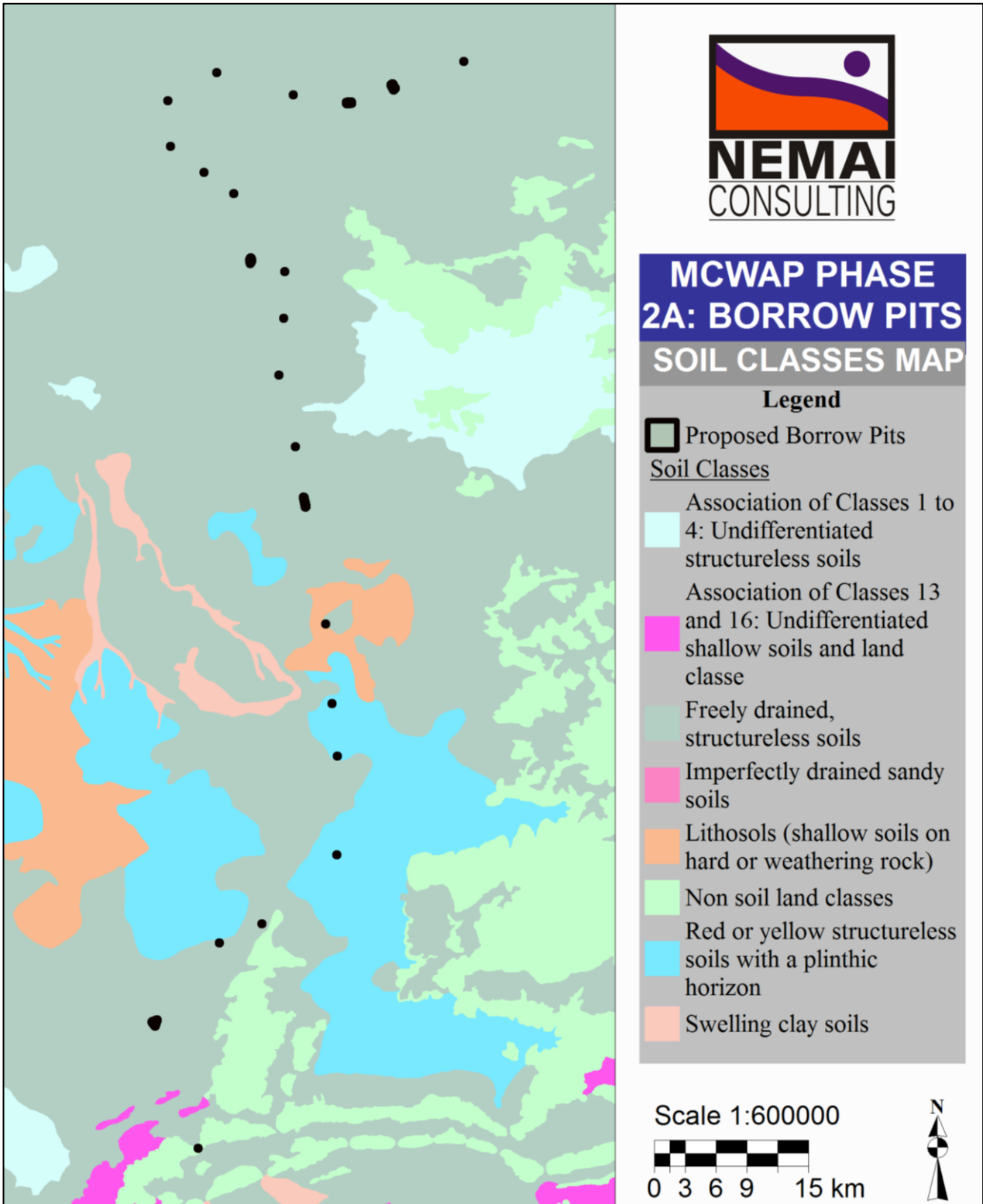


Figure 10: Geology map



# SOILS

The soil classes encountered in the project area are shown in **Figure 11**. The majority of the borrow pits fall within areas characterised by freely drained, structure less soils. However, some borrow areas fall within red or yellow structureless soils and lithosols, which are shallow soils found on hard or weathering rock.



**Figure 11: Soil classes**

## GEOHYDROLOGY

The main findings from the 2010 Geotechnical Investigations (Mokolo Crocodile Consultants, 2012) contained in **Appendix E**, with regards to groundwater found beneath the borrow areas, follow:

### BP SS1 to BP 35:

No seepage was encountered in any test pits, even though some were dug in the vicinity of the Crocodile River (The investigation was carried out during February and July - August 2010) (Mokolo Crocodile Consultants, 2012a).

### BP 28 to BP 43:

A total of 269 test pits were dug along the pipeline route and in only one was groundwater encountered – slight seepage at 2,1 m depth in test pit CC/202. Caving of the sides of the test pit occurred, preventing measurement of an overnight water rest level. No significant occurrences of hydrophilic vegetation, which might be indicative of shallow groundwater conditions, were observed along the route (Mokolo Crocodile Consultants, 2012b).

### BP 43 to BP 15:

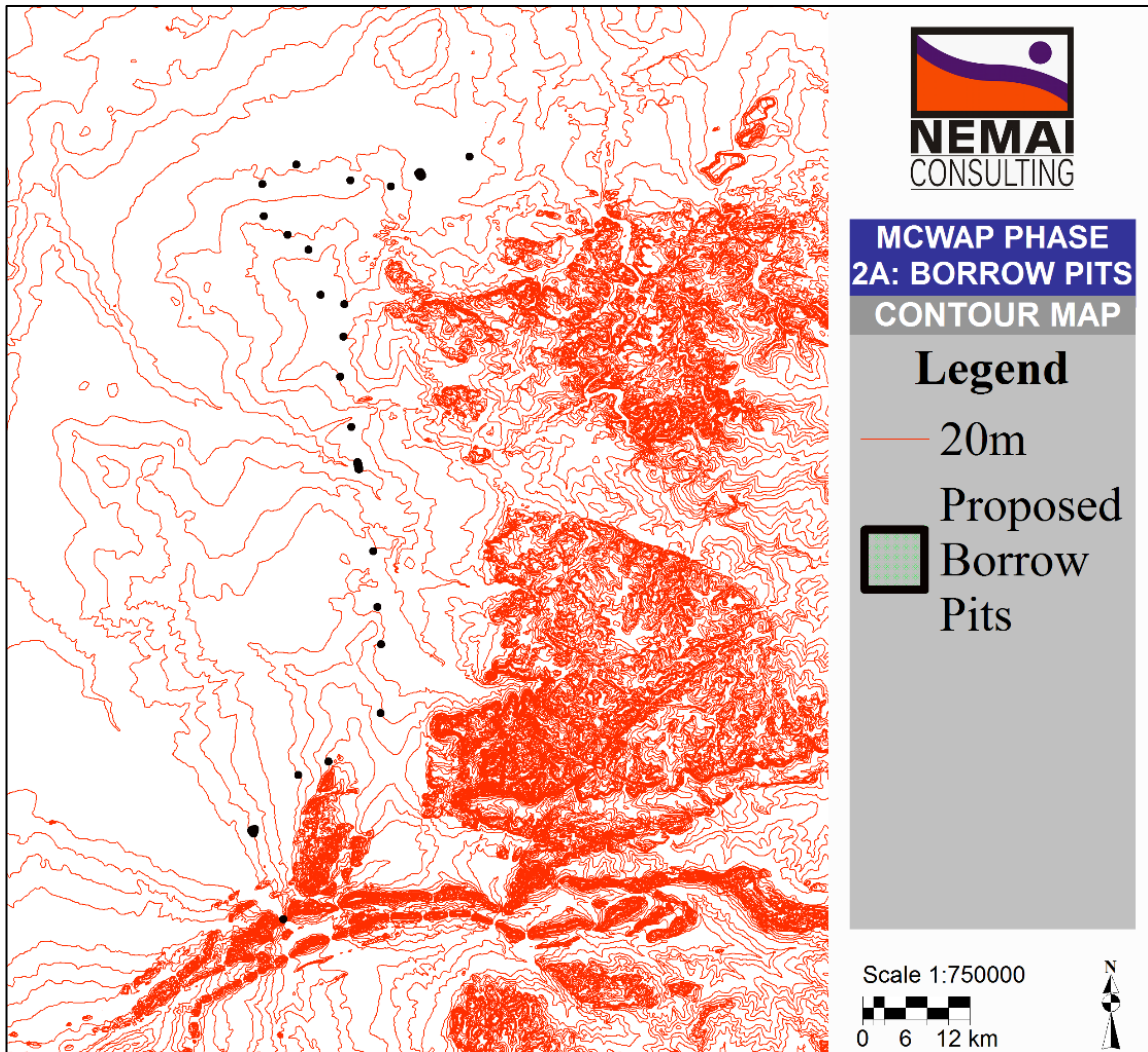
A total of 163 test pits were dug along the two pipeline routes and in only 3 was groundwater encountered - slight seepage at between 2 and 3 m depth in test pits CN/01, CN/12 and CN/94. None of these test pits showed signs of instability. A number of non-perennial pans occur along the route and elevated water tables may be found in their vicinity, when they contain water. No occurrence of hydrophilic vegetation, which might be indicative of shallow groundwater conditions, was observed along the route (Mokolo Crocodile Consultants, 2012c).

### BP 15 to BP 51:

A total of 196 test pits were dug along the pipeline route. Seepage was encountered in 5 test pits, all north of the Medupi construction site. No occurrence of hydrophilic vegetation, which might be indicative of shallow groundwater conditions, was observed along the route (Mokolo Crocodile Consultants, 2012d).

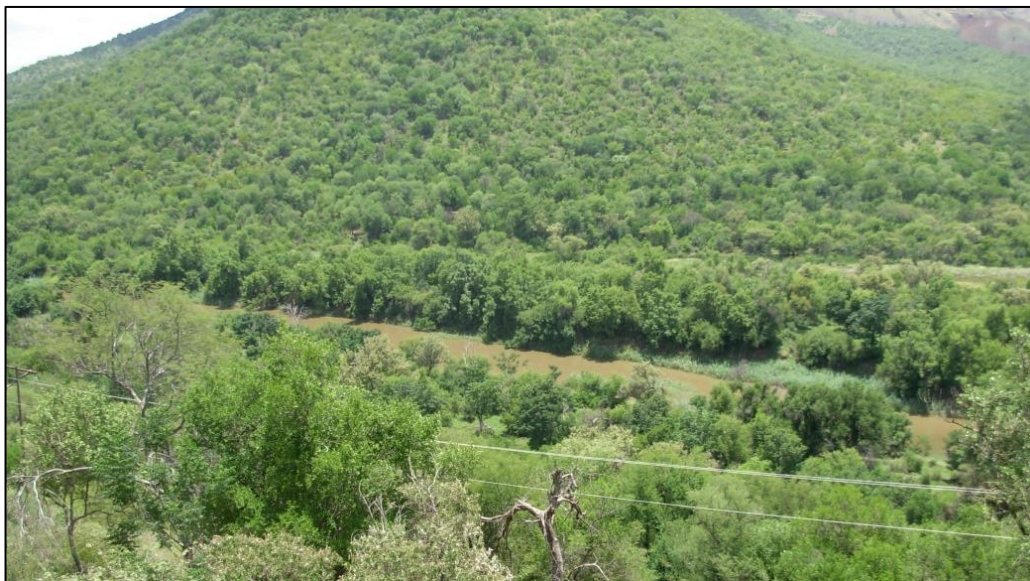
## TOPOGRAPHY

The terrain in the first section of the project footprint in the Vlieëpoort region (i.e. south-western part of project area) consists of low mountains. From there the terrain transforms to plains for the remainder of the project area, which comprises flat and undulating topography. Refer to **Figure 12** for the contours in the greater area.



**Figure 12: Contour map (20m interval)**

The first borrow area, BP SS1, is located in a narrowing valley where the Crocodile River (West) cuts through the Vlieëpoort mountains, below the proposed weir site (see **Figure 13**). The site is characterised by a relatively wide river section, estimated in the order of 350 m.



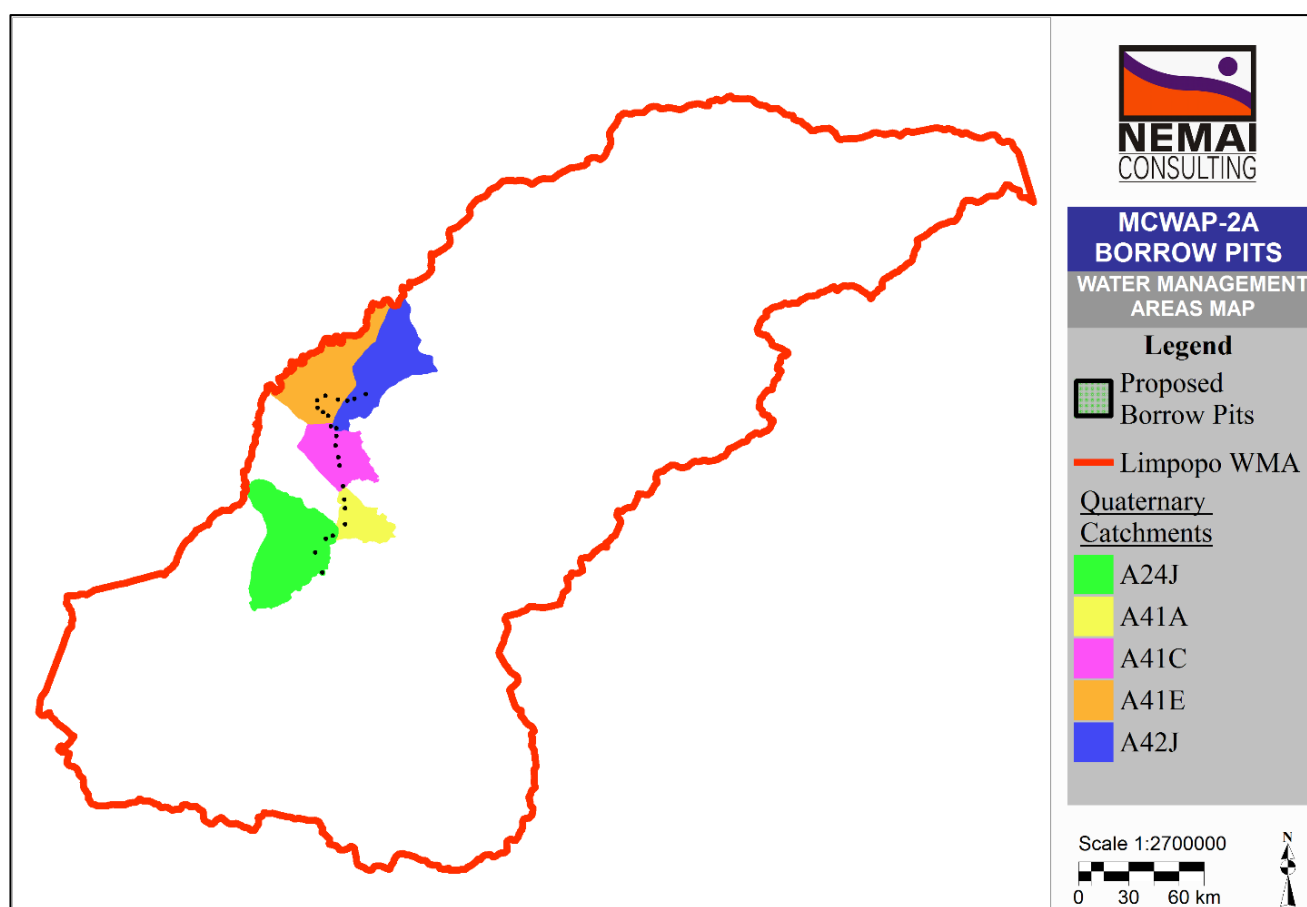
**Figure 13: BP SS1 site by Vlieëpoort Mountains**

## SURFACE WATER

A Baseline Aquatic and Impact Study was conducted (see **Appendix F1**) for the project. This section has been updated with the pertinent findings from the above-mentioned study, Refer to **Section 1(i)** for the related impact assessment and **Section 1(j)** for all recommendations from the study.

### *Hydrology*

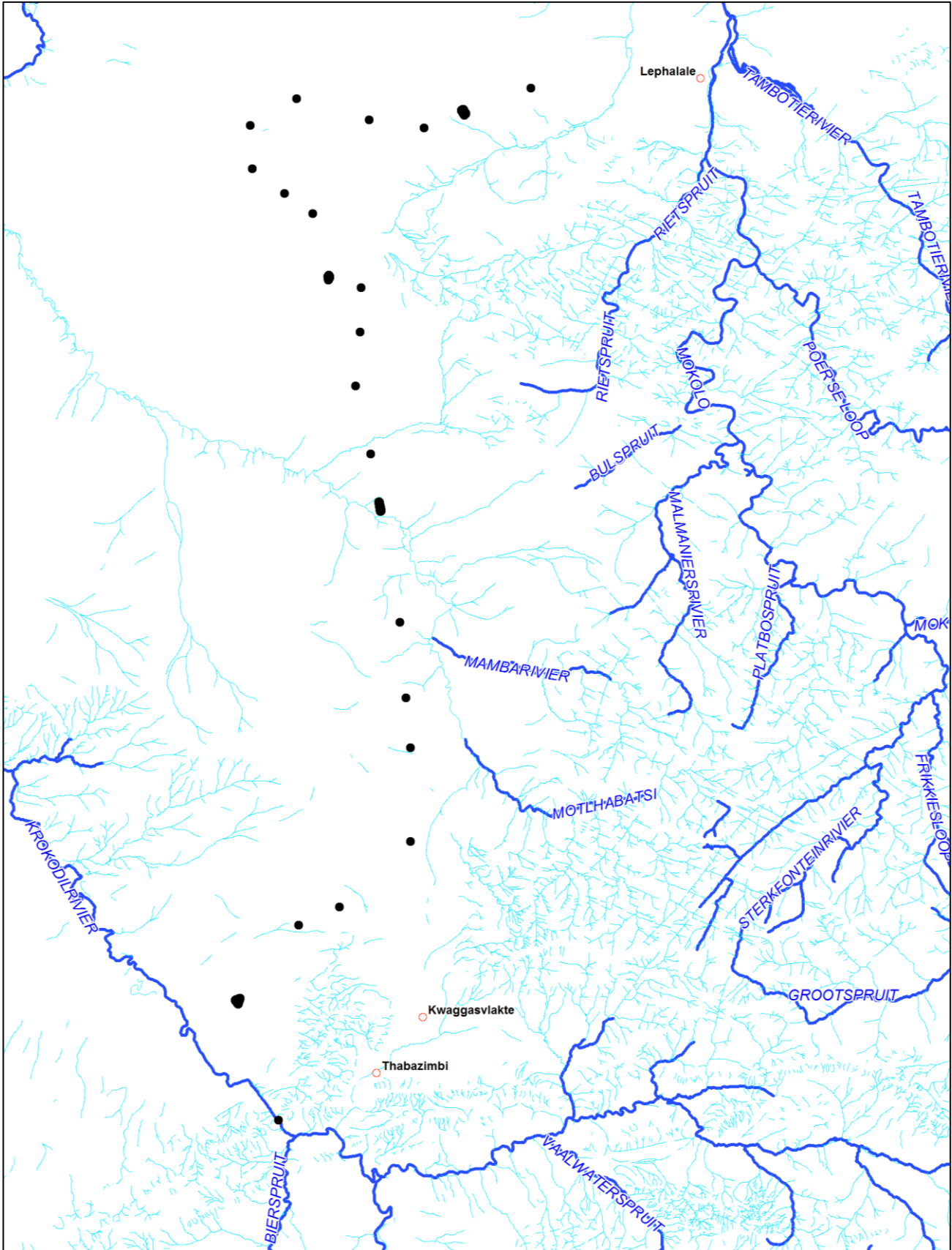
According to the G.N. 1056 (16 September 2017) “New Nine (9) Water Management Areas of South Africa”, the study area is situated within the Limpopo Water Management Area (WMA). As seen in the **Figure 14**, the proposed borrow pits also fall within Quaternary Catchments within the Limpopo WMA.



**Figure 14: Limpopo Water Management Area**

The southern sections of the proposed borrow pits fall within the A24J quaternary catchment area, whereas the middle section falls within the A41A, A41C quaternary catchments. The northern section of proposed borrow pits fall within two quaternary catchments, namely A41E and A42J. The Crocodile River, which is a major tributary of the Limpopo River, is primarily fed by the Pienaars, Apies, Moretele, Hennops, Jukskei, Magalies and Elands Rivers. The total area of the Crocodile River Catchment is 29 400 km<sup>2</sup> (DWAF, 2004b).

The major watercourses and drainage lines in the region, are shown in **Figure 15** below.



**Figure 15: Perennial and non-perennial map**

The natural Mean Annual Runoff (MAR) of the Limpopo River is 5 067 million m<sup>3</sup> per annum, which mainly occurs during large floods. According to the Water Research Commission (WRC) (2004), some key features of the Limpopo River catchment include the following:

- Parts of Johannesburg and Pretoria are situated in the upper reaches of the Crocodile River (in the Crocodile (West) Marico WMA) and are supplied with 650 million m<sup>3</sup> per annum of water transferred from Vaal Dam (in Upper Vaal WMA);
- Some 340 million m<sup>3</sup> per annum of this imported water is returned to the upper tributaries of the Crocodile River as treated but nutrient rich effluent, which has resulted in eutrophication of dams, whereas the natural runoffs of the Crocodile and Marico Rivers (in the Crocodile West/Marico WMA) together equal only 202 million m<sup>3</sup> per annum. Dolomitic aquifers supply 111 million m<sup>3</sup> per annum; and
- The demand for water in all the South African tributaries of the Limpopo River is dominated by the irrigation requirements, followed by urban usage.

Africa has international agreements and obligations with each of these countries that need to be adhered to in terms of any new water resource developments within the catchment. The Crocodile River system is regulated by the following 9 major dams:

- Rietvlei, Hartbeespoort and Roodekopjes Dams in the Crocodile River (West);
- Roodeplaat and Klipvoor Dams in the Apies/Pienaars River; and
- Olifantsnek, Bospoort, Lindleyspoort and Vaalkop Dams in the Elands River area.

#### Directly affected Rivers and Streams

The Crocodile River (West) is directly affected by first proposed borrow area known as BP SS1, and associated infrastructure that will fall within the management area of the borrow pit (refer to **Figure 16** below). BP SS1 is approximately 2,2km downstream of the confluence of the Bierspruit and is situated downstream of the proposed Vlieëpoort Weir Site. BP 39A is situated between the Matlabas River and its tributary (refer to **Figure 16**).



**Figure 16: Directly affected watercourses**

#### Water Use

Existing water users from the portion of the Crocodile River (West) catchment downstream of the borrow area BP SS1 are mainly irrigators (see **Figure 17**) that fall within the Mooivalei and Makoppa areas.



**Figure 17: Indication of irrigation areas in the Crocodile River (West) (downstream of BP SS1)**

### Ecological Status

According to the Baseline Aquatic and Impact Assessment (The Biodiversity Company, 2018) the results of the Present Ecological Status (PES) of the Crocodile River (West), directly affected by the borrow pit BP SS1, is presented in the table to follow:

**Table 13: PES of the Crocodile River reach (The Biodiversity Company, 2018)**

| Category          | Score | Ecological Category |
|-------------------|-------|---------------------|
| Riparian          | 56,1  | D                   |
| Macroinvertebrate | 76,5  | C                   |
| Fish              | 69,51 | C                   |
| Eco Status        | C     |                     |

The results from the table above indicates that the Crocodile reach was in a moderately modified state during the survey (**Table 13**). This is attributed to the modifications to instream habitat, connectivity, flows, water quality, and riparian zone, resulting in a modified biotic integrity.

With regards to fish species, during the dry season survey, 12 indigenous fish species were collected and a single exotic species (*Gambusia affinis*) was found within the Crocodile River reach. This included several sensitive species, including *Chiloglanis paratus*, *C. pretoriae*, *Labeo cylindricus*, *L. molybdinus*, and *Labeobarbus marequensis* (Table 14).

The species most frequently collected within the Crocodile River includes *L. molybdinus*, *L. marequensis*, and *Oreochromis mossambicus*. The predominant cover features within the system included undercut banks with marginal vegetation (e.g. *Phragmites* sp.).

Sites CROC1 and CROC2 presented stones and bedrock with fast flowing water biotopes, which are preferred habitat for several species collected during the survey including the *Labeo*, *Labeobarbus* and *Chiloglanis* species. The dominant biotope within the reach was moderately flowing waters over shallow sandy substrate, providing poor cover for fish species.

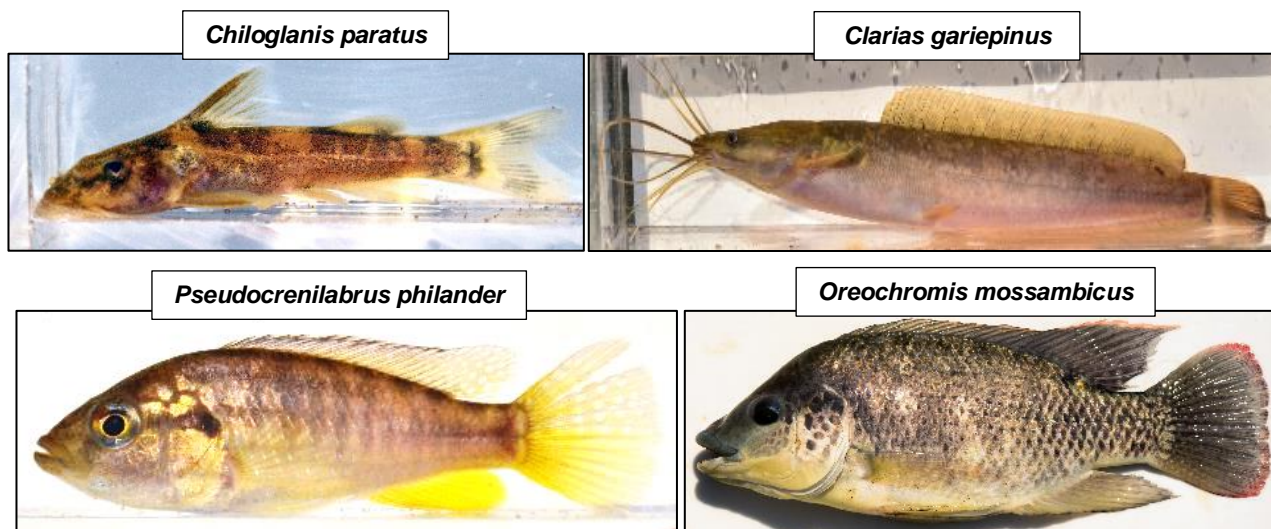
**Table 14: Fish species collected during the survey, sensitivities and frequency of occurrence within each reach**

| Scientific name                    | Frequency of Occurrence |          | Sensitivity |           |
|------------------------------------|-------------------------|----------|-------------|-----------|
|                                    | Crocodile               | Matlabas | No-flow     | Phys-chem |
| <i>Chiloglanis paratus</i>         | 2,5                     | 0        | 3,2         | 3,1       |
| <i>Chiloglanis pretoriae</i>       | 1,25                    | 0        | 4,8         | 4,5       |
| <i>Clarias gariepinus</i>          | 3,75                    | 5        | 1,7         | 1,0       |
| <i>Coptodon rendalli</i>           | 0                       | 2,5      | 1,8         | 2,1       |
| <i>Cyprinus carpio</i>             | Observed                | 0        | N/A         | N/A       |
| <i>Enteromius annectans</i>        | 0                       | 2,5      | 2,8         | 3,0       |
| <i>Enteromius bifrenatus</i>       | 0                       | 5        | 2,5         | 3         |
| <i>Enteromius paludinosus</i>      | 1,25                    | 0        | 2,3         | 1,8       |
| <i>Enteromius trimaculatus</i>     | 2,5                     | 5        | 2,7         | 1,8       |
| <i>Enteromius unitaeniatus</i>     | 2,5                     | 0        | 2,3         | 2,2       |
| <i>Gambusia affinis</i>            | 1,25                    | 0        | N/A         | N/A       |
| <i>Labeo cylindricus</i>           | 3,75                    | 5        | 3,1         | 3,1       |
| <i>Labeo molybdinus</i>            | 5                       | 0        | 3,3         | 3,2       |
| <i>Labeobarbus marequensis</i>     | 5                       | 0        | 3,2         | 2,1       |
| <i>Oreochromis mossambicus</i>     | 5                       | 5        | 0,9         | 1,3       |
| <i>Petrocephalus wesselsi</i>      | 0                       | 2,5      | N/A         | N/A       |
| <i>Pseudocrenilabrus philander</i> | 1,25                    | 0        | 1,0         | 1,4       |
| <i>Schilbe intermedius</i>         | 0                       | 2,5      | 1,3         | 1,8       |
| <i>Tilapia sparrmanii</i>          | 3,75                    | 0        | 0,9         | 1,4       |

N/A- Data not available



Illustrations of some of the fish species collected during the June 2018 survey, are shown below:



**Figure 18: Examples of fish species collected as part of the June 2018 survey**

A single species of special concern occur within the reach, *Oreochromis mossambicus* (**Figure 18**). *O. mossambicus* occurs in all but fast-flowing waters and thrives in standing waters. The species is threatened by hybridization with the rapidly spreading *Oreochromis niloticus*. Further south in its range it is most common in blind estuaries and coastal lakes where it tolerates brackish and marine environments. Feeds on algae, especially diatoms, and detritus, large individuals also take insects and other invertebrates.

### Water Quality

According to DWA (2012a), the Crocodile River is highly impacted in terms of water quality which is attributed to the following:

- ❖ The Lower Crocodile River water quality is deteriorating because of increased salts and nutrients. There are also increased levels of toxicants in the middle reaches of the river;
- ❖ Urbanisations, industrial diffuse sources and high agricultural return flows are the major impacting activities; and
- ❖ Treated wastewater return flows from the Upper Vaal WMA play an important role downstream where the water is used in the Crocodile West catchment area.

Noteworthy point sources of pollution in the Crocodile River, and the watercourses into which they discharge their effluent, include the following:

- ❖ Northern Waste Water Treatment Works (WWTW) - Jukskei River;
- ❖ Driefontein WWTW - Muldersdrif-se-loop River;
- ❖ Sunderland Ridge WWTW - Hennops River;
- ❖ Baviaanspoort and Zeekoegat WWTW - Pienaars River;
- ❖ Baviaanspoort and Zeekoegat WWTW - Pienaars River;
- ❖ Daspoort, Rooiwal, Temba and Babelegie WWTW - Apies River;
- ❖ Sandspruit and Klipgat WWTW - Sand Spruit;
- ❖ Rietgat WWTW - Soutpan Spruit; and
- ❖ Brits WWTW - Crocodile River.

Organic pollution from point and diffuse pollution sources is a significant contributor to the poor water quality in the Crocodile River, which is evident in the highly eutrophic Hartbeespoort Dam. According to DWAF (2004a), there are no reported water quality problems in the Matlabas Area, either surface or groundwater. Due to the low levels of development in this area, no water quality problems are anticipated.

According to the survey from the Baseline Aquatic and Impact Assessment (The Biodiversity Company, 2018) the current *in-situ* water quality of the Crocodile River (West) is presented in the table to follow:

**Table 15: In situ water quality results for the low flow survey (June 2018)**

| Site         | pH      | Conductivity (µS/cm) | DO (mg/l) | Temperature (°C) |
|--------------|---------|----------------------|-----------|------------------|
| <b>TWQR*</b> | 6.5-9.0 | <700**               | >5.0      | 5-30             |
| <b>CROC1</b> | 7,8     | 825                  | 8,5       | 15,0             |
| <b>CROC2</b> | 7,7     | 812                  | 7,9       | 15,0             |
| <b>CROC3</b> | 8,2     | 819                  | 8,8       | 16,0             |
| <b>CROC5</b> | 8,2     | 821                  | 8,0       | 15,2             |

\*Target Water quality Range; \*\*Expert opinion conductivity range

In situ water quality analysis of the Crocodile River indicated elevated dissolved solids during the survey (**Table 15**). The elevated dissolved solids are attributed to extensive anthropogenic activities upstream of these sites. These concentrations are above recommended levels, and would present adverse conditions to local aquatic biota, limiting diversity and abundances. The pH and DO levels within the Crocodile River fell within recommended TWQR limits and would not present adverse conditions to local aquatic biota. The water temperature ranges in the Crocodile River fell within expected limits for the region and did not present any marked fluctuations between sites.

### Habitat

The riparian vegetation at the borrow area BP SS1 is dominated by Lowveld Alluvial Vegetation, which has retained much of its ecological integrity (see **Figure 19** below). The instream habitat of the river is dominated by slow-flowing, medium to deep channel. Prominent sand banks and marginal reed beds are present in the watercourse.



**Figure 19: Riparian vegetation along the Crocodile River (West)**

According to the Baseline Aquatic and Impact Assessment (The Biodiversity Company, 2018) the results of the intermediate habitat integrity assessment and riparian assessment are represented in the table below:

**Table 16: Instream Intermediate Habitat Integrity Assessment for the Crocodile River reach**

| Criterion                      | Average Score | Score       |
|--------------------------------|---------------|-------------|
| <b>Instream</b>                |               |             |
| Water abstraction              | 17            | 9,52        |
| Flow modification              | 16            | 8,32        |
| Bed modification               | 13            | 6,76        |
| Channel modification           | 11            | 5,72        |
| Water quality                  | 16            | 8,96        |
| Inundation                     | 11            | 4,4         |
| Exotic macrophytes             | 10            | 3,6         |
| Exotic fauna                   | 8             | 2,56        |
| Solid waste disposal           | 7             | 1,68        |
| <b>Total Instream Score</b>    |               | <b>48,5</b> |
| <b>Instream Category</b>       |               | <b>D</b>    |
| <b>Riparian</b>                |               |             |
| Indigenous vegetation removal  | 7             | 3,64        |
| Exotic vegetation encroachment | 5             | 2,4         |
| Bank erosion                   | 15            | 8,4         |
| Channel modification           | 12            | 5,76        |
| Water abstraction              | 16            | 8,32        |
| Inundation                     | 9             | 3,96        |
| Flow modification              | 13            | 6,24        |
| Water quality                  | 10            | 5,2         |
| <b>Total Riparian Score</b>    |               | <b>56,1</b> |
| <b>Riparian Category</b>       |               | <b>D</b>    |

The results of the assessment illustrated above indicate that the instream and riparian habitat integrity of the Crocodile River are largely modified (class D), indicating a large loss of natural habitat, biota and basic ecosystem functions has occurred.

### Wetlands

A Wetland Impact Assessment (see **Appendix F5**) was conducted for the project. Refer to **Section 1(j)** for a summary of the recommendations of the study, and **Section 1(i)** for the related impact assessment. In terms of the National Water Act (No. 36 of 21998), a wetland means “*land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil*”.

According to the Wetland Impact Assessment (Index, 2018b), borrow pit SS1 is located on the river floor and will only be exposed once the diversion canal is constructed (**Figure 20**). BP SS1 is situated within the delineated ‘River Wetlands’. The proposed position of BP 39A is just south of the Matlabas River, and is approximately 25m outside of the 32m buffer of the wetland (**Figure 21**).

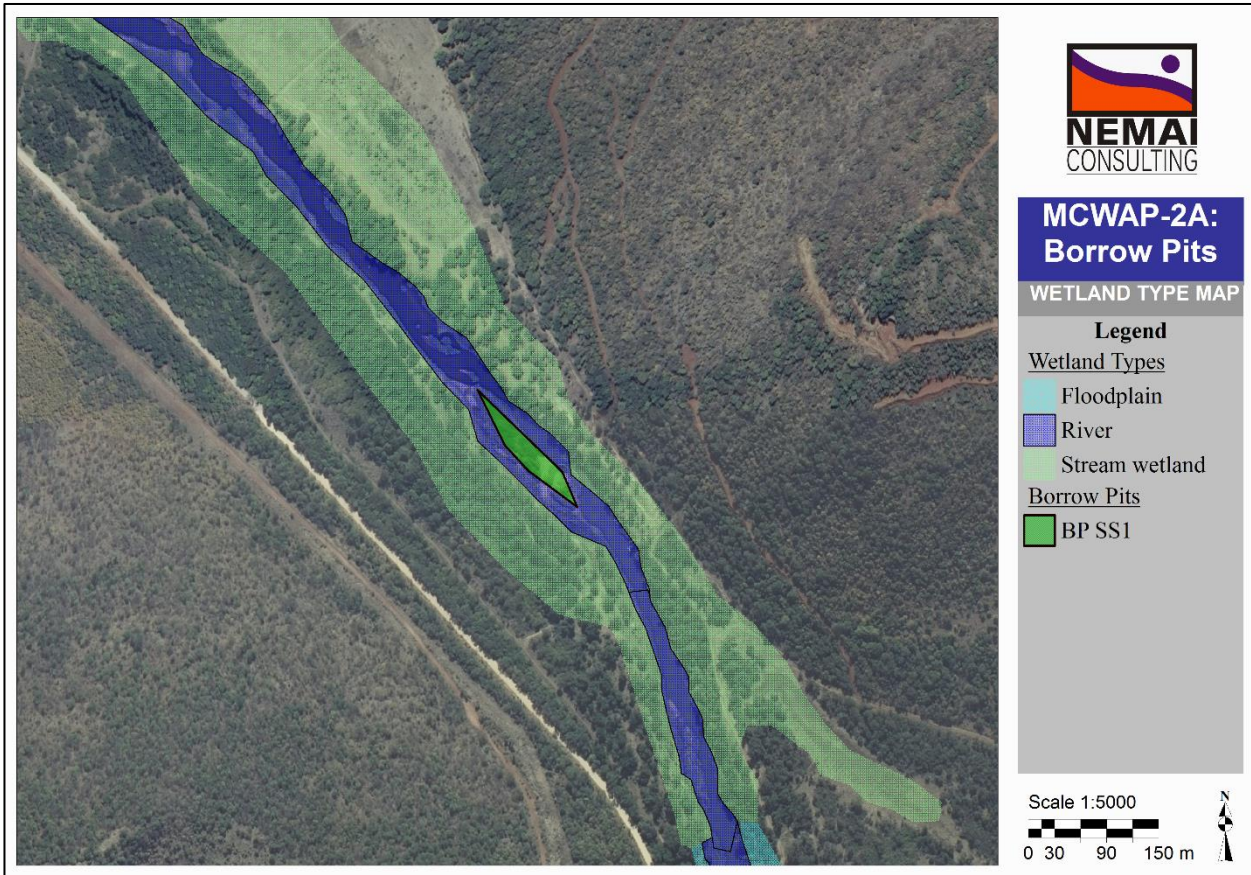


Figure 20: Wetland types situated by BP SS1

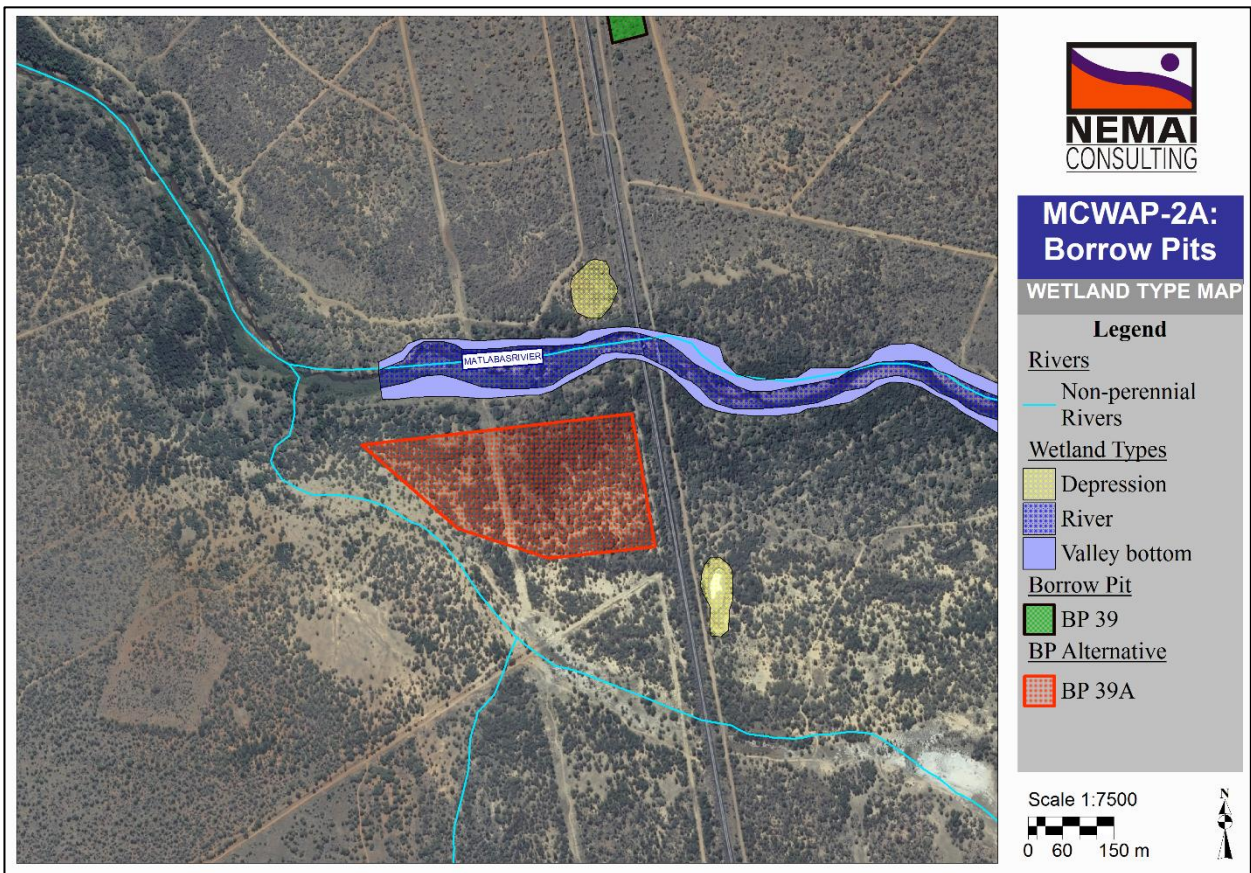


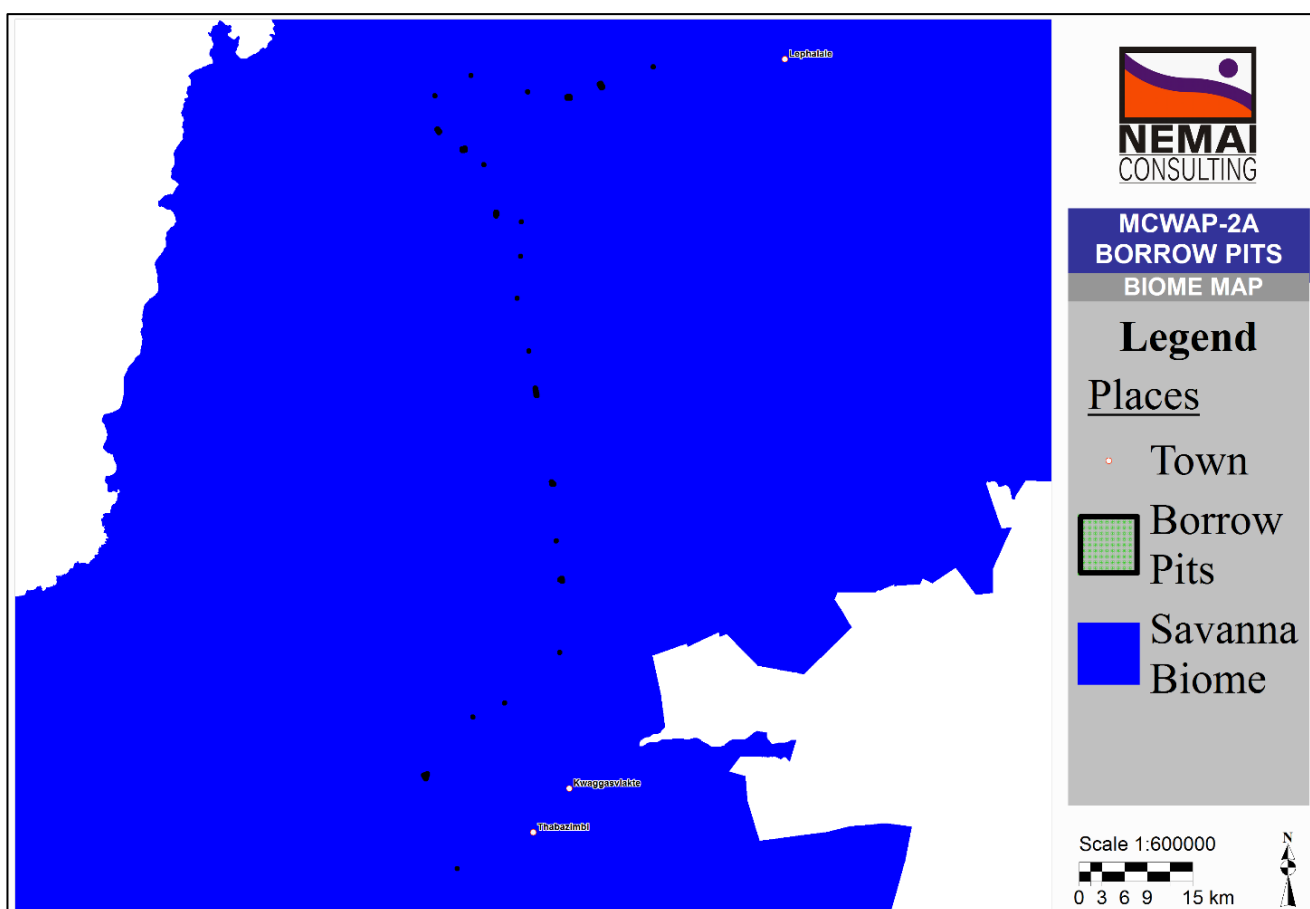
Figure 21: Wetland types situated by BP 39A

## FLORA

The information to follow was sourced from the Terrestrial Ecological Impact Assessment (see **Appendix F2**). Refer to **Section 1(j)** for a summary of the recommendations of the study, and **Section 1(i)** for the related impact assessment.

### *Regional Vegetation*

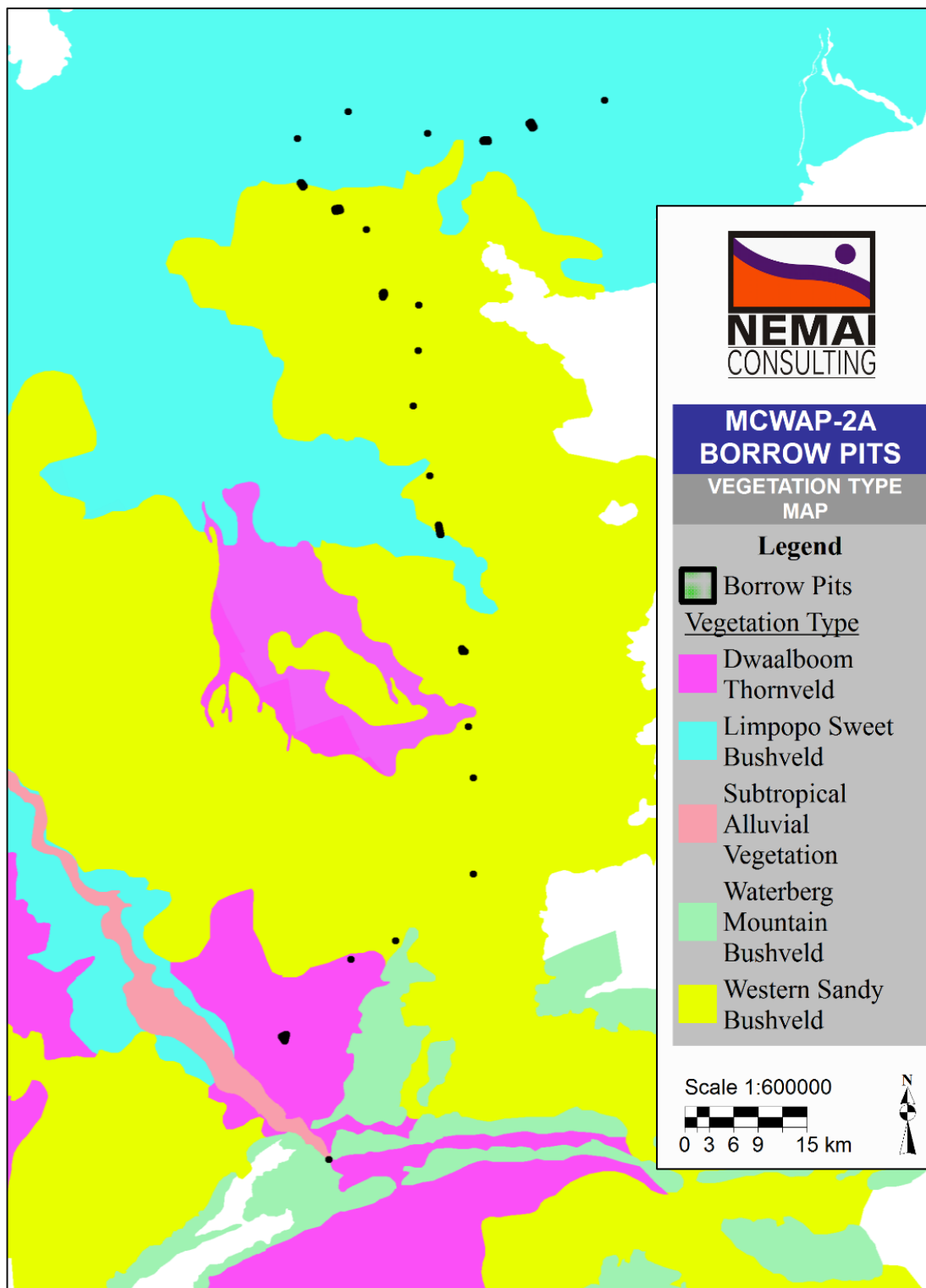
Mucina and Rutherford (2016) described the study area as falling within the Savanna Biome (**Figure 22**). The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the Lowveld and Kalahari region of South Africa and is also the dominant vegetation in Botswana, Namibia and Zimbabwe. It is characterized by a grassy ground layer and distinct upper layer of woody plants (Low and Rebelo, 1996).



**Figure 22: Savanna Biome**

The study area traverses five (5) vegetation types-namely (**Figure 23**):

1. Limpopo Sweet Bushveld;
2. Western Sandy Bushveld;
3. Dwaalboom Thornveld;
4. Waterberg Mountain Bushveld; and
5. Subtropical Alluvial Vegetation.



**Figure 23: Vegetation types**

*Limpopo Sweet Bushveld*

The Limpopo Sweet Bushveld is found in Limpopo Province. It extends from the lower reaches of the Crocodile and Marico Rivers around Makoppa and Derdepoort, respectively, down the Limpopo River Valley including Lephalale and into the tropics past Tom Burke to the Usutu border post and Taaiboschgroet area in the north. The unit also occurs on the Botswana side of the border (Mucina and Rutherford, 2006).

This vegetation type is listed as **least threatened** with a national conservation target of 19%. Less than 1% is statutorily conserved and limited to reserves straddling the south-eastern limits of the unit, for example the D'Nyala Nature Reserve. Very little of this vegetation type is conserved in other reserves. About 5% is transformed, mainly by cultivation (Mucina and Rutherford, 2006). Borrow areas (BP 15 to BP 51) which are situated in the northern most part of the study area, fall within this vegetation type.

#### Western Sandy Bushveld

Western Sandy Bushveld vegetation type is found in Limpopo and North-West Provinces. It occurs on flats and undulating plains from Assen northwards past Thabazimbi and remaining west of the Waterberg Mountains towards Steenbokpan in the north. Some patches occur between the Crocodile and Marico Rivers to the west (Mucina and Rutherford, 2006).

This vegetation type is listed as **least threatened** with a national conservation target of 19%. About 6% is statutorily conserved, just over half of which in the Marakele National Park. About 4% is transformed, mainly by cultivation (Mucina and Rutherford, 2006). As seen in Figure 22, approximately 60 % of the proposed borrow areas, fall within this vegetation type.

#### Dwaalboom Thornveld

The abovementioned vegetation type is found in Limpopo and North-West Provinces. It falls north of the Dwarsberge and associated ridges mainly west of the Crocodile River in the Dwaalboom area, but including a patch around Sentrum. South of the ridges, it extends eastwards from the Nietverdiend area, north of the Pilanesberg to the Northam area (Mucina and Rutherford, 2006).

This vegetation type is listed as **least threatened** with a national conservation target of 19%. Some 6% is statutorily conserved, mostly within the Madikwe Game Reserve in the west. About 14% is transformed mainly by cultivation. Main use is extensive cattle grazing (Mucina and Rutherford, 2006). In the southern section of the study area, BP 25 and BP 30 fall within the vegetation type.

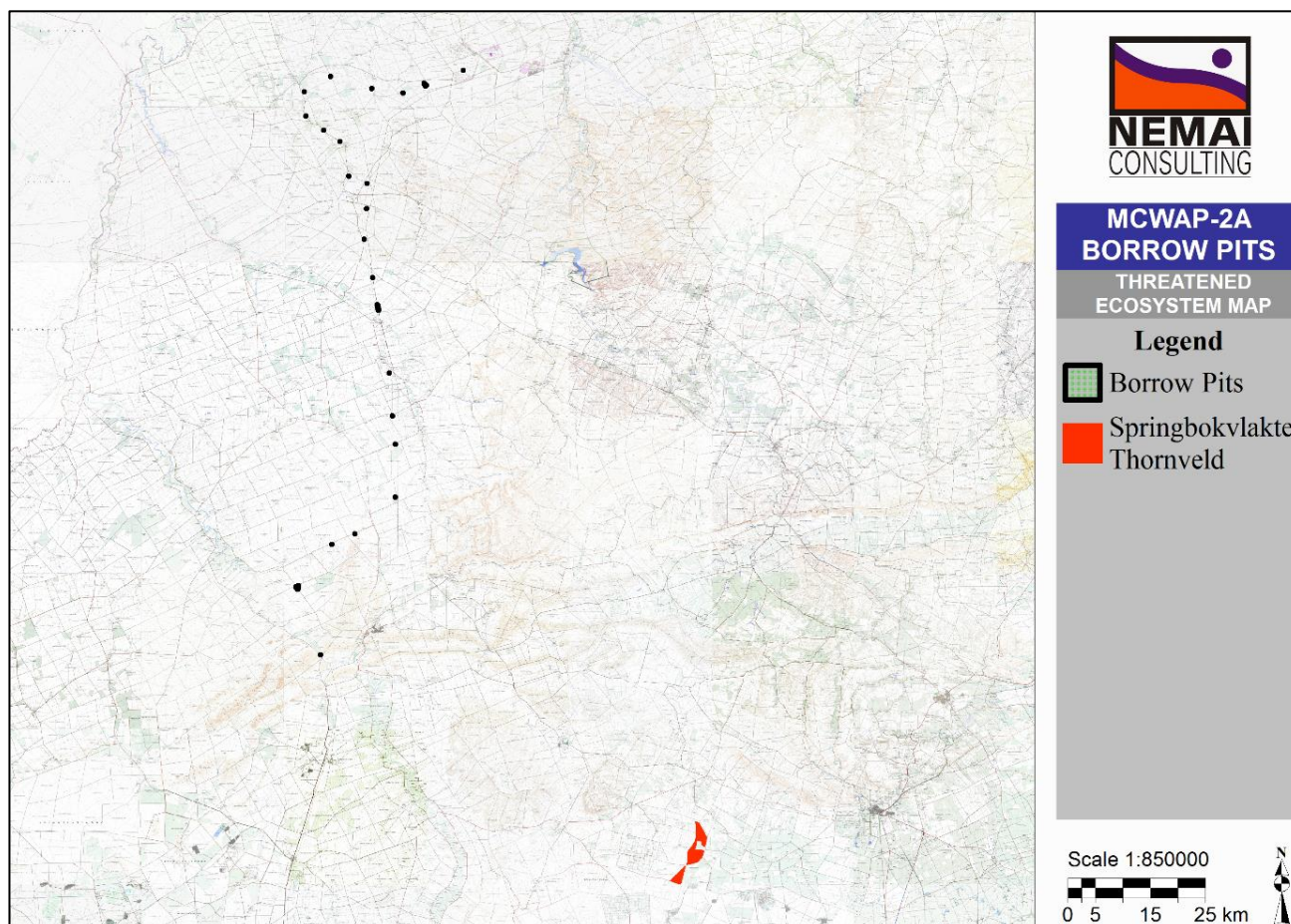
#### Subtropical Alluvial Vegetation

Subtropical Alluvial vegetation unit is found in Limpopo, Mpumalanga and KwaZulu-Natal Provinces and in Swaziland. It occurs in broad river alluvia and around some river-fed pans in the subtropical regions of eastern South Africa, in particular in the Lowveld, Central Bushveld and in northern KwaZulu-Natal. The most important alluvia include the Limpopo, Luvubu, Olifants, Sabie, Crocodile, Phongolo, Usutu and Mkuze Rivers. This unit is fully embedded within the Savanna Biome (Mucina and Rutherford, 2006).

The conservation status is **least threatened** with a national conservation target of target of 31%. Much of the area has been transformed for cultivation, urban development and road building. Alien woody species commonly occurring in this vegetation type include *Melia azedarach*, *Chromolaena discolor* etc (Mucina and Rutherford, 2006). The first borrow area in the southern most region of the study area, BP SS1, falls within this vegetation type.

### Terrestrial Threatened Ecosystem

According to the data sourced from SANBI, none of the borrow areas are situated within terrestrial threatened ecosystems. The closest to the proposed borrow pits, is the Springbokvlakte Thornveld, show in **Figure 24** below, which is approximately 73 km from the BP SS1 borrow area.



**Figure 24: Terrestrial Threatened Ecosystems**

### Limpopo Conservation Plan

Critical Biodiversity Areas (CBAs) within the bioregion are the portfolio of sites that are required to meet the region's biodiversity targets, and need to be maintained in the appropriate condition for their category (Desmet, 2013). An objective of the CBA map is to identify a network of areas, which if managed according to the land use guidelines would meet the pattern targets for all important biodiversity features, while at the same time ensuring the areas necessary for supporting necessary ecological processes remain functional.

The systematic conservation planning process resulted in 40% of the Limpopo Province being identified as CBAs (CBA1 22% and CBA2 18%). Ecological Support Areas (ESAs) cover a further 22% of the province, of which 16% are intact natural areas (ESA 1) and 7% are degraded or areas with no natural remaining which are nevertheless required as they potentially retain some value for supporting ecological processes (ESA 2) (Desmet, 2013). A CBA map, indicating the Limpopo C Plan categories in relation to the project footprint, is shown in **Figure 25**.



According to the Terrestrial Ecological Impact Assessment (Nemai Consulting, 2018), the proposed borrow pits in relation to the Limpopo Conservation Plan are as follows:

- ❖ CBA 1 –BP SS1, BP53; BP52, BP44, BP43, BP41, BP39, BP 39A, BP28, BP25, BP14 and BP 14A;
- ❖ CBA 2 - BP53; BP42, BP39, BP 39A, BP38 & BP28;
- ❖ ESA 1 - BP51 &, BP13;
- ❖ ESA 2 - BP33;
- ❖ Other Natural Area -. BP59, BP50, BP 50A, BP49, BP48, BP35, BP30, BP 30A, BP25, BP15 & BP46; and
- ❖ No Natural Remaining -.BP49 & BP15.

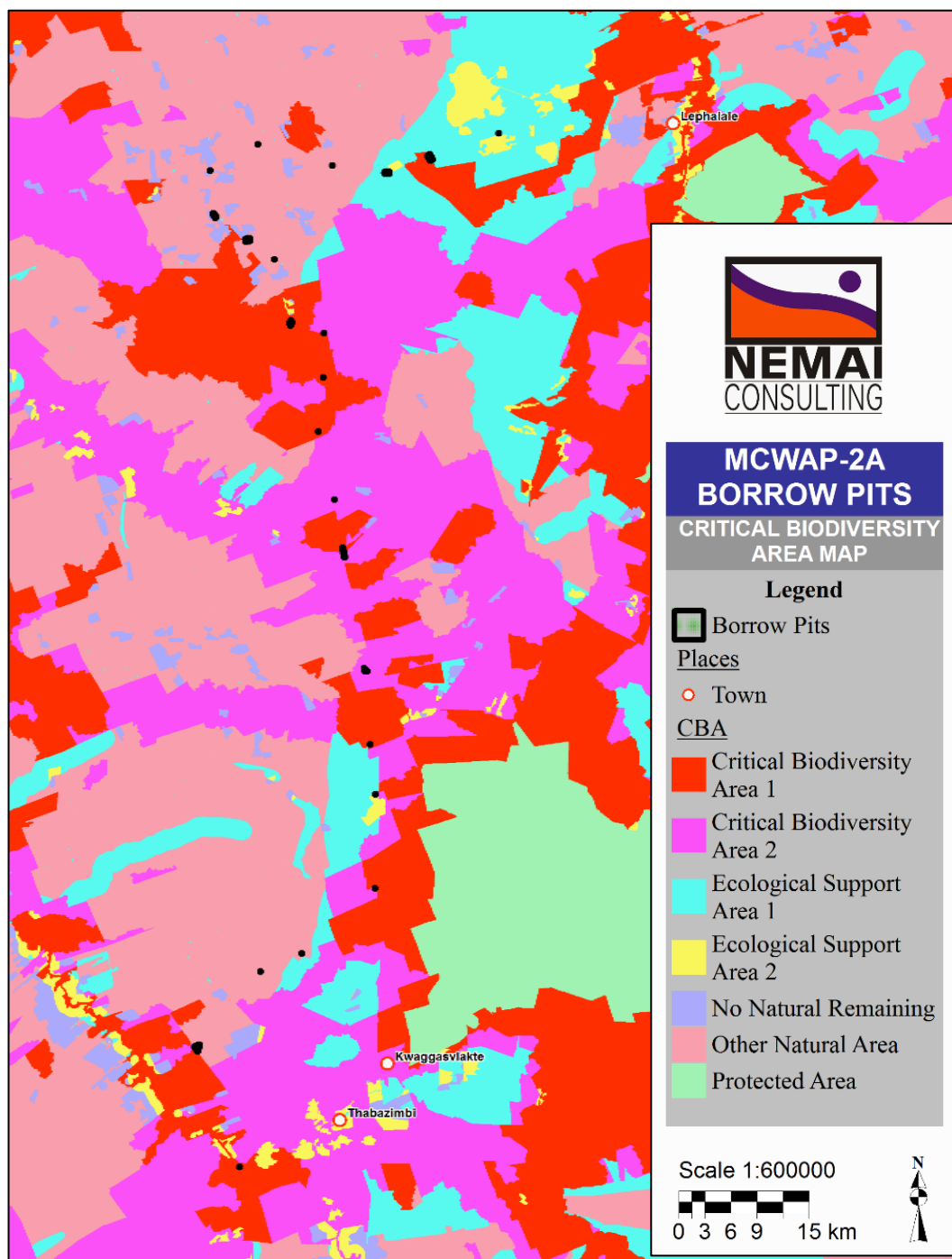
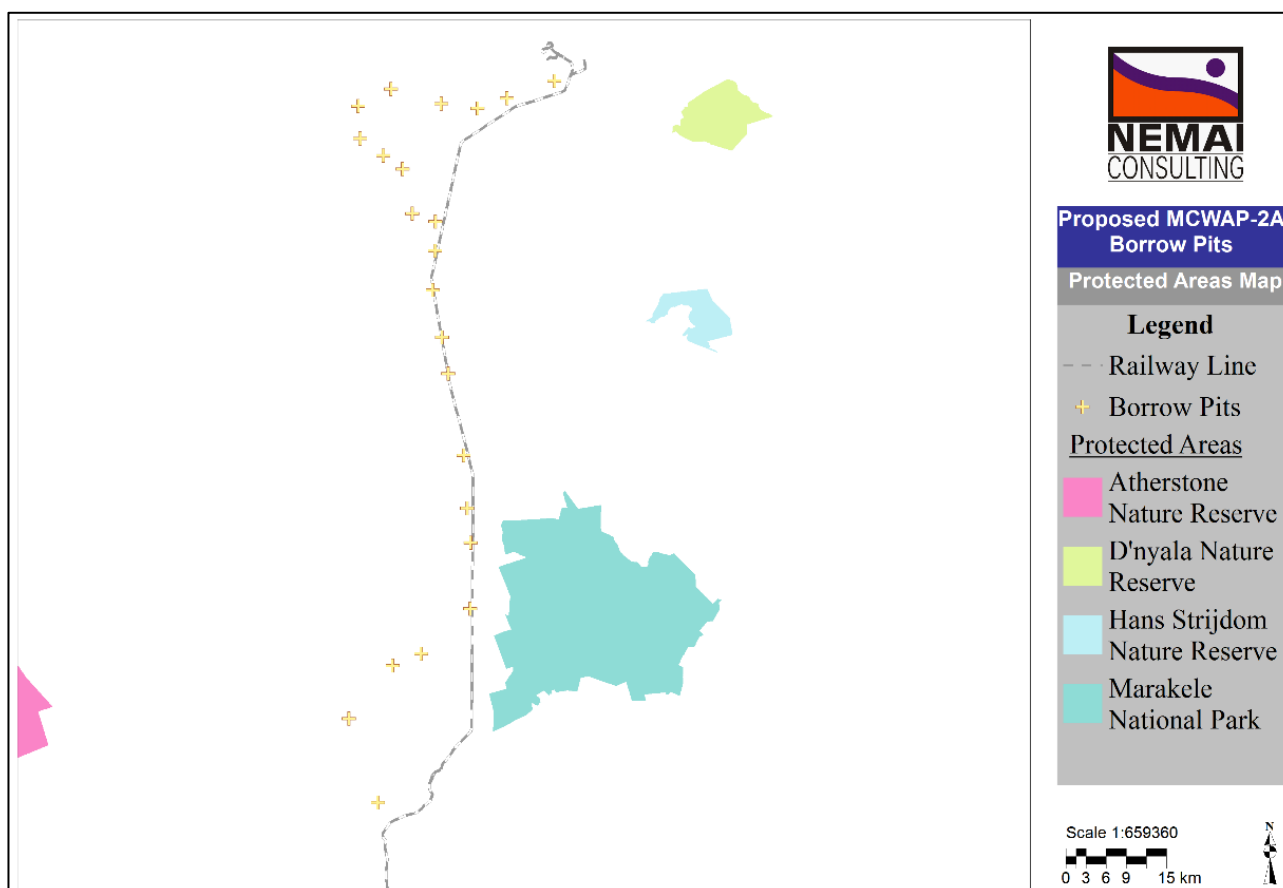


Figure 25: Limpopo Conservation Plan (CBAs and ESAs)

### Protected Areas

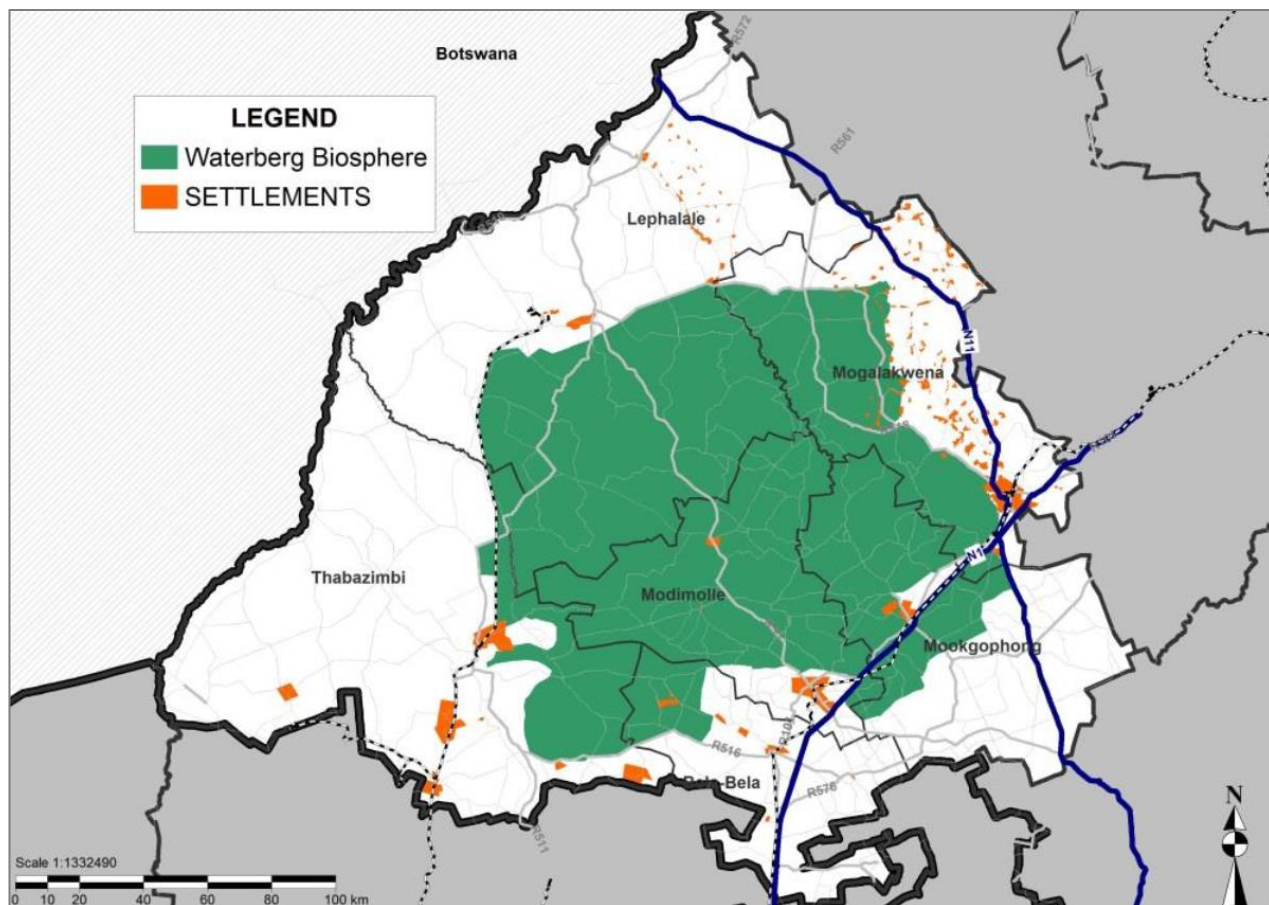
The nearest protected areas, with a formal status in terms of the National Environmental Management Protected Areas Act (Act No. 57 of 2003), to the study area include the following (see **Figure 26**):

- Marakele National Park – located approximately 3.5 km to the east of BP 28 and BP 41;
- Atherstone Nature Reserve – located approximately 40 km to the west of BP SS1;
- Hans Strijdom Nature Reserve – located approximately 30 km to the east of BP 42; and
- D'nyala Nature Reserve – located approximately 20 km to the east of BP 51.



**Figure 26: Protected areas in proximity to the proposed borrow pits**

The Waterberg Biosphere, which is located to the east of the project area (see **Figure 27**), represents a considerable area of the savanna biome and contains a high level of biological diversity. It stretches from Marakele National Park in the south-west to Wonderkop Nature Reserve in the north-east with Vaalwater as the gateway town. According to UNESCO (2009), Biosphere reserves are areas of terrestrial and coastal marine ecosystems which are internationally recognized under UNESCO's Man and the Biosphere (MAB) Programme. Biosphere Reserves are protected areas and they promote and demonstrate a balanced relationship between people and nature. Sections of the MCWAP-2A WTI central pipeline route and borrow pits encroach into the transition zone of the biosphere, which is a flexible area of co-operation, which may contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources (Waterberg DM, 2013).



**Figure 27: Waterberg Biosphere (Waterberg DM, 213)**

The Ben Alberts Nature Reserve lies immediately southeast of the BP SS1. The reserve belongs to Kumba Iron Ore, Thabazimbi mine, which is currently in its closure phase.

#### Flora Species

The study area is located within 2327CB, 2327CD, 2427AB, 2427AD, 2427CB and 2327 DA quarter degree squares in terms of the 1:50 000 grid of South Africa. SANBI uses this grid system as a point of reference to determine any Red Data plant species or any species of conservation importance occurring in South Africa.

Based on the findings from the Terrestrial Ecological Impact Assessment (Nemai Consulting, 2018) the following protected trees are situated in the borrow pit areas, namely Leadwood (*Combretum imberbe*) situated within BP 48, and *Sclerocarya birrea* subsp. *africana* (Marula) situated within the borrow pits BP 25, 30, 35, 43, 52, 50, 48, 49, 15, 46, 59.

Refer to **Figure 28** for an example of the protected trees found on site.



**Figure 28: Leadwood (top) and Marula tree (bottom) found on site**

There is only one plant species which falls within “protected plants” in terms of Limpopo Environmental Management Act (LEMA) (Act No. 7 of 2003) Schedule 12, namely *Spirostachys africana* (Tamboti) (Figure 29).



**Figure 29: *Spirostachys africana* (Tamboti) situated within BP 46**

## FAUNA

### Mammals

The greater area was historically commonly used for cattle grazing. Game farms are now more common, with an associated high faunal biodiversity. Various mammal species (e.g. buffalo) have been introduced through this practice. Numerous farms also keep exotic game species. Proper conservation measures on game farms also afford protection to other species that naturally occur in the area, which include leopard, warthog, baboon and aardvark. Known mammal distributions correlate well with biomes as defined by Acocks (1953), Low and Rebelo (1998), Knobel and Bredenkamp (2005) as well as Mucina and Rutherford (2006). However, the local occurrences of mammals are more closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (treeliving), rupicolous (rock-dwelling) and wetland-associated vegetation cover. The riverine areas and ridges in the area are regarded as significant in terms of the habitat that they provide to fauna. Riparian zones also serve as important corridors to allow for animal migration. The Red Data mammal species that could potentially naturally occur in the project area are those which have been recorded in the grid cells 2327CB, 2327CD, 2327DA, 2427AB, 2427AD and 2427CB (ADU, 2016) are listed in **Table 17**.

**Table 17: Red data mammal species recorded in the grid cells (ADU, 2016)**

| Family           | Genus              | Species           | Subspecies   | Common name       | Red list category | Atlas region endemic |
|------------------|--------------------|-------------------|--------------|-------------------|-------------------|----------------------|
| Bovidae          | <i>Hippotragus</i> | <i>equinus</i>    |              | Roan Antelope     | Vulnerable        | Yes                  |
| Bovidae          | <i>Hippotragus</i> | <i>niger</i>      | <i>niger</i> | Sable Antelope    | Vulnerable        |                      |
| Felidae          | <i>Acinonyx</i>    | <i>jubatus</i>    |              | Cheetah           | Vulnerable        | Yes                  |
| Felidae          | <i>Leptailurus</i> | <i>serval</i>     |              | Serval            | Near Threatened   | Yes                  |
| Hyaenidae        | <i>Hyaena</i>      | <i>brunnea</i>    |              | Brown Hyena       | Near Threatened   | Yes                  |
| Felidae          | <i>Acinonyx</i>    | <i>jubatus</i>    |              | Cheetah           | Vulnerable        | Yes                  |
| Manidae          | <i>Smutsia</i>     | <i>temminckii</i> |              | Ground Pangolin   | Vulnerable        | Yes                  |
| Mustelidae       | <i>Mellivora</i>   | <i>capensis</i>   |              | Honey Badger      | Near Threatened   | Yes                  |
| Vespertilionidae | <i>Myotis</i>      | <i>tricolor</i>   |              | Temminck's Myotis | Near Threatened   | Yes                  |

Previous studies found a bat cave that is situated in the Mooivalei area. The bats recorded from the cave are reported to be *Rhinolophus darlingi* and *Miniopterus schreibersii*, and are both ranked as 'Near Threatened'.

### Avifauna

The banks of the Crocodile River, where BP SS1 is situated, are steep with reeds that grow in most areas followed by riparian vegetation that varies in density from place to place. The Matlabas River is a smaller river system with more or less the same vegetation that grows on its banks. These rivers are sensitive for bird species that depend on them for food, water and breeding purposes. Bird species such as herons, crakes, moorhens, bishops, weavers, cisticolas and warblers will breed in the reeds growing on the banks of the river systems and will also feed on insects that live within the reeds and

semi-aquatic vegetation. Fish living in the water of these rivers will also attract birds such as kingfishers, cormorants and darters. Frogs and crabs also occur and will attract bird species that feed on them such as Hadeda, herons, hamerkop and kingfishers.

The vegetation within the riparian zone consists of large Acacia and broadleaved trees, which are taller than those trees further away from the river due to the availability of water. This riparian vegetation will favour species typically associated with a bushveld habitat. These birds include a great variety of arboreal passerines such as drongos, warblers, flycatchers, shrikes, sunbirds, waxbills and weavers as well as arboreal nonpasserines such as doves, cuckoos and woodpeckers. Many of these species make use of the thorny nature of these trees to build their nests. Acacia trees generally attract many insects and in turn attract a good diversity of typical “Bushveld” bird species. The bird species within the woodland habitat include a great variety of arboreal passerines such as drongos, warblers, flycatchers, shrikes, sunbirds, waxbills and weavers as well as arboreal non-passerines such as doves, cuckoos and woodpeckers. Many of these species make use of the thorny nature of these trees to build their nests. Acacia trees generally attract many insects and in turn attract a good diversity of typical Acacia savanna bird species. The ground cover between the trees consists of mainly short to long grass interspersed with shrubs.

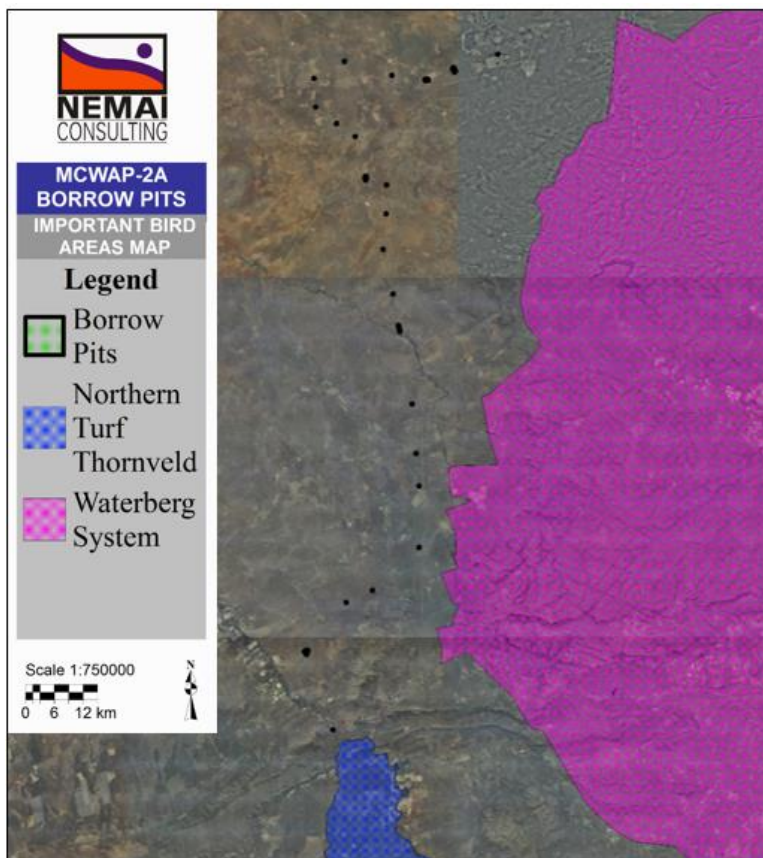
Several, mainly seasonal, pans are found in the region. Not only are these pans important for Red Data species but also for many Palaearctic waders which visit southern Africa during the summer months. The pans will attract several water bird species such as lapwings, ducks, herons and egrets for foraging, breeding and roosting purposes. They will feed on prey species such as frogs and their tadpoles and fish that aestivate and hibernate in the mud during times when the pans are dry as well as aquatic insects and plants. The pans are also an important source of water for many woodland bird species such as waxbills, buntings, sparrows, weavers and doves especially during hot and dry periods. Bird distribution data of the Southern African Bird Atlas Project (SABAP1 – Harrison et al. 1997) obtained from the Avian Demography Unit of the University of Cape Town was used in order to ascertain which Red Data bird species occur in the study area (see **Table 18**). The more recent SABAP2 data was also consulted online ([http://sabap2.adu.org.za/v1/gap\\_analysis.php](http://sabap2.adu.org.za/v1/gap_analysis.php)).

**Table 18: Red data bird species recorded in the grid cells 2327CB, 2327CD, 2327DA, 2427AB, 2427AD and 2427CB (ADU, 2016)**

| Common Name                | Scientific Name                | Conservation Status | 2327CB | 2327CD | 2427AB | 2427AD | 2427CB |
|----------------------------|--------------------------------|---------------------|--------|--------|--------|--------|--------|
| Kori Bustard               | <i>Ardeotis kori</i>           | VU                  | ✓      |        | ✓      | ✓      | ✓      |
| White-bellied Korhaan      | <i>Eupodotis senegalensis</i>  | VU                  |        |        |        | ✓      |        |
| Yellow-throated Sandgrouse | <i>Pterocles gutturalis</i>    | NT                  |        |        | ✓      |        | ✓      |
| Greater Painted-snipe      | <i>Rostratula benghalensis</i> | NT                  |        |        |        |        | ✓      |
| Black-winged Pratincole    | <i>Glareola nordmanni</i>      | NT                  | ✓      |        |        |        | ✓      |
| White-backed Vulture       | <i>Gyps africanus</i>          | VU                  | ✓      | ✓      | ✓      |        | ✓      |
| Cape Vulture               | <i>Gyps coprotheres</i>        | VU                  | ✓      |        | ✓      |        | ✓      |
| Lappet-faced Vulture       | <i>Aegyptius tracheliotus</i>  | VU                  | ✓      |        | ✓      |        |        |

| Common Name           | Scientific Name                 | Conservation Status | 2327CB | 2327CD | 2427AB | 2427AD | 2427CB |
|-----------------------|---------------------------------|---------------------|--------|--------|--------|--------|--------|
| Bateleur              | <i>Terathopius ecaudatus</i>    | VU                  | ✓      |        | ✓      |        |        |
| African Marsh-Harrier | <i>Circus ranivorus</i>         | VU                  |        |        |        |        | ✓      |
| Tawny Eagle           | <i>Aquila rapax</i>             | VU                  | ✓      | ✓      | ✓      |        | ✓      |
| Martial Eagle         | <i>Polemaetus bellicosus</i>    | VU                  |        |        | ✓      | ✓      | ✓      |
| Secretarybird         | <i>Sagittarius serpentarius</i> | NT                  | ✓      | ✓      | ✓      | ✓      | ✓      |
| Lesser Kestrel        | <i>Falco naumanni</i>           | VU                  |        |        | ✓      |        | ✓      |
| Lanner Falcon         | <i>Falco biarmicus</i>          | NT                  |        |        |        |        | ✓      |
| Yellow-billed Stork   | <i>Mycteria ibis</i>            | NT                  |        |        | ✓      |        | ✓      |
| Black Stork           | <i>Ciconia nigra</i>            | NT                  |        |        | ✓      |        | ✓      |
| Marabou Stork         | <i>Leptoptilos crumeniferus</i> | NT                  |        |        | ✓      |        | ✓      |
| Red-billed Oxpecker   | <i>Buphagus erythrorhynchus</i> | NT                  |        |        | ✓      |        | ✓      |

The Important Bird & Biodiversity Area (IBBA) programme of southern Africa (Barnes, 1998) identified 124 IBAs in South Africa. IBAs are places of international significance for the conservation of birds and other biodiversity and are sites that together form part of a wider, integrated approach to the conservation and sustainable use of the natural environment. The Waterberg System IBA occurs approximately 3.5 km to the east of BP 28, BP 33 and BP 41 which are situated in the middle of the study area, and the Northern Turf Thornveld IBA is situated approximately 2 km to the south of BP SS1 (see **Figure 30**). No borrow areas encroach into any of the surrounding IBAs.



**Figure 30: Important Bird Areas**

### Herpetofauna (Reptiles and Amphibians)

In general, the habitat types affected by the proposed project are suitable for relatively high species diversity. The herpetofauna mainly consists of widespread, common Bushveld species with slight variation due to the presence of sandy substrate, stony to rocky terrain, water bodies, bush and trees. Riparian habitats are ordinarily rich in reptile diversity and densities due to the habitat supporting a high abundance of prey species, such as frogs, birds and small mammals (Branch, 2001).

Reptilian species are largely dependent on habitat unit structures and prey abundance, which, in turn, also depends on general habitat unit structure and condition. Many reptilian species, together with a large proportion of their prey species, have been shown to be broadly tolerant to a variety of habitat types. Vegetative cover is also greater within this habitat type. Species are also very often “ousted” into wetland and riparian zones due to transformation of lands for urban and agricultural purposes.

Amphibians are an important component of South Africa’s exceptional biodiversity and are such worthy of both research and conservation effort. This is made additionally relevant by international concern over globally declining amphibian populations, a phenomenon currently undergoing intensive investigation but is still poorly understood (Wyman, 1990 & Wake, 1991). This decline seems to have worsened over the past 25 years and amphibians are now more threatened than either mammals or birds, though comparisons with other taxa are confounded by a shortage of reliable data.

Frogs are particularly restricted to aquatic habitats (wetlands and other surface water bodies) and, thus, impacts on these habitats (as a result of the clearing of the vegetation) are likely to negatively impact on amphibian species. Frogs also require terrestrial habitats adjoining aquatic habitats. Frogs are useful environmental bio-monitors (bio-indicators) and may act as an early warning system for the quality of the environment. Frogs and tadpoles are good species indicators on water quality, because they have permeable, exposed skins that readily absorb toxic substances. Tadpoles are aquatic and greatly exposed to aquatic pollutants (Blaustein, 2003). The presence of amphibians is also generally regarded as an indication of intact ecological functionality.

Based on Jacobsen (1989), the SARCA Reptile Survey (2006 – 2009) and (Minter et al. 2004) the following list of Red Data herpetofauna species may occur within the project area:

- Giant Bullfrogs (*Pyxicephalus adspersus*);
- African Bullfrog (*Pyxicephalus edulis*); and
- Southern African Python (*Python natalensis*).

## SOCIO-ECONOMIC ENVIRONMENT

### General

A Socio-Economic Impact Assessment (see **Appendix F6**) was undertaken for the project. Refer to **Section 1(j)** for recommendations of the study and **Section 1(i)** for the related impact assessment.

An extract from the Socio-Economic Impact Assessment follows (Bews & Chidley, 2018).



### Overview of Affected Municipal Wards

The local study area comprises Ward 1 and Ward 9 of the Thabazimbi LM, as well as Ward 3 of the Lephalale LM. The analysis below uses data drawn from Census 2011, published by Statistics South Africa.

### **Language**

Refer to **Table 19** below for an overview of the languages used in the study area.

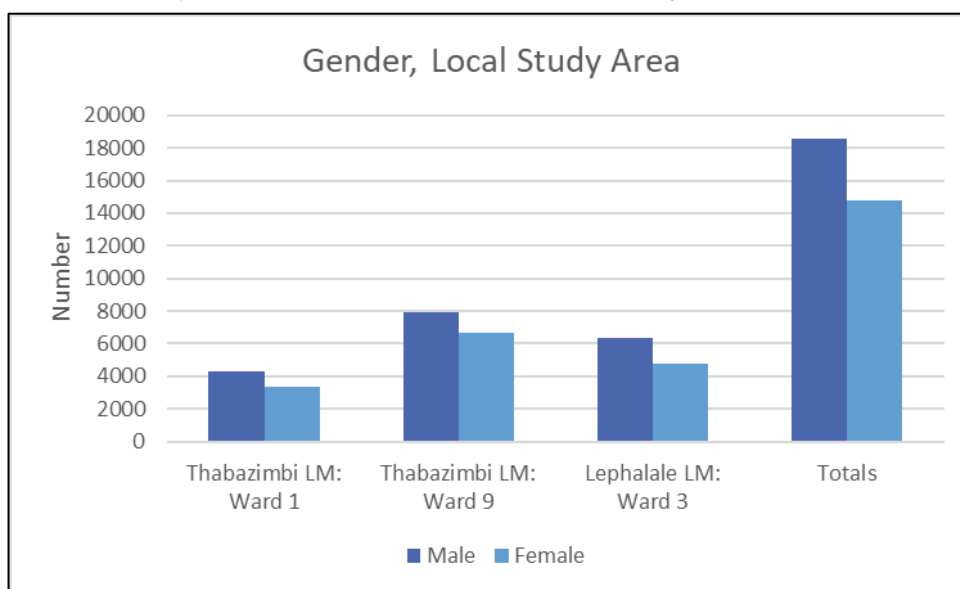
**Table 19: Language in the local study area**

| Language       | Thabazimbi LM |               | Lephalale LM  | Totals        | % of Total    |
|----------------|---------------|---------------|---------------|---------------|---------------|
|                | Ward 1        | Ward 9        | Ward 3        |               |               |
| Setswana       | 4 261         | 9 468         | 2 919         | 16 648        | 49,8%         |
| Sepedi         | 383           | 2 021         | 3 214         | 5 618         | 16,8%         |
| Afrikaans      | 1 335         | 214           | 1 318         | 2 867         | 8,6%          |
| Xitsonga       | 384           | 683           | 926           | 1 993         | 6,0%          |
| English        | 264           | 434           | 398           | 1 096         | 3,3%          |
| Other          | 379           | 296           | 2 364         | 3 039         | 9,1%          |
| <b>Totals:</b> | <b>7 006</b>  | <b>13 116</b> | <b>11 139</b> | <b>31 261</b> | <b>100,0%</b> |

**Setswana** and **Sepedi** are the dominant languages in the local study area, becoming increasingly Sepedi the further north that one travels.

### **Gender**

**Figure 31**, provides the gender balance in the local study area. The study area has a 56:44 split between male and female, a ratio that is most in keeping with that for the Limpopo Province than for the regional study area as a whole. This is since the mining and large industrial facilities that are present in the local municipalities do not fall within the local study area.



**Figure 31: Gender in the local study area**

In this regard, the gender split in the local study area is more typically rural in nature than the regional study area as a whole.

### **Household Income**

Annual household income is an indicator of the access to services and level of economy vulnerability that a house will face. **Table 20** provides data on the levels of annual household income in the local study area.

**Table 20: Local Study Area Annual Household Income**

| Income Values                          | Thabazimbi LM |              | Lephalale LM | Totals        | % of Totals   |
|----------------------------------------|---------------|--------------|--------------|---------------|---------------|
|                                        | Ward 1        | Ward 9       | Ward 3       |               |               |
| Very Low Income [R1 - R9 600 pa]       | 185           | 481          | 198          | 864           | <b>9,6%</b>   |
| Low Income [R9 601 to R38 200 pa]      | 1 285         | 1 484        | 1 639        | 4 408         | <b>49,0%</b>  |
| Middle Income [R38 201 to R614 400 pa] | 669           | 1 867        | 894          | 3 430         | <b>38,2%</b>  |
| High Income [R614 60 and above pa]     | 139           | 65           | 83           | 287           | <b>3,2%</b>   |
| Totals:                                | 2 278         | 3 897        | 2 814        | 8 989         | <b>100,0%</b> |
| <b>% of Totals:</b>                    | <b>25,3%</b>  | <b>43,4%</b> | <b>31,3%</b> | <b>100,0%</b> |               |

The table demonstrates that sixty percent of the households in the local stud area earn less than R38 200 per year, in 2011. Average household size across the local study area is 3.5. Thus, the degree of economic vulnerability to external shocks is high, with most households living a subsistence livelihood.

### **Education Level Attained**

**Table 21** below provides detail on the education levels attained by residents of the local study area.

**Table 21: Local Study Area Education Levels**

| Education Level Attained | Thabazimbi LM |              | Lephalale LM | Total         | % of Total   |
|--------------------------|---------------|--------------|--------------|---------------|--------------|
|                          | Ward 1        | Ward 9       | Ward 3       |               |              |
| No Schooling             | 999           | 1 171        | 1 251        | 3 421         | <b>10,2%</b> |
| Some Primary School      | 1 826         | 3 431        | 2 564        | 7 821         | <b>23,4%</b> |
| Primary School           | 506           | 789          | 876          | 2 171         | <b>6,5%</b>  |
| Some High School         | 2 025         | 4 667        | 3 331        | 10 023        | <b>30,0%</b> |
| Matriculated             | 1 019         | 2 682        | 1 298        | 4 999         | <b>15,0%</b> |
| Secondary Education      | 36            | 46           | 55           | 137           | <b>0,4%</b>  |
| Higher Degrees           | 225           | 125          | 300          | 650           | <b>1,9%</b>  |
| Other and Not Applicable | 1 037         | 1 686        | 1 466        | 4 189         | <b>12,5%</b> |
| Totals:                  | 7 673         | 14 597       | 11 141       | 33 411        |              |
| <b>% of Total:</b>       | <b>23,0%</b>  | <b>43,7%</b> | <b>33,3%</b> | <b>100,0%</b> |              |

Education levels within the local study area reflect the low-income levels found in the previous section. Ten percent of the residents have no schooling, whilst a further thirty percent have completed up to

primary school. An additional thirty percent have completed some high school but have not matriculated. The result is that sixty-nine percent of the residents of the area have not completed matric. Approximately two percent have gained an education level higher than matric. These results reinforce the conclusion that the residents of the local study area are vulnerable to economic shocks.

### **Dwelling Type**

Dwelling type is a livelihood indicator that provides insight into the socio-economic conditions in the local study area. The characteristics of the dwellings in which households live and their access to various services and facilities provide an important indication of the well-being of household members. It is widely recognised that shelter satisfies a basic human need for physical security and comfort. According to the Statistics South Africa household classification, the following definitions apply to formal and informal housing:

- ❖ **Formal dwelling**, refers to a structure built according to approved plans, i.e. house on a separate stand, flat or apartment, townhouse, room in backyard, rooms or flat let elsewhere. Contrasted with informal dwelling and traditional dwelling; and
- ❖ **Informal dwelling**, is a makeshift structure not erected according to approved architectural plans, for example shacks or shanties in informal settlements or in backyards.

**Table 22** provides data on the levels of annual household income in the local study area.

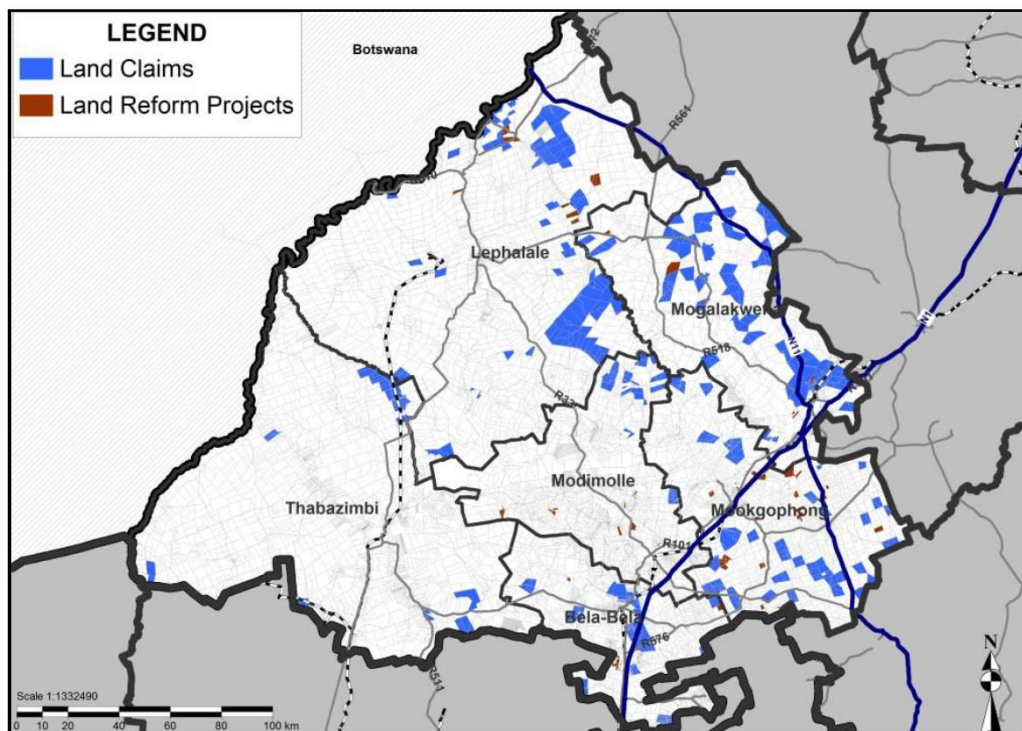
**Table 22: Local Study Area Dwelling Type**

| Dwelling Type                         | Thabazimbi LM |        | Lephalale LM | Totals | % of Total   |
|---------------------------------------|---------------|--------|--------------|--------|--------------|
|                                       | Ward 1        | Ward 9 | Ward 3       |        |              |
| House, separate stand                 | 64,1%         | 65,6%  | 48,7%        | 19 914 | <b>59,6%</b> |
| Traditional Dwelling                  | 3,5%          | 0,6%   | 1,9%         | 564    | <b>1,7%</b>  |
| Townhouses/Flats                      | 0,8%          | 2,5%   | 1,1%         | 555    | <b>1,7%</b>  |
| Backyard Dwelling or Flatlet          | 1,1%          | 0,7%   | 4,6%         | 699    | <b>2,1%</b>  |
| Informal Dwelling                     | 21,0%         | 24,8%  | 17,1%        | 7 134  | <b>21,4%</b> |
| Not Applicable, Other and Unspecified | 9,5%          | 5,8%   | 26,6%        | 4 530  | <b>13,6%</b> |

The analysis of dwelling type shows that sixty percent of the residents in the local study area live in brick houses located on separate stands. The next most common housing typology is an informal structure, which is home to twenty-one percent of residents. These figures can be viewed alongside those for the labour force, using the working assumption that lower skilled and informal members of the workforce would be most likely to live in informal structures. Forty-five percent of the labour force is low skilled or part of the informal sector and yet twenty-one percent of the dwellings are informal. This disparity leads to the conclusion that housing typologies are not related to level of skill of the labour-force member. Hence, it is concluded that living in a separate brick structure should not be taken as an indicator of lower economic vulnerability when compared to those living in informal structures.

### Land Claims

The land claims in the district, based on the SDF (Waterberg DM, 2013), are shown in **Figure 32**. The project area around the Matlabas River seems to be the most affected by land claims.



**Figure 32: Land claims in district (Waterberg DM, 2013)**

## AGRICULTURE

An Agricultural Impact Assessment (**Appendix F3**) was conducted for the project. Refer to a summary of the recommendations in **Section 1(j)** and the impact assessment of this study contained in **Section 1(i)**.

### Irrigation

In general, the study area is regarded as arid, and irrigation is hence limited to major watercourses, as is evident immediately downstream of the proposed BP SS1 (shown in **Figure 32**). Agricultural practices are mainly reliant on the abstraction of water from the Crocodile River (West), in order to irrigate crops. Formal agricultural groups in the study area include the following:

- Hartbeespoort Irrigation Board;
- Crocodile River (West) Irrigation Board;
- Makoppa Agriculture;
- Transvaal Agricultural Union South Africa (TAU SA); and
- Agri-SA Lephalale.

The Makoppa Farmers are downstream of BP SS1 in the Vlieëpoort region (**Figure 33**).



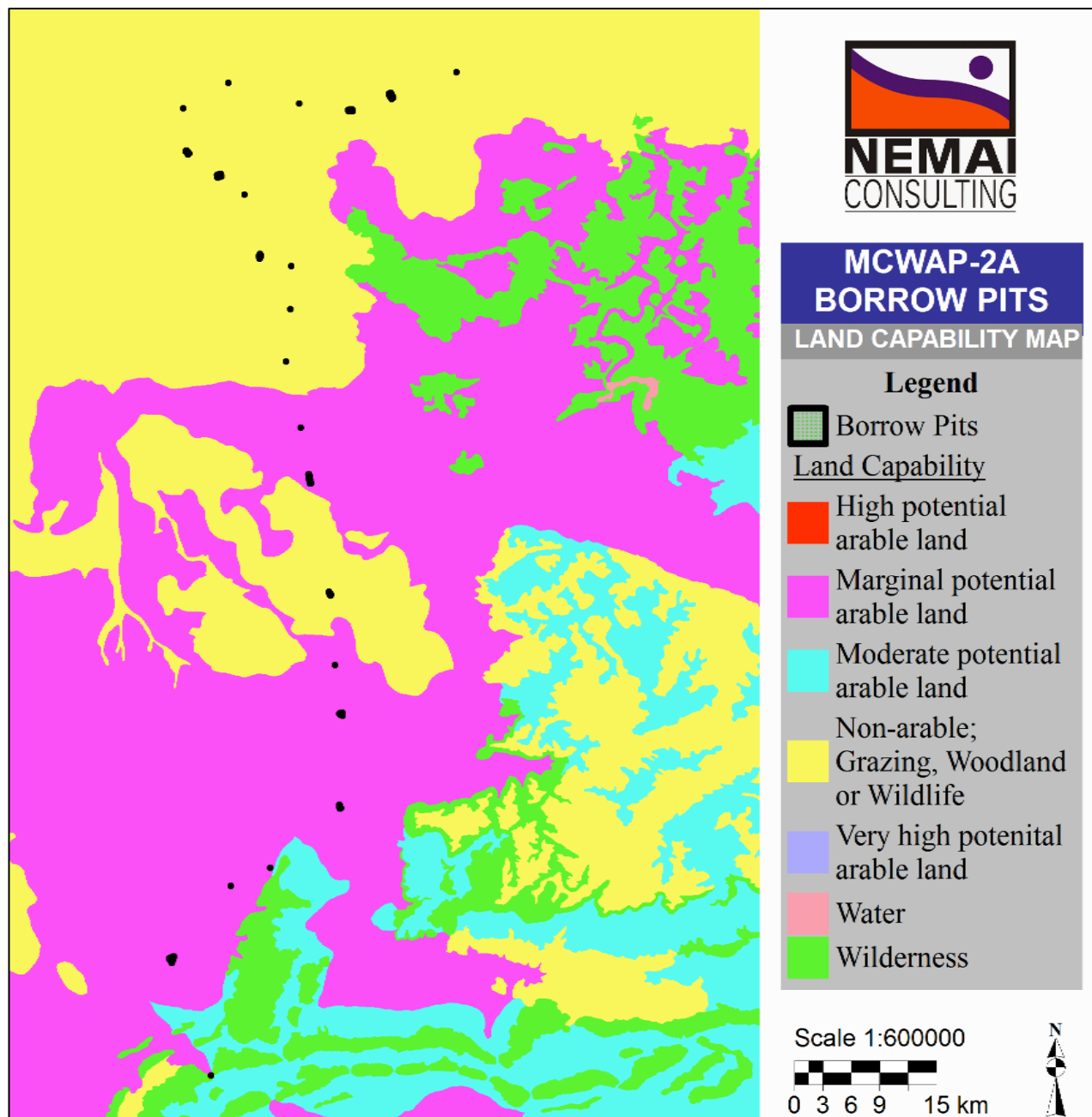
**Figure 33: Agricultural practices alongside the Crocodile River (West) downstream of BP SS1**

According to the Agricultural Impact Assessment (**Appendix F3**) the only land uses observed on the land proposed for the borrow pits were grazing or browsing for animals. No farming infrastructure will be negatively impacted on by the locality of the borrow pits. BP SS1 is in the river bed and has no agricultural use.

#### Land Capability

The following observations are made with regards to the land capability map in **Figure 34**:

- Marginal potential arable land is affected by majority of the borrow areas that fall in the central and southern parts of the study area; and
- The borrow areas that fall within the northern region of the study area affect non-arable land (grazing, woodland or wildlife).



**Figure 34: Land capability map**

### Existing Agricultural Activities

According to the Crocodile (West) Marico Internal Strategic Perspective (ISP) (DWAF, 2004b), smallholding and commercial agricultural activities (limited formal irrigation) take place in the area to the north west of Johannesburg (south of the Magaliesberg northern range). The area between Rustenburg and Brits is known for its citrus farming activities, whereas irrigated cash crop farming takes place below the Hartbeespoort Dam and Brits. Irrigation also occurs along the main stem of the Crocodile River (West), the most significant areas being just south and north of the town of Thabazimbi. The rest of the area is used for dryland farming (limited), cattle grazing and game ranching (DWAF, 2004b). Generally, there has been a movement away from cattle farming towards game farming in the greater area. The project footprint of BP 33 affects existing cultivated fields as seen in **Figure 35**.



**Figure 35: Agricultural activities affected by BP 33**

Impacts on grazing land is contained in the impact assessment in **Section 1(i)** and **Appendix G**.

## AIR QUALITY

Due to the predominantly rural nature of the study area, the air quality is regarded to be good.

Obvious sources of air pollution in the greater region include the following:

- ❖ Grootgeluk coal mining operations;
- ❖ Dust from areas affected by the previous Thabazimbi iron ore mining operations
- ❖ Urban-related emissions from towns (notably Lephalale and Thabazimbi);
- ❖ Emissions from Matimba and Medupi power stations (stacks) and its associated ash dump;
- ❖ Dust from agricultural lands, bare areas and use of dirt roads;
- ❖ Tailpipe emissions from vehicles travelling along the road network;
- ❖ Burning of wood for household purposes in areas without electricity;
- ❖ Waste treatment and disposal;
- ❖ Burning of biomass (veld fires); and
- ❖ Veld fires.

For all impacts on air quality, refer to **Section 1(i)** for the impact assessment and **Appendix G**.

## NOISE

The rural state of the study area affords it tranquillity. Noise in the region emanates primarily from the following sources:

- ❖ Mining operations;
- ❖ Human settlements;
- ❖ Operations at the Matimba power station and ash dump;
- ❖ Farming operations (e.g. use of farming equipment);
- ❖ Vehicles on the road network;
- ❖ Trains utilising the railway line and
- ❖ Occasional overflying aircrafts.

Noise is likely to emanate from the construction and operational phases of the proposed borrow pits and associated access/haul roads, and the potential noise impacts are further discussed in the impact assessment contained in **Section 1(i)** and **Appendix G**.

## HISTORICAL AND CULTURAL FEATURES

A Phase 1 Heritage Impact Assessment (HIA) (see **Appendix F4**), as well as a paleontological desktop study, was undertaken for the project in accordance with the National Heritage Resources Act (Act No. 25 of 1999) (NHRA). Refer to **Section 1(i)** for the impact assessment and **Section 1(j)** for all mitigation measures and recommendations from the study.

### Historical Features

According to the Heritage Impact Assessment (PGS, 2018) a total of 18 archaeological and heritage sites were identified in the project area during the fieldwork. These were numbered from MCWAP Site 1 to MCWAP Site 18. These identified sites included the following:

- ❖ Five black homesteads where the potential risk for the presence of unmarked stillborn graves exist. See MCWAP Site 1, MCWAP Site 3, MCWAP Site 11, MCWAP Site 12 and MCWAP Site 16
- ❖ Five sites containing confirmed graves and possible graves. See MCWAP Site 2, MCWAP Site 4, MCWAP Site 7, MCWAP Site 13 and MCWAP Site 14.
- ❖ Three historic farmsteads which are older than 60 years. See MCWAP Site 5, MCWAP Site 6 and MCWAP Site 15.
- ❖ Two Stone Age sites. See MCWAP Site 8 and MCWAP Site 18.
- ❖ Two metalworking sites associated with the Iron Age. See MCWAP Site 9 and MCWAP Site 10.
- ❖ Memorial where cremated ash may have been placed. See MCWAP Site 17.

Of these identified sites, one site, MCWAP Site 10 was discovered within borrow pit BP 43, which contained a scatter of slag (**Figure 36**). This heritage resource was identified over a relatively small area. The HIA indicated that the site is located in an area where the vegetation almost exclusively consists of juvenile Tamboti trees (*Spirostachys africana*). As a result, it seems likely for the immediate



surroundings of the study area to have been disturbed, which explains the lack of associated cultural material. The site is of Generally Protected B (GP. B) or **Medium Significance**.



**Figure 36: Scatter of slag found within BP 43**

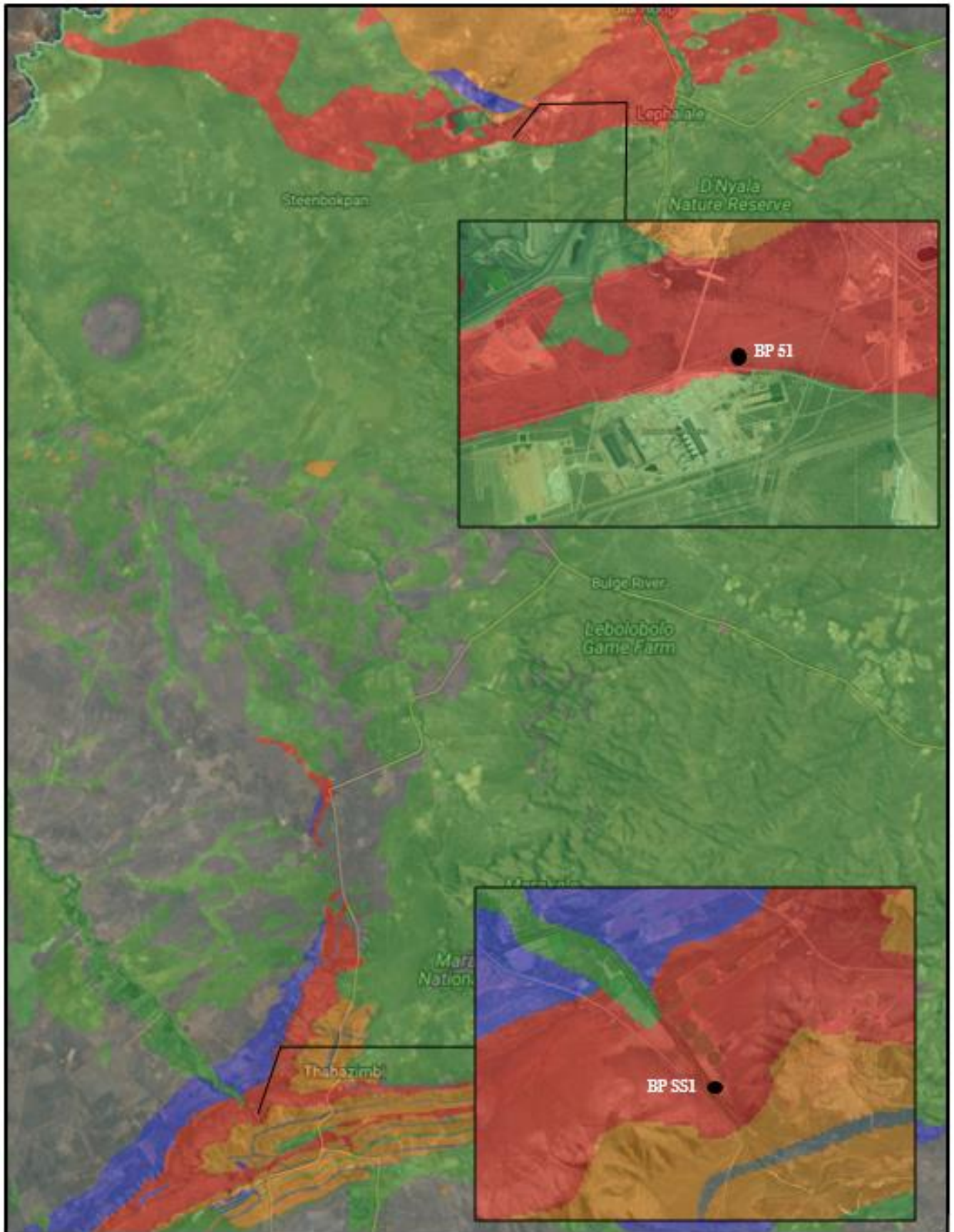
### Palaeontology

Based on the Palaeontological (Fossil) Sensitivity Map, sourced from South African Heritage Resources Information System (SAHRIS), (see **Table 23** and **Figure 37**), the following is noted in terms of the project footprint in relation to areas of palaeontological sensitivity:

- Very high sensitivity – Possibly affected by BP SS1 in the south, and by BP 51 in the north;
- Moderate sensitivity - affected by all the borrow pits which fall within the southern region of the study area (mainly BP 44 – BP 15); and
- Insignificant / zero sensitivity – remainder of proposed borrow pits.

**Table 23: Palaeontology Sensitivity Index**

| Colour               | Sensitivity               | Required Action                                                                                                                     |
|----------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>RED</b>           | <b>VERY HIGH</b>          | Field assessment and protocol for finds is required                                                                                 |
| <b>ORANGE/YELLOW</b> | <b>HIGH</b>               | Desktop study is required and based on the outcome of the desktop study, a field assessment is likely                               |
| <b>GREEN</b>         | <b>MODERATE</b>           | Desktop study is required                                                                                                           |
| <b>BLUE</b>          | <b>LOW</b>                | No palaeontological studies are required however a protocol for finds is required                                                   |
| <b>GREY</b>          | <b>INSIGNIFICANT/ZERO</b> | No palaeontological studies are required                                                                                            |
| <b>WHITE/CLEAR</b>   | <b>UNKNOWN</b>            | These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map. |



**Figure 37: Palaeontological Sensitivity Map (SAHRIS)**

According to the findings of the desktop paleontological study (**Appendix F4**), **Table 24** indicates the geological sediments in the project area, as well as their respective palaeontological sensitivities.

**Table 24: Geological sediments underlying the project area (PGS Heritage, 2018)**

| Era      | Supergroup/Sequence                    | Group          | Subgroup  | Formation  | Sensitivity |
|----------|----------------------------------------|----------------|-----------|------------|-------------|
| Mokolien |                                        | Waterberg      | Kransberg |            | Low         |
|          |                                        |                | Matlabas  |            |             |
|          |                                        |                | Nylstroom |            |             |
| Vaalian  | Bushveld Complex; Lebowa Granite Suite |                |           |            | Zero        |
|          | Transvaal Supergroup                   | Pretoria       |           | Black Reef | Moderate    |
|          |                                        | Chuniespoort   | Malmani   |            | High        |
|          |                                        | Buffelsfontein |           |            | Moderate    |
| Randian  |                                        |                |           |            |             |

Based on the table above, the Malmani Subgroup of the Chuniespoort Group (Transvaal Group) has a high Palaeontological sensitivity.

## PLANNING

Waterberg DM covers an area of approximately 4 951 882 ha. It consists mainly of commercial farms, game farming, rural settlements and small towns. The district is geographically, the largest municipality in the Limpopo Province but has the smallest population compared to the other districts (Waterberg DM, 2015). It is located on the western part of the Province. Thabazimbi LM is located in the south-western part of the Limpopo Province and Waterberg DM. The total area of the municipality is 10 882 km<sup>2</sup>, which constitutes 21,97% of the overall DM. The project footprint is located Wards 1 and 3 of the Thabazimbi LM (based on 2015 delimitation of wards).

Lephalale LM is located in the western part of the Limpopo Province and north-western part of the Waterberg DM. The total area of the municipality is 14 000 km<sup>2</sup>, which constitutes 28,3% of the overall DM. The project footprint is located Wards 3 and 5 of the Lephalale LM (based on 2015 delimitation of wards). As mentioned, the proposed borrow areas, and associated haul roads are mostly located on privately-owned properties that are primarily used for agriculture, game farming and eco-tourism.

### Spatial Development Framework (SDF)

#### ***Limpopo Province SDF***

The Limpopo SDF is dated September 2007 and indicates the following elements (Waterberg DM, 213) (see **Figure 38**):

- ❖ Infrastructure;
- ❖ Nodes;
- ❖ Environmentally sensitive areas; and
- ❖ Corridors: Four corridors are identified as Strategic Development Initiatives. Two of these impact on the District: namely the Trans-Limpopo Corridor along the N1 and the east-west Corridor from Polokwane via Lephalale to Botswana.

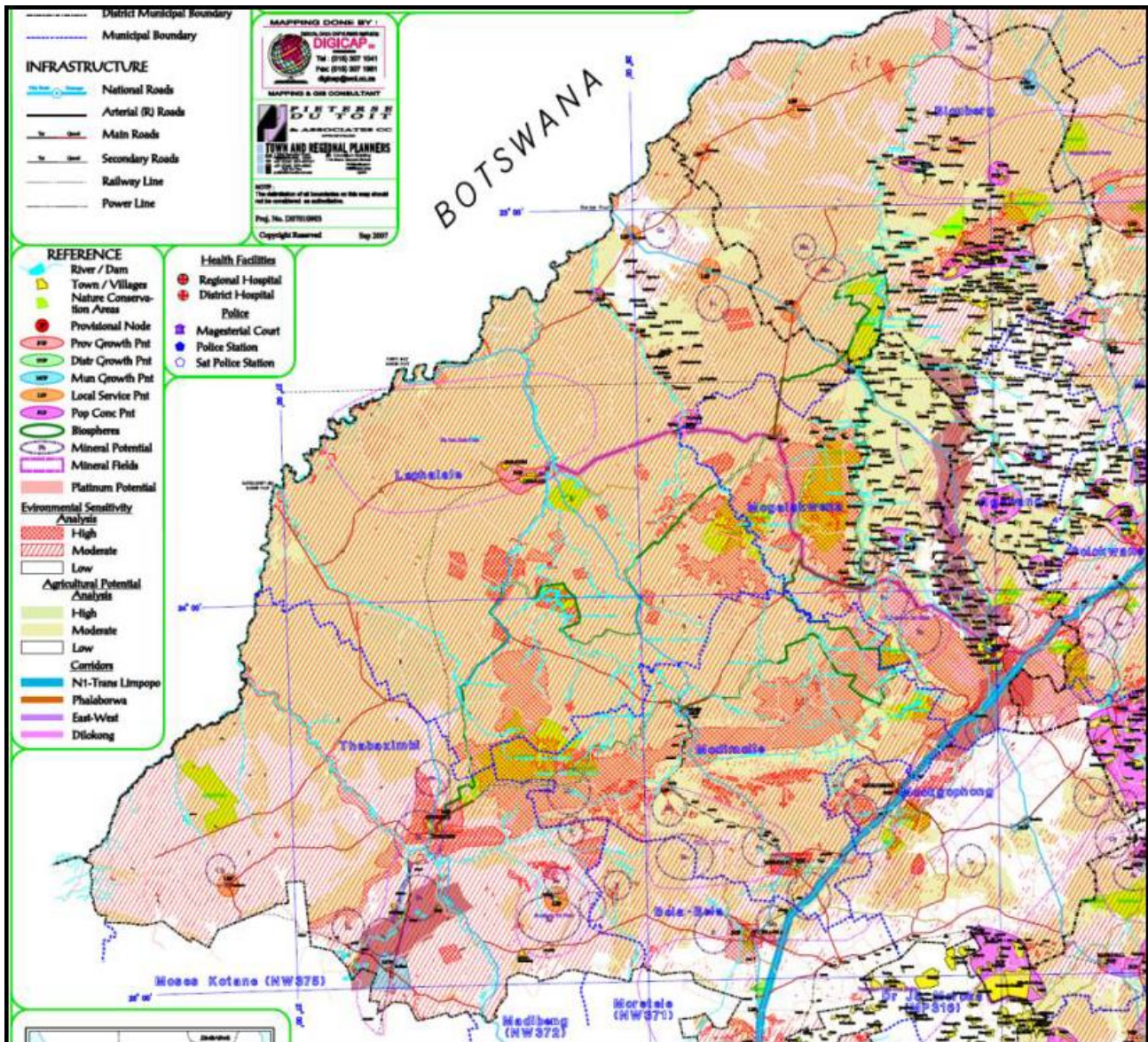


Figure 38: Limpopo Province SDF

### **Waterberg DM SDF**

There is an existing SDF for the Waterberg District, which was approved in 2009, and indicates the following (Waterberg DM, 213) (see **Figure 39**):

- ❖ Nodes;
- ❖ Networks;
- ❖ Conservation and Tourism;
- ❖ Mining; and
- ❖ Urban and Rural Development.

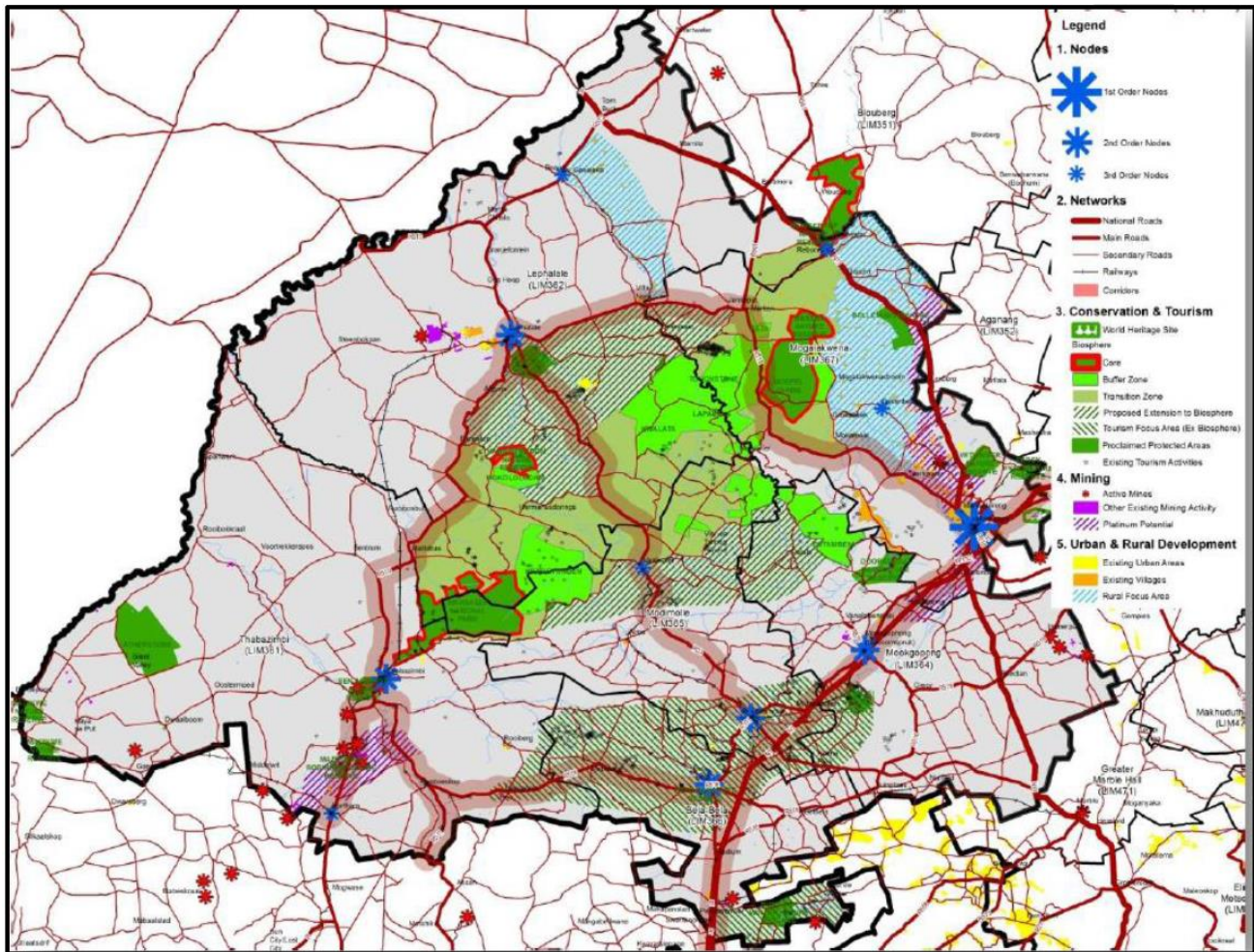


Figure 39: Waterberg DM SDF

### ***Lephalale LM SDF***

The Lephalale SDF is dated November 2012 and indicates the following (Waterberg DM, 213) (see **Figure 40**):

- ❖ Development corridors and strategic roads;
- ❖ Nodal points;
- ❖ Human settlement and other zones; and
- ❖ Long term vision and other features.

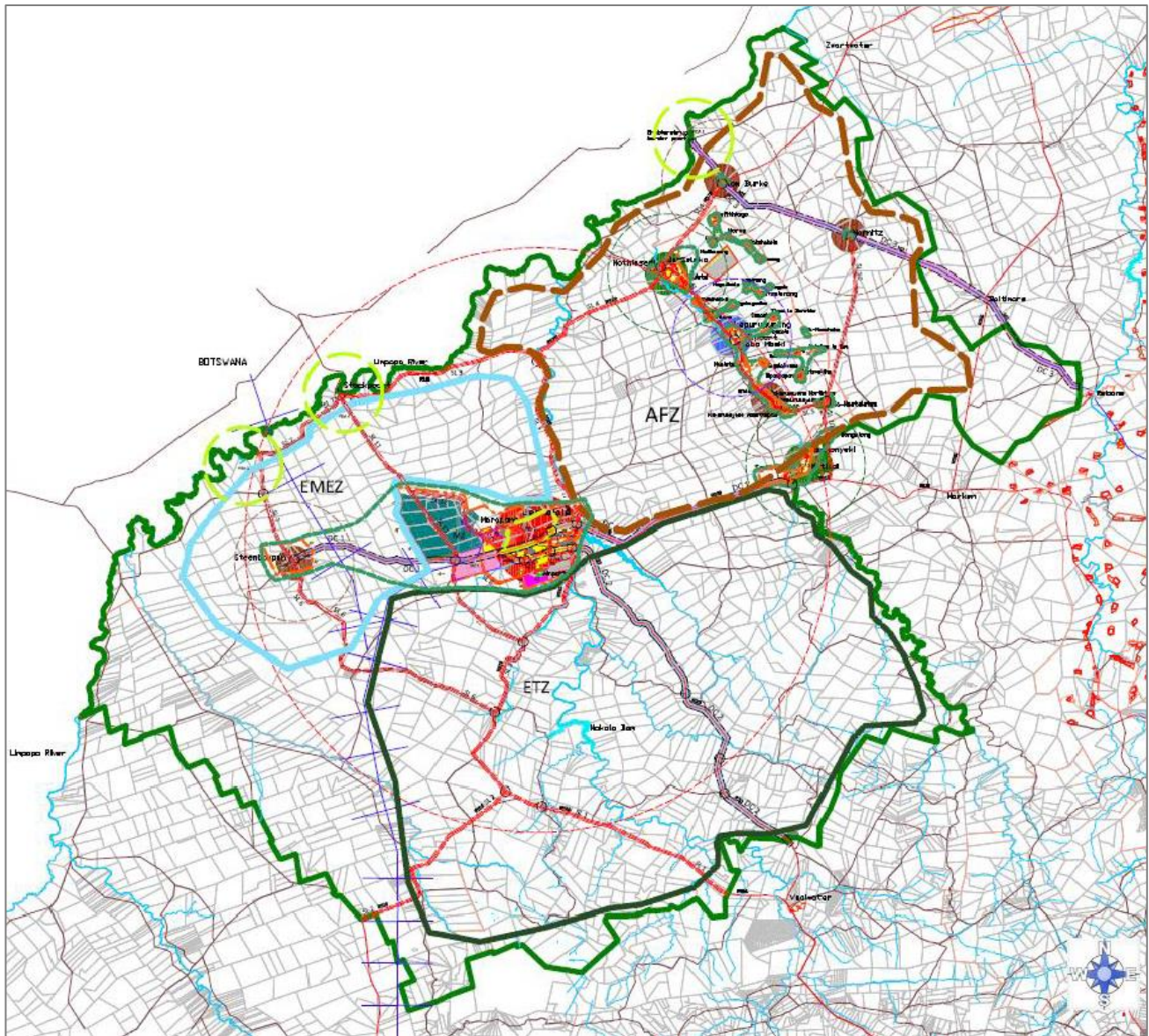


Figure 40: Lephale LM SDF

#### ***Thabazimbi LM SDF***

The Thabazimbi SDF is dated June 2008 and indicates the following (Waterberg DM, 213) (see **Figure 41**):

- ❖ Growth points;
- ❖ Settlements;
- ❖ Corridors;
- ❖ Nodes;
- ❖ Waterberg Biosphere;
- ❖ Mines; and
- ❖ High-risk river areas.

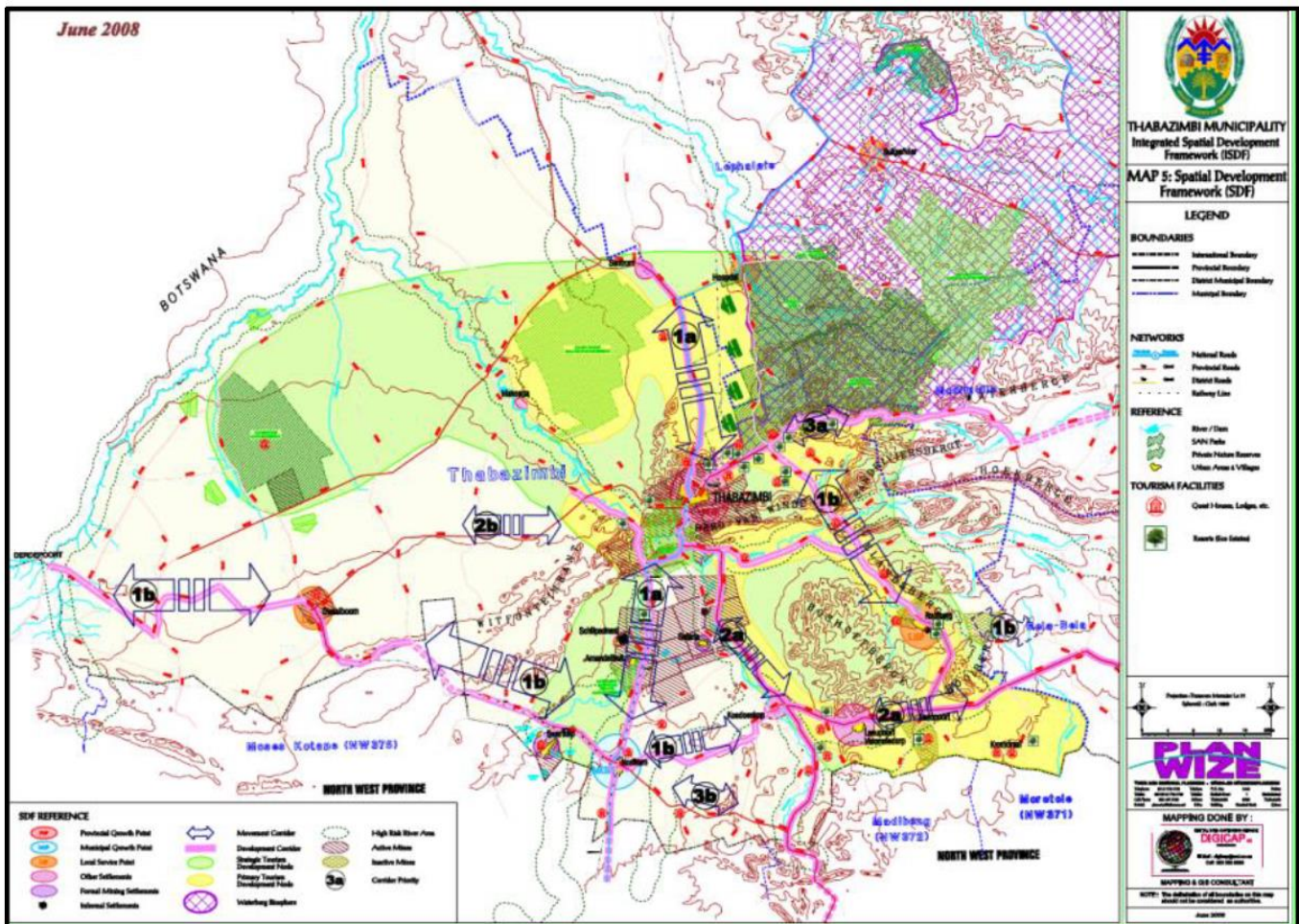


Figure 41: Thabazimbi LM SDF

### Environmental Management Framework

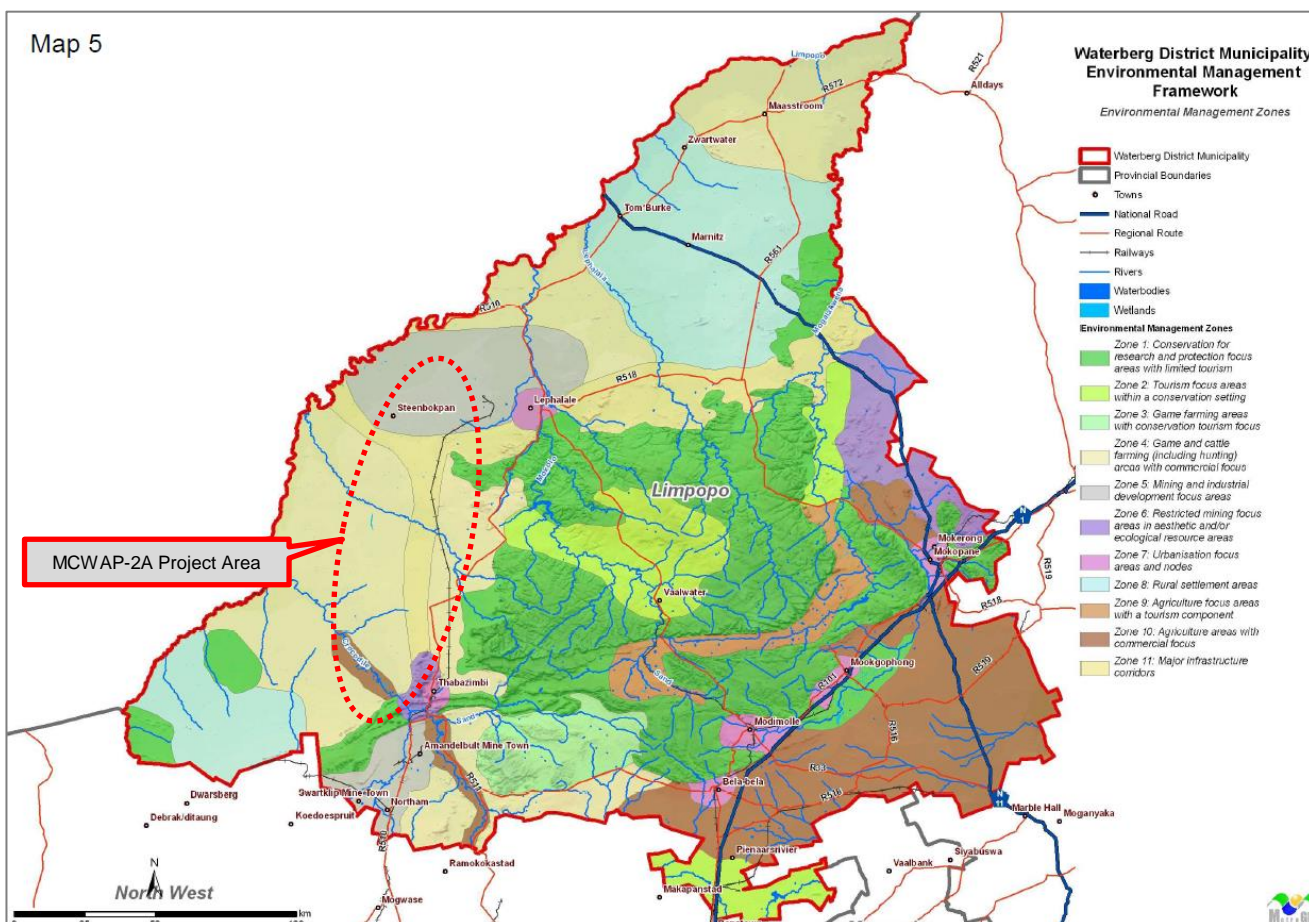
An EMF was developed for the Waterberg District with the following objectives:

- ❖ Encourage sustainable development;
- ❖ Establish development priorities;
- ❖ Identify strategic guidance and development management proposals;
- ❖ Identify the status quo, development pressures and trends in the area;
- ❖ Determine opportunities and constraints;
- ❖ Identify geographical areas in terms of NEMA;
- ❖ Specify additional activities within identified geographical areas that will require an EIA based on the environmental attributes of such areas;
- ❖ Specify currently listed activities that will be excluded from EIA within certain identified geographical areas based on the environmental attributes of such areas; and
- ❖ Develop a decision support system for development in the area to ensure that environmental attributes, issues and priorities are taken into account.

In terms of the EMF the project falls within the following Environmental Management Zones (refer to **Figure 42**):

- ❖ Zone 4: Game and cattle farming (including hunting) areas with commercial focus;
- ❖ Zone 5: Mining and industrial development focus areas;
- ❖ Zone 6: Restricted mining focus areas in aesthetic and/or ecological resource areas; and
- ❖ Zone 11: Major infrastructure corridors.

It is noted that Zone 11 facilitates the routing of bulk infrastructure, such as the pipeline associated with MCWAP-2A and borrow pits required for the construction of the pipeline infrastructure. The EIA will further assess whether MCWAP-2A is incompatible with the desired state established for the remaining zones.



**Figure 42: Waterberg DM EMF**

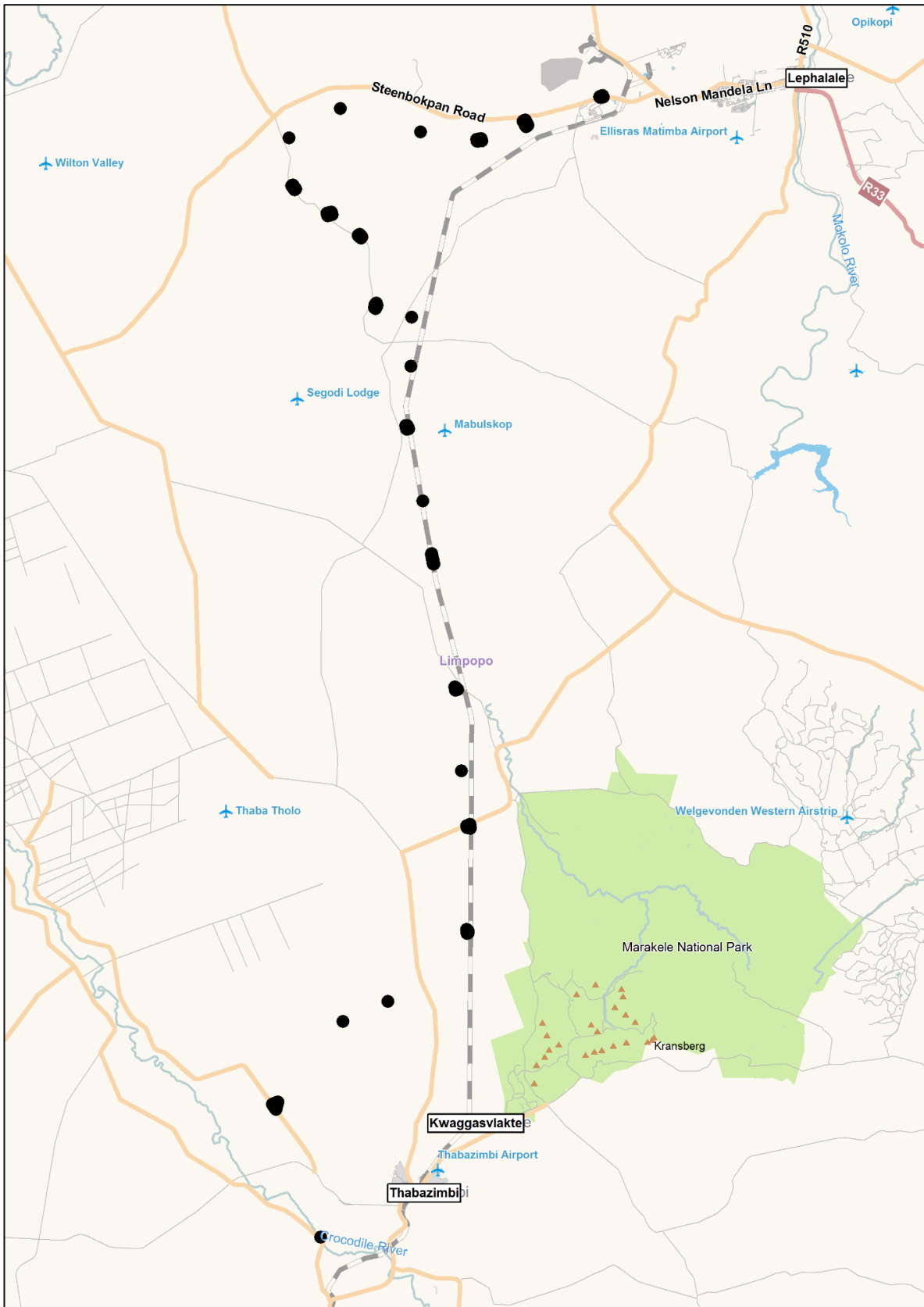
## WASTE DISPOSAL FACILITIES

Lephhalale LM has one permitted waste disposal facility. The life expectancy of the landfill is 5 years without waste minimization programmes but with such programmes the life expectancy can go as far as more than ten years (Lephhalale LM, 2015). The Municipality has appointed a service provider to conduct the feasibility studies for the development of new landfill site. According to the IDP (Thabazimbi LM, 2015), there are 3 formal waste disposal sites (Northam, Donkerspoort and Leeupoort) and 1 informal site (Rooiberg) in Thabazimbi LM.



# TRANSPORTATION

The major transportation network situated in the study region is shown in **Figure 43**.



**Figure 43 : Major transportation network**

Provincial roads in Lephalale, which serve as links between Thabazimbi, Vaalwater, Ellisras and Mokopane include:

- ❖ P84/1 (Vaalwater/Ellisras/Botswana);
- ❖ P19/2 (Ellisras/Marken) that links with (Mokopane); and
- ❖ P198/1 (Vaalwater/Ellisras).

The majority of the movement in the municipality occurs between the Mokerong-area and Lephalale where most of the business facilities are located, and along the road networks to Thabazimbi, Mokopane and Gauteng. A number of District Roads link with the Main roads, and there are also a number of internal formal and informal roads, which grant access to farms and settlements within Lephalale district. Lephalale is serviced with a north/south railway line, which transports coal to and from the Grootgeluk Mine. An airfield is also situated in Lephalale, known as the Ellisras Vliegveld/Aerodrome.

Important routes in Thabazimbi municipal area:

- ❖ P16/2 (link with the P84/1 situated in the Lephalale Local Municipality);
- ❖ P110/1 (north-south route; access route to the North West Province - Brits/Madibeng);
- ❖ P20-1 (east-west route; main access to Bela-Bela);
- ❖ P20-2 (east-west route; access to Koedoeskop/Northam);
- ❖ D928 (access road to Rooiberg from Thabazimbi); and
- ❖ D1649 (access road to Dwaalboom).

## EXISTING STRUCTURES AND INFRASTRUCTURE

The following existing structures and features located on properties, which will be directly and indirectly affected by the proposed borrow pits and associated access roads and activities, are listed below:

- ❖ Power lines;
- ❖ Railway line and servitude;
- ❖ Public and private roads;
- ❖ Telephone lines;
- ❖ Access roads to private farms;
- ❖ Private dams and boreholes;
- ❖ Fencing erected on the boundaries of private farms;
- ❖ Wildlife farms with fenced enclosures, breeding camps;
- ❖ Farm houses, dwellings of farm labourers and lodges; and
- ❖ Hunting facilities (skinning and cold rooms, shooting range, accommodation)

## TOURISM

Tourism is a key economic sector within the study area. An abundance of tourism activities are available including hunting, game viewing, bird watching, fishing, horse riding, hiking, etc. There has been a large-scale shift from cattle farming to ecotourism-based land use, hunting and exotic game-farming in the region, with numerous lodges, chalets and other forms of bush-accommodation also available. The Waterberg Mountain Range, which stretches from Thabazimbi to Mokopane, is a popular tourist attraction in the region. Thabazimbi is renowned for the numerous hunting opportunities afforded to tourists. Key tourist attractions in proximity to the study area include (amongst others):

- ❖ The Marakele National Park lies to the east of the study area;
- ❖ Thaba Tholo, which is renowned for breeding threatened and endangered game species like Roan Antelope, Sable Antelope, Tsessebe and disease-free Buffalo, is situated to the west of the pipeline route;
- ❖ The Ben Alberts Nature Reserve lies immediately southeast of BP SS1; and
- ❖ Borrow areas fall alongside or within Private game reserves.

## AESTHETIC QUALITIES

The visual character of the landscape is typical of the bushveld. Private game farms are prevalent in the project area, which afford a high-level of aesthetic appeal to the region. The visual quality of the area is further enhanced by watercourses, undisturbed vegetation and the Vlieëpoort ridge to the south of the study area. The aesthetic quality of certain areas surrounding the proposed borrow areas is partly degraded due to the existence of infrastructure such as roads, railway lines and transmission lines (see examples in **Figure 44**).



**Figure 44: Roads, Railway lines and Transmission Lines in the study area**

## (b) Description of the current land uses

The dominant land use and land cover in the areas earmarked for the proposed borrow pits are provided in **Table 25** and shown in **Figure 45**. The proposed borrow pits are mostly located on privately-owned properties, which are primarily used for agricultural practices or game-farming. Sensitive aspects associated with the aforementioned land uses include (amongst others) cultivated commercial fields, orchards and pivots (primarily in the Mooivallei area), agricultural infrastructure and facilities (e.g. pipelines, boreholes, dams), and sensitive game species (e.g. exotic game).

According to the Agricultural Impact Assessment (Index, 2018) the only land uses observed on the land proposed for the borrow pits, were **grazing** or **browsing** for animals.

**Table 25: Land Cover in the study area**

| Borrow Pits (BP) | Dominant Land Use & Land Cover                     |
|------------------|----------------------------------------------------|
| BP SS1           | River                                              |
| BP 25            | Woodland/Open bush/Grassland                       |
| BP 30            | Woodland/Open bush/Grassland                       |
| BP 35            | Woodland/Open bush                                 |
| BP 28            | Woodland/Open bush                                 |
| BP 33            | Cultivated Fields                                  |
| BP 41            | Woodland/Open bush                                 |
| BP 38            | Woodland/Open bush/Grassland                       |
| BP 39            | Low shrubland/Woodland/Open bush/Grassland         |
| BP 42            | Low shrubland/Woodland/Open bush                   |
| BP 44            | Woodland/Open bush                                 |
| BP 43            | Woodland/Open bush                                 |
| BP 53            | Woodland/Open bush                                 |
| BP 52            | Woodland/Open bush                                 |
| BP 50            | Low shrubland                                      |
| BP 48            | Cultivated Fields/Low shrubland/Woodland/Open bush |
| BP 49            | Cultivated Fields/Low shrubland/Woodland/Open bush |
| BP 15            | Cultivated Fields                                  |
| BP 46            | Woodland/Open bush/Grassland                       |
| BP 59            | Woodland/Open bush                                 |
| BP 13            | Woodland/Open bush/Low shrubland                   |
| BP 14            | Woodland/Open bush/Grassland                       |
| BP 51            | Woodland/Open bush/Grassland                       |

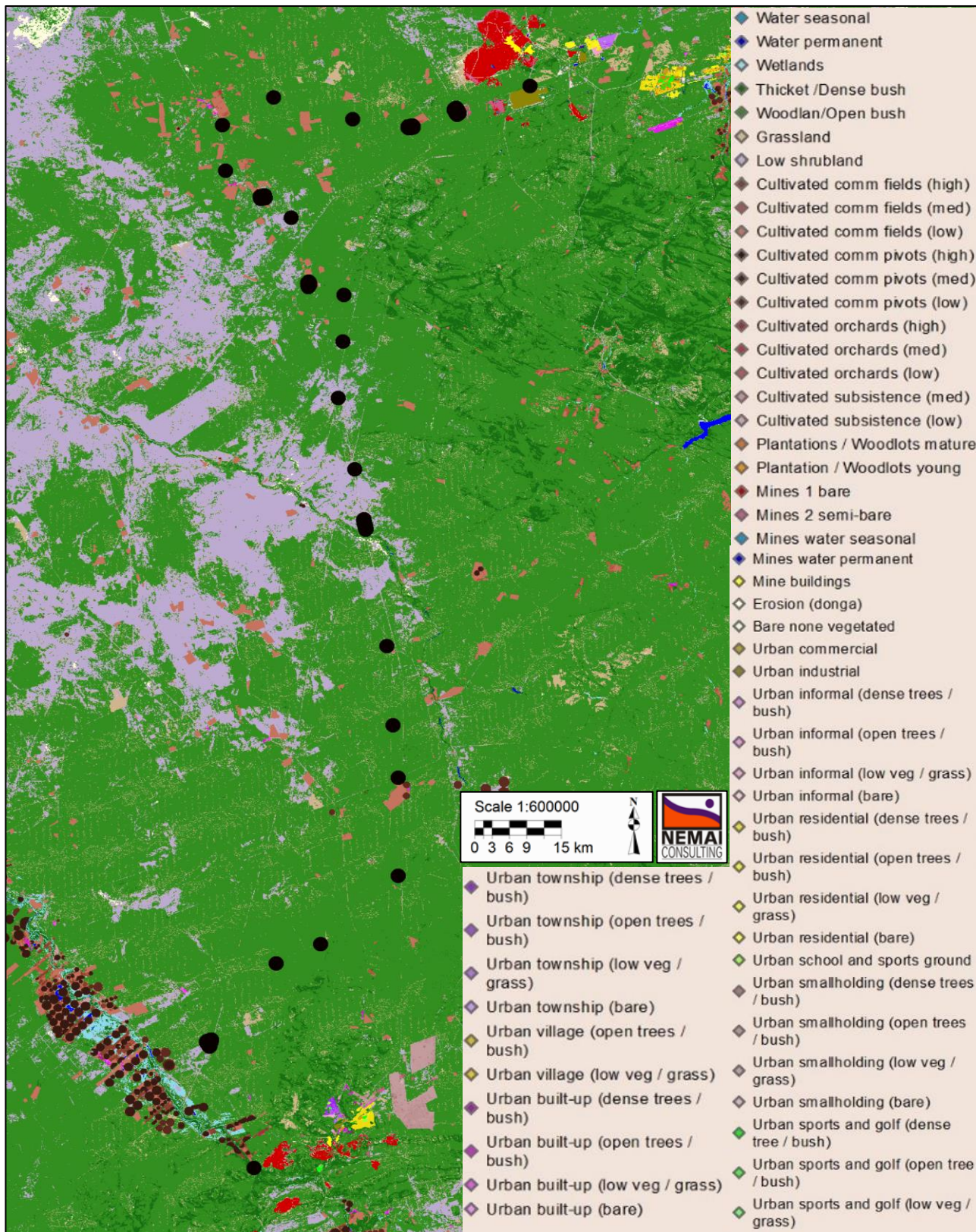


Figure 45: Current land use and land cover

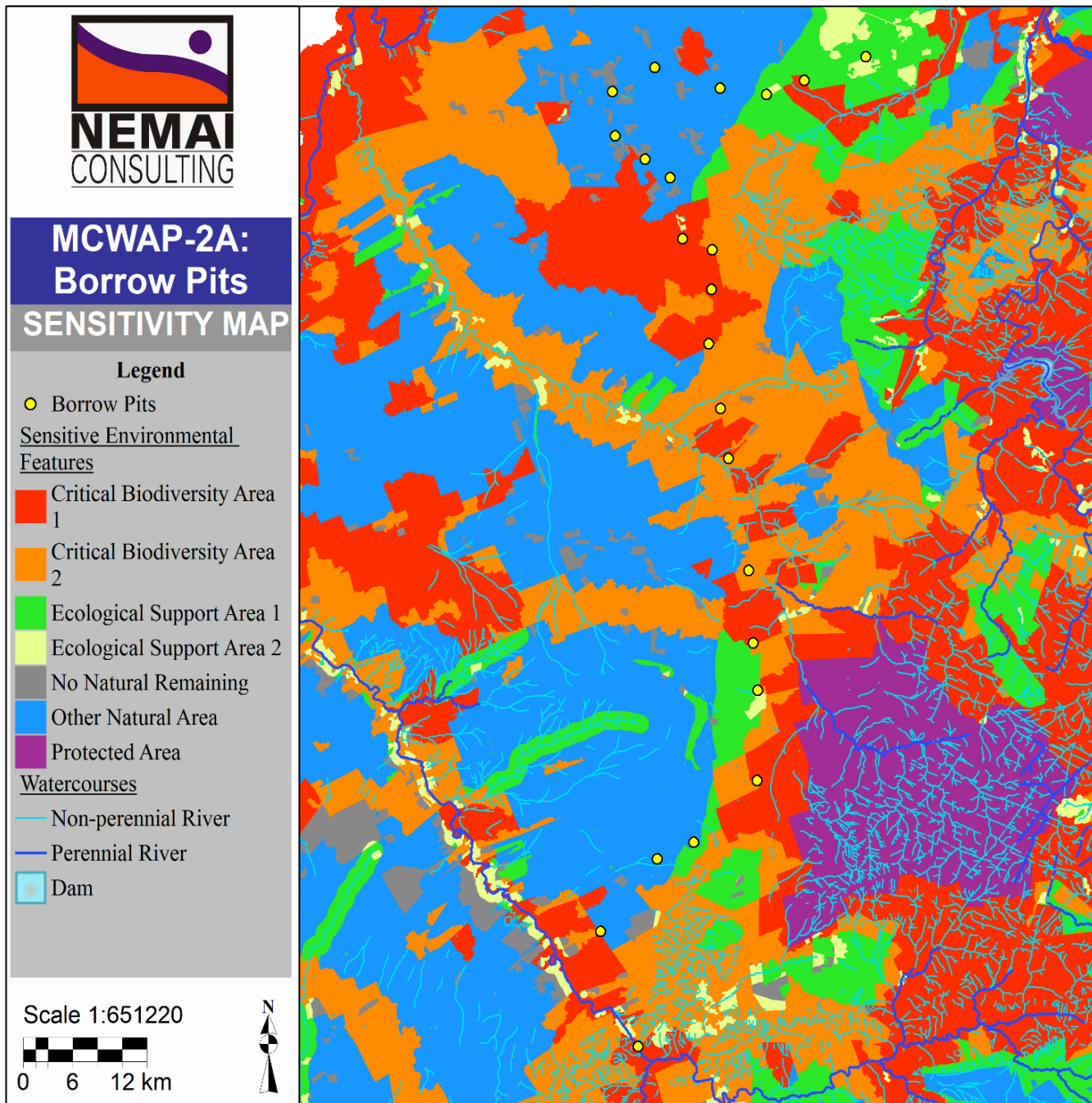
**(c) Description of specific environmental features and infrastructure on the site**

Refer to the sensitivity map (Figure 46) for all sensitive environmental features within the project area. Refer to the baseline assessment in Section 1(g)(iv) for a description of all environmental features and infrastructure on-site.

A summary of all sensitive features on-site are listed below:

- BP SS1 is situated within a river wetland, and directly affects the Crocodile River (West);
- A scatter of slag (MCWAP Site 10) is situated on BP 43;
- Protected trees occur on site, namely Leadwood (*Combretum imberbe*) which is situated within BP 48, and *Sclerocarya birrea* subsp. *africana* (Marula) situated within the borrow pits BP 25, 30, 35, 43, 52, 50A, 48, 49, 15, 46, 59; and
- Borrow pits are situated within CBA 1, CBA 2, ESA 1 and ESA 2 habitats.

#### (d) Environmental and current land use map



**Figure 46: Overall sensitivity map**

Refer to **Appendix D** for the individual sensitivity maps.

**v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts**

The potential impacts and risks are presented in **Table 26** below. The impact assessment in **Section 1(i)** includes the nature, significance, consequence, extent, duration and probability of the potential impacts. Refer to **Appendix G** for the supplementary impact assessment.

**Table 26: Potential Environmental Impact/Issues**

| Environmental Aspect               | Construction & Operational Phases<br>Potential Issues / Impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Land Use</b>                    | <ul style="list-style-type: none"> <li>• Temporary loss of agricultural and grazing land;</li> <li>• Fragmentation of farm/farm portions due to fencing of borrow pit and access/haul roads;</li> <li>• Disruptions and alternations to existing land use;</li> </ul>                                                                                                                                                                                                                                                                                                                               |
| <b>Climate</b>                     | <ul style="list-style-type: none"> <li>• Possible emission of greenhouse gases during the pre-mining and mining phases of borrow pit.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Geology</b>                     | <ul style="list-style-type: none"> <li>• Blasting related impacts.</li> <li>• Sourcing of construction aggregate and associated impacts (e.g. borrow pits, haul roads).</li> <li>• Disposal of overburden/spoil material.</li> <li>• Unsuitable geological conditions.</li> <li>• Excavation of required material within borrow area.</li> </ul>                                                                                                                                                                                                                                                    |
| <b>Geohydrology</b>                | <ul style="list-style-type: none"> <li>• Potential disturbance of the aquifer from blasting.</li> <li>• Potential contamination of groundwater during the site clearing and mining stage.</li> <li>• Use of boreholes and groundwater on site.</li> <li>• Contamination of groundwater from poor stormwater management, spills and leaks of hazardous chemical substances (HCS) during operation of borrow area, insufficient bunding of HCS, oil and petrol spills from stagnant vehicles on site.</li> </ul>                                                                                      |
| <b>Soil</b>                        | <ul style="list-style-type: none"> <li>• Removal of topsoil;</li> <li>• Soil erosion (e.g. steep terrain and instream works); and</li> <li>• Soil contamination through poor mining practices and inadequate management of HCS (e.g. fuel, oil).</li> </ul>                                                                                                                                                                                                                                                                                                                                         |
| <b>Topography</b>                  | <ul style="list-style-type: none"> <li>• Erosion on steep slopes;</li> <li>• Alteration of the natural topography of the borrow area.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Surface Water</b>               | <ul style="list-style-type: none"> <li>• Alteration of site hydrology;</li> <li>• Sewage contaminants from toilets;</li> <li>• Solid waste inputs from the staff of the mining operation;</li> <li>• Hydrocarbon related contamination;</li> <li>• Erosion and sedimentation;</li> <li>• loss/degradation of riparian areas;</li> <li>• Alteration of natural hydrology;</li> <li>• Contamination of surface water;</li> <li>• Bed, flow and channel modification;</li> <li>• Altered hydro-dynamics;</li> <li>• Lowering of the water table; and</li> <li>• Increased suspended solids.</li> </ul> |
| <b>Wetlands</b>                    | <ul style="list-style-type: none"> <li>• Altering the bed, banks, course or characteristics of the watercourse;</li> <li>• Impeding or diverting flow;</li> <li>• Altering wetland habitat.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Terrestrial Ecology - Flora</b> | <ul style="list-style-type: none"> <li>• Loss of plant species of conservation concern;</li> <li>• Destruction of indigenous flora during site establishment;</li> <li>• Loss of vegetation due to fuel and chemical spills;</li> <li>• Management of alien invasive species;</li> <li>• Loss of topsoil and erosion;</li> <li>• Loss of CBA and ESA habitats;</li> <li>• Damage to plant life outside of the project area;</li> </ul>                                                                                                                                                              |
| <b>Terrestrial Ecology - Fauna</b> | <ul style="list-style-type: none"> <li>• Loss of <i>Protected species</i> listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Threatened or Protected Species regulations</li> </ul>                                                                                                                                                                                                                                                                                                                                                              |

| Environmental Aspect                            | Construction & Operational Phases<br>Potential Issues / Impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 | <ul style="list-style-type: none"> <li>• Loss and displacement of animals on site;</li> <li>• Disturbance to animals outside of project area;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Wildlife</b>                                 | <ul style="list-style-type: none"> <li>• Relocation of game;</li> <li>• Habitat loss;</li> <li>• Habitat fragmentation;</li> <li>• Loss of wildlife biodiversity;</li> <li>• Noise and dust;</li> <li>• Wildlife dispersal and migration;</li> <li>• Impacts on land-use;</li> <li>• Poaching.</li> </ul>                                                                                                                                                                                                                                                                                                                             |
| <b>Socio-economic Environment</b>               | <ul style="list-style-type: none"> <li>• Increased traffic on public and private roads;</li> <li>• Local road conditions;</li> <li>• Increase in noise and dust;</li> <li>• Influx of workers and people seeking employment;</li> <li>• Worker health and safety;</li> <li>• Security and increase in crime;</li> <li>• Damage to property;</li> <li>• SMME creation;</li> <li>• Job creation and skills development;</li> <li>• Recreational or tourism business impacts;</li> <li>• Loss of productive land or business value;</li> <li>• Disruption of daily living activities; and</li> <li>• Temporary road closures.</li> </ul> |
| <b>Agriculture</b>                              | <ul style="list-style-type: none"> <li>• Temporary loss of agricultural productivity;</li> <li>• Temporary loss of grazing land;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Air Quality</b>                              | <ul style="list-style-type: none"> <li>• Alteration of air quality/air pollution; and</li> <li>• Excessive dust levels as a result of construction and operational activities.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Noise</b>                                    | <ul style="list-style-type: none"> <li>• Excessive noise levels as a result of construction and operational activities;</li> <li>• Noise impacts from machinery (screener, crusher) and use of access/haul roads;</li> <li>• Blasting operations (if required); and</li> <li>• Altered ambient noise levels.</li> </ul>                                                                                                                                                                                                                                                                                                               |
| <b>Historical and Cultural Features</b>         | <ul style="list-style-type: none"> <li>• Risk of heritage and cultural resources being damaged / destroyed through vegetation clearance and operational/mining activities.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Existing Structures &amp; Infrastructure</b> | <ul style="list-style-type: none"> <li>• Disruptions of existing services (boreholes, powerlines, pipelines)</li> <li>• Relocation of infrastructure;</li> <li>• Borrow pit domain close to existing households;</li> <li>• Use of existing private roads as access//hauling</li> </ul>                                                                                                                                                                                                                                                                                                                                               |
| <b>Aesthetics</b>                               | <ul style="list-style-type: none"> <li>• Visual quality and sense of place affected by mining activities.</li> <li>• Noise and dust generated from blasting affecting households/infrastructure in close proximity to borrow areas;</li> <li>• Light pollution; and</li> <li>• Inadequate reinstatement and rehabilitation of borrow pit footprint.</li> </ul>                                                                                                                                                                                                                                                                        |
| <b>Traffic and Access</b>                       | <ul style="list-style-type: none"> <li>• Inadequate road conditions;</li> <li>• Disruptions to existing road users;</li> <li>• Safety risks;</li> <li>• Crossing main roads;</li> <li>• Increase in dust levels;</li> <li>• Poor road maintenance;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Solid Waste</b>                              | <ul style="list-style-type: none"> <li>• Waste generated from construction activities;</li> <li>• Domestic waste;</li> <li>• Hazardous waste (e.g. chemicals, oils, soil contaminated by spillages, diesel rags).</li> <li>• Wastewater (sanitation facilities, washing of plant, operations at the batching plant, etc.).</li> <li>• Disposal of excess spoil material (soil and rock) generated as part of the bulk earthworks.</li> </ul>                                                                                                                                                                                          |



**vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks**

The EIA quantitative impact assessment focuses on the direct and indirect impacts associated with the project. All impacts will be analysed with regard to their nature, extent, magnitude, duration, probability and significance. The following definitions and criteria apply:

**Nature (/Status)**

The project could have a positive, negative or neutral impact on the environment.

**Extent**

- Local - extend to the site and its immediate surroundings.
- Regional - impact on the region but within the province.
- National - impact on an interprovincial scale.
- International - impact outside of South Africa.

**Magnitude**

Degree to which impact may cause irreplaceable loss of resources.

- Low - natural and social functions and processes are not affected or minimally affected.
- Medium - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
- High - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

**Duration**

- Short term - 0-5 years.
- Medium term - 5-11 years.
- Long term - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.
- Permanent - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

**Probability**

- Almost certain - the event is expected to occur in most circumstances.
- Likely - the event will probably occur in most circumstances.
- Moderate - the event should occur at some time.
- Unlikely - the event could occur at some time.
- Rare/Remote - the event may occur only in exceptional circumstances.

**Significance**

Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-

0 – Impact will not affect the environment. No mitigation necessary.

1 – No impact after mitigation.

2 – Residual impact after mitigation.

3 – Impact cannot be mitigated.

Information provided by specialists will be used to calculate an overall impact score by multiplying the product of the nature, magnitude and the significance of the impact by the sum of the extent, duration and probability based on the following equation:

$$\text{Overall Score} = (\mathbf{N \times M \times S}) \times (\mathbf{E + D + P})$$

Where: **N** = Nature  
**M** = Magnitude  
**S** = Significance  
**E** = Extent  
**D** = Duration  
**P** = Probability

**Table 27: Impact methodology**

| Nature              |                                |                                         |                                 |                |
|---------------------|--------------------------------|-----------------------------------------|---------------------------------|----------------|
| Negative            |                                | Neutral                                 |                                 | Positive       |
| -1                  |                                | 0                                       |                                 | +1             |
| Extent              |                                |                                         |                                 |                |
| Local               | Regional                       | National                                | International                   |                |
| 1                   | 2                              | 3                                       | 4                               |                |
| Magnitude           |                                |                                         |                                 |                |
| Low                 |                                | Medium                                  | High                            |                |
| 1                   |                                | 2                                       | 3                               |                |
| Duration            |                                |                                         |                                 |                |
| Short Term (0-5yrs) | Medium Term (5-11yrs)          | Long Term                               | Permanent                       |                |
| 1                   | 2                              | 3                                       | 4                               |                |
| Probability         |                                |                                         |                                 |                |
| Rare/Remote         | Unlikely                       | Moderate                                | Likely                          | Almost Certain |
| 1                   | 2                              | 3                                       | 4                               | 5              |
| Significance        |                                |                                         |                                 |                |
| No Impact/None      | No Impact After Mitigation/Low | Residual Impact After Mitigation/Medium | Impact Cannot be Mitigated/High |                |
| 0                   | 1                              | 2                                       | 3                               |                |

For example, the worst possible impact score of -117 would be achieved based on the following ratings:

N = Nature = -1

M = Magnitude = 3

S = Significance = 3

E = Extent = 4

D = Duration = 4

P = Probability = 5

Worst impact score =  $(-1 \times 3 \times 3) \times (4+4+5) = -117$

On the other hand, if the nature of an impact is 0 (neutral or no change) or the significance is 0 (no impact), then the impact will be 0. Impact Scores will therefore be ranked in the following way:

**Table 28: Ranking of overall impact score**

| Impact Rating | Low/Acceptable impact | Medium     | High       | Very High   |
|---------------|-----------------------|------------|------------|-------------|
| Score         | 0 to -30              | -31 to -60 | -61 to -90 | -91 to -117 |

**vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected**

Refer to **Table 26** for a list of impacts (positive and negative) that the proposed borrow pits will have on the environment (biophysical and socio-economic aspects) and directly/indirectly affected landowners and communities. Refer to the impact assessment in **Section 1(i)** and **Appendix G**.

**viii) The possible mitigation measures that could be applied and the level of risk**

The impact assessment (**Section 1(i)**) which encompasses specific input from specialist studies, commenting authorities and I&APs, assesses all possible impacts and provides specific mitigation measures. Also refer to the supplementary impact assessment in **Appendix G**.

**ix) Motivation where no alternative sites were considered**

Initially, no alternatives were assessed for the proposed borrow pits, as previous geotechnical investigations (Mokolo Crocodile Consultants, 2012) contained in Appendix E, confirmed the location and layout of the required BPs through on-site test pit investigations. The proposed sites were identified for suitability of material and provide the required volumes that would have to be excavated economically and used as construction material for MCWAP-2A. However, during the public participation process, comments were received from directly affected landowners motivating for the relocation of the proposed BP sites to an alternative location. The alternatives sites provided by the landowners were situated either at an alternative location on the same property, or on a neighbouring property.

### x) Statement motivating the alternative development location within the overall site.

During the PPP, comments were received from directly affected landowners motivating for the relocation of the proposed BP sites to an alternative location. The alternative sites provided by the landowners were situated either at an alternative location on the same property, or on a neighbouring property.

**Table 29** below provides a summary of the preferred alternative sites, based on motivation provided by the affected landowners, as well as the findings from the geotechnical and specialist studies.

**Table 29: BP Alternative Sites**

| Alternative BP Name | Statement motivating the Alternative Borrow Pit site                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BP30A               | <ul style="list-style-type: none"> <li>• The landowner stated that the current location of BP 30 is too close to the farm entrance and too close to Buffelsvley, and requested that it must be out of sight.</li> <li>• Based on the geotechnical findings for the alternative site BP 30A, it was found to be a potentially suitable source of selected backfill material.</li> <li>• The terrestrial ecological specialist had no preference between BP 30 and BP 30A as the two sites are situated in the same habitat units.</li> <li>• The wetland specialist indicated that there is no wetland in proximity to BP 30A, and thus no impact is foreseen on the new BP 30A site.</li> <li>• The agricultural specialist stated that the alternative will have no impact on the farming and the alternative site is recommended.</li> <li>• The aquatic specialist had no preference between BP 30 and BP 30A as there was no risk to modify any natural aquatic systems.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| BP39A               | <ul style="list-style-type: none"> <li>• The landowner stated that the Schoonwater and Rietfontein farms are one of their pristine areas for conservation and tourism activities. The areas host Lions and Elephants, which will pose a major risk for the contractors. They currently have a 5 star lodge 2.5km from the proposed BP 39 area. Access to BP 39 via the servitude is impossible when the river is flooded, due to the bridge at the crossing being under water. The landowner motivated for the alternative BP 39A as access to the new proposed site is much easier for the contractors, as it is located much closer to the Maaitjiesfontein main road. The compensation for BP 39A will be a fraction of the compensation required for the pristine Schoonwater and Rietfontein farms.</li> <li>• Based on the geotechnical findings for the alternative site BP 39A, it was found to be a potentially suitable source of selected backfill material.</li> <li>• The terrestrial ecologist preferred BP 39A as approximately 55% of the BP 39 site falls within the CBA 1 whereas only less than 1% of the alternative BP 39A site falls within a CBA 1.</li> <li>• The wetland specialist stated that BP 39A is situated just south of the Matlabas River, and is approximately 25m outside of the 32m buffer of the wetland. The specialist stated that no reason from a wetland perspective to reject BP 39A.</li> <li>• The aquatic specialist did not prefer BP 39A because it is likely to result in long-term modifications within the reach, particularly modifications to stormwater and surface water hydrology, as well as result in water volume reduction in the Matlabas system. If BP 39A is the preferred site, all mitigation measures provided in the Aquatic Impact Assessment must be implemented, stormwater management must be in place, and a rehabilitation plan must be established and implemented post operation of the borrow pit.</li> <li>• The agricultural specialist stated that the alternative will have no impact on the farming and the alternative site is recommended.</li> </ul> |

| Alternative BP Name                             | Statement motivating the Alternative Borrow Pit site                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>BP50A</b></p> | <p>The landowner indicated the following:</p> <ul style="list-style-type: none"> <li>• The breeding camps on their farm occur along the first 2000m, adjacent to the road. It cost approximately R2 million to prepare this area. The game fence is brand new and costs approximately R30 000 per km, and is approximately 12km on the eastern side of the farm. The sable camp was identified by specialists as the most suitable for breeding purposes. The surrounding camp serves as breeding camps for golden wildebeest, black impalas, etc. The back end of our farm is used for hunting. The sable camp in on Leliefontein and the golden wildebeest and black impalas are on Zandfontein, along the side of the road.</li> <li>• The borrow pit, BP 50 is located at the entrance of the farm, less than 400m from their workers' homes. A historical baobab is located in that camp. Lanes of baobab trees were planted towards the lodge.</li> <li>• The lodge alone cost R1 500 000 to upgrade it to a five star lodge. No international tourist will stay there with such noise and dust.</li> <li>• Security cameras were installed. The fence was electrified. Hides were built which cost approximately R500 000.</li> <li>• In the last few years they have spent millions to develop the farm, and have only started to earn profit now, hence cannot accept that a borrow pit is planned on Leliefontein.</li> </ul> <p>The specialists indicated the following:</p> <ul style="list-style-type: none"> <li>• Based on the geotechnical findings for the alternative site BP 50A, it was found to be a potentially suitable source of selected backfill material.</li> <li>• The aquatic specialist stated that BP 50A is situated 160m away from a pan, but is unlikely to impact the pan if the mitigation measures provided in the aquatic impact assessment are followed.</li> <li>• The terrestrial specialist preferred BP 50A, as BP 50 is home to a breeding camp of the Sable antelope, and the surrounding camp serves as a breeding camps for the Golden wildebeest and Black impala.</li> <li>• The wetland specialist recommended the alternative BP 50A as there are no wetlands in proximity that would be affected by the proposed location.</li> <li>• The agricultural specialist stated that the alternative will have no impact on the farming and the alternative site is recommended.</li> </ul> |
| <p style="text-align: center;"><b>BP14A</b></p> | <ul style="list-style-type: none"> <li>• The landowner requested that BP 14 be moved to the old cultivated land, as the proposed site affects natural bush on the farm.</li> <li>• Based on the geotechnical findings for the alternative site BP 14A, it was found to be a potentially suitable source of selected backfill material.</li> <li>• The terrestrial specialist preferred BP 14A as the alternative site is situated on old cultivated land, therefore would require less clearing of natural vegetation.</li> <li>• The wetland specialist indicated that there is no wetland in proximity to BP 14A, and thus no impact is foreseen on the new BP 14A site.</li> <li>• The agricultural specialist stated that the alternative will have no impact on the farming and the alternative site is recommended.</li> <li>• The aquatic specialist had no preference between BP 14 and BP 14A as there was no risk to modify any natural aquatic systems.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

In summary, the alternative BP sites provided by the landowners, tabulated above, are preferred as they are deemed technically feasible, they are a potentially suitable source of selected backfill material, and are preferred by the above mentioned specialist studies provided that the recommended mitigation measures are implemented. Refer to **Appendix C** for locality maps of the preferred alternative BPs.

**h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.**

The following process was undertaken in order to identify potential impacts associated with the proposed BPs:

- ❖ Specialist Studies:
  - Specialist investigations were conducted on-site during the EIA Phase in order to determine the impacts on different aspects of the environment. The specialist studies conducted are listed below:
    - Baseline Aquatic and Impact Study;
    - Terrestrial Ecological Impact Assessment;
    - Heritage Impact Assessment;
    - Agricultural Impact Assessment;
    - Socio-Economic Impact Assessment;
    - Wildlife Impact Assessment;
  - The specialists assessed whether there were any fatal flaws associated with the project;
  - All possible impacts and risks identified by the specialists, were included in the EIA Report and all mitigation measures were incorporated into the EMPr.
- ❖ Public Participation:
  - All directly and adjacently affected landowners were involved in the public participation process, and all comments received from landowners, stakeholders, commenting authorities and I&APs were included in the EIA and assessed in the impact assessment.
  - Focus group meetings and one-on-one landowner consultations were conducted and the concerns raised and site specific impacts informed by the landowners, were incorporated into the EIA and included in the impact assessment;
  - Alternative BP sites proposed by landowners.
- ❖ Baseline desktop assessment:
  - A detailed desktop assessment was conducted in the Scoping Phase in order to determine the status quo of the natural and social environment within the project area. Based on the desktop screening, certain resources were used to determine the baseline environmental aspects. This involved the use of the following:
    - Geographic Information Systems (GIS);
    - MCWAP Pre-feasibility studies and geotechnical investigations;
    - Municipal IDP, SDF and EMF;
    - South African National Biodiversity Institute (SANBI) maps and GIS information;
    - Google Earth Pro; and
    - Various site visits.
- ❖ Impact Assessment (**Section 1(i)** and **Appendix G**):
  - Includes an assessment of all potential impacts identified in the Scoping and EIA phases that the proposed development may have on the environment and also incorporates the impact assessments conducted by the specialist studies.

### i) Assessment of each identified potentially significant impact and risk

Refer to the supporting impact assessment, contained in **Appendix G**.

| ACTIVITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ASPECTS AFFECTED | POTENTIAL IMPACTS                                | PHASE                    | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SIGNIFICANCE if mitigated |
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| Construction and Operation of borrow pits.<br><br>The primary activities: <ul style="list-style-type: none"> <li>• Complete detailed geotechnical investigations;</li> <li>• Complete negotiations with affected landowners;</li> <li>• Contractor to confirm the mining process and to develop a mining method statement;</li> <li>• Contractor to develop Mining Plan, which includes the layout of mining activities and features such as fencing, access arrangements, aggregate stockpiles, topsoil stockpiles, container stores, crushing and screening area, office and support facilities, haul roads, overburden placement, etc.;</li> <li>• Understand site drainage and manage stormwater</li> </ul> | Land use         | Land acquisition and servitude restrictions      | Construction             | <b>Medium (-)</b>             | 1. Compensation to be determined by an independent valuer, in accordance with the principle set out in Section 25 of the Constitution concurrent with Section 12 of the Expropriation Act; and<br>2. Optimisation of borrow pit location to be considered in the design phase to avoid existing structures and buildings, as well as other sensitive features (where possible). Should the changing of the borrow pits' footprints be unfavourable, the existing infrastructure can be relocated to an agreed position or compensation for the market value can be offered upon undertaking of a valuation. | <b>Low (-)</b>            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | Disruptions and alterations to existing land use | Construction & Operation | <b>High (-)</b>               | 1. Construction of borrow pit will only commence following completion of land acquisition process;<br>2. Demarcation and fencing of borrow pit and associated haul roads;                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Low (-)</b>            |

| ACTIVITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ASPECTS AFFECTED | POTENTIAL IMPACTS                                          | PHASE                    | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SIGNIFICANCE if mitigated |
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| <p>(e.g. construct sediment holding basins and divert up-slope water around the mining area);</p> <ul style="list-style-type: none"> <li>• Construction of access and haul roads;</li> <li>• Site preparation, including clearing and grubbing;</li> <li>• Remove and safe storage (temporary stockpiles) of topsoil and remaining overburden material for post-mining rehabilitation;</li> <li>• Manage borrow pits, including side slopes and floor of mined area;</li> <li>• Process the borrowed material (crushing and screening) for use in earthworks;</li> <li>• Load the borrow material into tipper trucks and haul material to pipeline trench, as well as other areas where the material is required;</li> <li>• Inert and spoil material to be used to old fill borrow area (as necessary);</li> </ul> <p>Closure of borrow pits:</p> <ul style="list-style-type: none"> <li>• Grading of site;</li> </ul> |                  |                                                            |                          |                               | <ol style="list-style-type: none"> <li>3. Construction activities to be restricted to demarcated areas;</li> <li>4. Land disturbed or altered shall be rehabilitated;</li> <li>5. Rehabilitation of the borrow pits and haul roads must be undertaken as specified in the EMPr as well as to the satisfaction of the landowner, DWS and DMR; and</li> <li>6. Compensation based on legitimate claims for losses as a result of project-related activities.</li> </ol>                                                                                                                                                                                  |                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Climate          | Greenhouse gas emissions. Contributions to global warming. | Construction & Operation | Unknown                       | <ol style="list-style-type: none"> <li>1. Materials with a high recycled content should be used where possible and the re-use of site materials should be considered.</li> <li>2. The operational performance of site offices and storage facilities on site should be considered so to maximise the efficient use of energy and water.</li> <li>3. Suitable training should be provided to operators to ensure that they maximise the efficiency of the plant and idling is reduced.</li> <li>4. In terms of transportation of workers and staff, collective transportation arrangements should be made to reduce individual car journeys.</li> </ol> | Unknown                   |



| ACTIVITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ASPECTS AFFECTED | POTENTIAL IMPACTS  | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SIGNIFICANCE if mitigated |
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| <ul style="list-style-type: none"> <li>Removal of all facilities associated with mining activities; and</li> <li>Stabilise, reinstate and rehabilitate borrow areas.</li> </ul> <p>The mining equipment to be used includes the following:</p> <ul style="list-style-type: none"> <li>Excavators</li> <li>Bull-dozers, front-end loaders, backactors;</li> <li>Tipper trucks;</li> <li>Graders</li> <li>Water trucks; and</li> <li>Lowbed truck (transporting machines on and off site).</li> </ul> |                  |                    |                            |                               | 5. All vehicles used during the project should be properly maintained and in good working order.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Soils            | Soil erosion       | Construction & Operational | Medium (-)                    | <ol style="list-style-type: none"> <li>Stabilisation of cleared areas to prevent and control erosion. The method chosen (e.g. watering, planting, retaining structures, commercial anti-erosion compounds) will be selected according to the site-specific conditions. Drainage management should also be implemented to ensure the minimization of potential erosion.</li> <li>Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion during operation phase.</li> <li>Install suitable buttressing to prevent future erosion of the structures of the watercourses affected by construction, if required.</li> <li>Monitoring to be conducted to detect erosion (e.g. steep sections along access roads, management areas, stockpiles, and mining areas).</li> </ol> | Low (-)                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Soils            | Soil contamination | Construction & Operational | High (-)                      | 1. All hydrocarbons (e.g. fuel, oils and contaminated soil/materials) and other                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Medium (-)                |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                            | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SIGNIFICANCE if mitigated |
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|          |                  |                                                              |                            |                               | <p>hazardous waste resulting from spills, refuelling and maintenance activities shall be disposed of in a formally licensed hazardous waste site or, where possible, be removed and disposed by an approved contractor. The Contractor shall provide Safe Disposal Slips issued by the hazardous waste disposal facility. The Safe Disposal Slips shall be on site at all time.</p> <p>2. Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery may be collected in holding tanks prior to disposal.</p> <p>3. In the event of any hydrocarbon spills, the contaminated soil must be removed, placed in a sealed container and disposed of a registered hazardous landfill site.</p> |                           |
|          | Geohydrology     | Contamination of groundwater by poor construction practices. | Construction & Operational | <b>High (-)</b>               | <p>1. Suitable protection of groundwater during excavations. Implement mitigation measures suggested as part of the geotechnical investigations for managing groundwater.</p> <p>2. Vehicles to be in good working order to avoid leaks.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                      | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SIGNIFICANCE if mitigated |
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|          |                  |                                        |                            |                               | 3. Where vehicles/machinery are leaking oil, fuel drip trays must be used to contain the spill. All vehicles and machinery must be repaired as soon as possible.<br>4. All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.<br>5. Reduce sediment loads in water from dewatering operations. All dewatering should be done through temporary sediment traps (e.g. constructed out of geo-textiles and hay bales).<br>6. Implement a groundwater monitoring programme (refer to EMPPr). |                           |
|          |                  | Disturbances to aquifer from blasting. | Construction & Operational | High (-)                      | 1. Suitable protection of aquifer during blasting. Implement mitigation measures suggested as part of the geotechnical investigations for managing groundwater.<br>2. Baseline monitoring to include existing boreholes.                                                                                                                                                                                                                                                                                                                                                                                                                                    | Low (-)                   |
|          | Topography       | Erosion on steep slopes.               | Construction & Operational | High (-)                      | 1. Suitable erosion protective measures to be                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Low (-)                   |

| ACTIVITY | ASPECTS AFFECTED          | POTENTIAL IMPACTS                                        | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SIGNIFICANCE if mitigated |
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|          |                           |                                                          |                            |                               | <p>implemented where the borrow pits are located in steep terrain.</p> <p>2. Undertake rehabilitation of the construction area to minimise visual impacts.</p> <p>3. Although the use of indigenous vegetation is promoted, where there is a risk of soil erosion (e.g. steep slopes) a suitable specialist must be consulted to determine the most appropriate stabilisation measures.</p>                                                                                                                                                                                                         |                           |
|          | Topography                | Alteration of the natural topography of the borrow area. | Construction & Operational | <b>Medium (-)</b>             | <p>1. Stockpiling of material will be confined to one designated area.</p> <p>2. All residue deposits will be removed and the borrow areas will be reshaped to blend in with the surrounding environment.</p> <p>3. Unused overburden / spoil material shall be placed back into the excavation and reshaped, where possible, to blend into the surrounding landscape.</p> <p>4. The stockpiled topsoil will be spread over the site.</p> <p>5. Soil stockpiles shall not be higher than 1,5m and the slopes of soil stockpiles shall not have a vertical/horizontal gradient exceeding 1: 1.5.</p> | <b>Low (-)</b>            |
|          | Surface Water - Hydrology | Impacts to watercourses from                             | Construction               | <b>Medium (-)</b>             | <p>1. Minimise influence to downstream flow regime</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED              | POTENTIAL IMPACTS                                                                                                                                                                                            | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SIGNIFICANCE if mitigated |
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|          |                               | temporary diversions.                                                                                                                                                                                        |                            |                               | when diverting and impeding flow for construction and operation of borrow pit and access roads.<br>2. Prevent possible erosion caused by temporary in-stream diversion. Install suitable buttressing / stabilisation structures to prevent future erosion, if required.<br>3. Select most appropriate crossing point based on geotechnical conditions, sensitivity of riparian habitat (e.g. protected trees, large trees that afford bank stabilisation) and in-stream habitat, depending on technical feasibility.<br>4. Adequate rehabilitation and reinstatements of sand bank within watercourse. |                           |
|          | Surface Water – Water Quality | Contamination of surface water through sedimentation from in-stream works, silt-laden runoff from disturbed areas, and improper practices (e.g. poor management of waste water and disposal of solid waste). | Construction & Operational | High (-)                      | 1. Conduct water quality monitoring (baseline and during construction and operation of BP SS1) at suitable up- and downstream sites on Crocodile River (West);<br>2. All diffuse pollution sources to be managed to prevent pollution of the watercourses in the project area.<br>3. Storage area and ablution facilities to be located 50 m                                                                                                                                                                                                                                                           | Low (-)                   |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                             | PHASE        | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SIGNIFICANCE if mitigated |
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|          |                  |                                               |              |                               | from edge of riparian habitat.<br>4. Where necessary, install in-stream silt traps during construction within the watercourse channel and along the riparian habitat. The style of silt trap will depend on materials used and the water movement patterns.<br>5. Implement suitable storm water measures during construction to manage ingress of runoff into watercourses.<br>6. Ensure proper storage of material (including fuel, paint) that could cause water pollution. Ensure proper storage and careful handling of hazardous substances with spill prevention materials at hand.<br>7. Reduce sediment loads in water from dewatering operations. All dewatering should be done through temporary sediment traps (e.g. constructed out of geo-textiles and hay bales). |                           |
|          | Flora            | Loss of plant species of conservation concern | Construction | Medium (-)                    | 1. Permits from DAFF and LEDET are required before construction commences in order to cut, disturb, destroy or remove the several protected trees                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Low (-)                   |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                                | PHASE               | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SIGNIFICANCE if mitigated |
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|          |                  |                                                                  |                     |                               | <p>noted within the project area.</p> <p>2. It is recommended that search, rescue and relocation be conducted taking into consideration red data, protected and endangered flora and fauna species. For flora species, the following factors need to be considered (amongst others) as part of this plan:</p> <p>2.1 Detailed plan of action (including timeframes, methodology and costs);</p> <p>2.2 Site investigations;</p> <p>2.3 Consultation with authorities and stakeholders;</p> <p>2.4 Marking of species to be relocated;</p> <p>2.5 Applying for permits;</p> <p>2.6 Identification of suitable areas for relocation;</p> <p>2.7 Aftercare; and</p> <p>2.8 Monitoring (including targets and indicators to measure success).</p> |                           |
|          |                  | <p>Destruction of indigenous flora during site establishment</p> | <p>Construction</p> | <p><b>Medium (-)</b></p>      | <p>1. Clearly demarcate the construction servitude.</p> <p>2. Vegetation clearing should be kept to a minimum (restricted to construction servitude), and this should only occur where it is absolutely necessary.</p> <p>3. Rehabilitate all disturbed areas as soon as the</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Low (-)</b></p>     |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS | PHASE | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SIGNIFICANCE if mitigated |
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|          |                  |                   |       |                               | <p>construction is completed on the proposed development sites.</p> <ol style="list-style-type: none"> <li>4. Ensure that all personnel have the appropriate level of environmental awareness and competence.</li> <li>5. Vehicles and construction workers should under no circumstances be allowed outside the construction servitude to prevent impact on the surrounding vegetation.</li> <li>6. Prevent contamination of natural areas.</li> <li>7. Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site.</li> <li>8. Proliferation of alien and invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread.</li> <li>9. No storage of any construction material within sensitive areas.</li> <li>10. Avoid translocating stockpiles of topsoil from one place to sensitive areas in order to avoid translocating soil seed banks of alien species.</li> <li>3. Disturbance of vegetation must be limited to the</li> </ol> |                           |



| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                   | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SIGNIFICANCE if mitigated |
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|          |                  |                                                     |                            |                               | servitude area acquired for the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |
|          |                  | Loss of vegetation due to fuel and chemical spills. | Construction & Operational | Medium (-)                    | <ol style="list-style-type: none"> <li>1. Appropriate measures should be implemented in order to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person.</li> <li>2. Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks.</li> <li>11. Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use.</li> </ol> | Low (-)                   |
|          |                  | Management of alien invasive species                | Construction & Operational | Medium (-)                    | <ol style="list-style-type: none"> <li>1. Control of alien invasive species and noxious weeds for areas disturbed by the construction activities, in accordance with the requirements of the NEM:BA Alien and Invasive Species Regulations. Eradication method to be approved by the Project Manager.</li> <li>2. To prevent unnecessary alien plant infestations, an alien plant monitoring and eradication programme needs to be in place, at</li> </ol>                                                                                                                              | Low (-)                   |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                          | PHASE               | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                | SIGNIFICANCE if mitigated |
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|          |                  |                                            |                     |                               | <p>least until the disturbed areas have recovered and properly stabilised.</p> <p>3. Promote awareness of all personnel.</p>                                                                                                                                                                                                                                                                                                                                   |                           |
|          |                  | Loss of topsoil and erosion.               | Construction        | <b>Medium (-)</b>             | <p>1. During site preparation, topsoil and subsoil are to be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater.</p> <p>4. An ecologically-sound storm water management plan must be implemented during construction and appropriate water diversion systems put in place.</p> | <b>Low (-)</b>            |
|          |                  | Rehabilitation of site after construction. | Operation & Closure | <b>Medium (-)</b>             | <p>1. Bare surfaces should be grassed as soon as possible after construction to minimise time of exposure. Locally occurring, indigenous grasses should be used.</p> <p>2. The rehabilitated and seeded areas must be harrowed after spreading the topsoil and fertilizer uniformly.</p> <p>3. Inspect rehabilitated area at three monthly intervals during the first and second growing season to</p>                                                         | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                                                                                                                                           | PHASE        | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SIGNIFICANCE if mitigated |
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|          |                  |                                                                                                                                                                             |              |                               | <p>determine the efficacy of rehabilitation measures.</p> <p>4. Take appropriate remedial action where vegetation establishment has not been successful or erosion is evident.</p> <p>5. Only locally indigenous vegetation is to be used for rehabilitation.</p> <p>6. All waste generated by the construction activities will be stored in a temporary demarcated storage area, prior to disposal thereof at a licensed registered landfill site.</p> <p>7. All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state (where possible), in agreement with the ECO</p> |                           |
|          | Fauna            | Loss of Protected species listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Threatened or Protected Species regulations | Construction | <b>Medium (-)</b>             | 1. In order to protect Southern African Python on or around the site, should this species be encountered or exposed during the construction phase, it should be removed and relocated to natural areas in the vicinity. This remedial action requires the engagement of a herpetologist and or ecologist to oversee the                                                                                                                                                                                                                                                                                                                                             | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                         | PHASE        | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SIGNIFICANCE if mitigated |
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|          |                  |                                           |              |                               | removal of any herpetofauna during the initial ground clearing phase of construction (i.e. initial ground-breaking by earthmoving equipment). However, if this species is found during winter period, when it is in hibernation, then a permit from LEDET would be required in order to catch and release it to a safer environment.<br>2. The desktop study shows that spider species such as <i>Ceratogyrus darlingi</i> are expected to occur in the area, and it is therefore suggested that during the walk down survey, if any of these are found, a permit from LEDET will be required before relocation can take place. |                           |
|          |                  | Loss and displacement of animals on site. | Construction | Medium (-)                    | 1. If any herpetological species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. This remedial action requires the employment of a herpetologist and or ecologist to oversee the removal of any herpetofauna during the initial ground clearing phase of construction (i.e.                                                                                                                                                                                                                                                                     | Low (-)                   |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS | PHASE | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SIGNIFICANCE if mitigated |
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|          |                  |                   |       |                               | initial ground-breaking by earthmoving equipment).<br>2. Training of construction workers to recognise threatened animal species will reduce the probability of fauna being harmed unnecessarily.<br>3. The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase.<br>4. No trapping or any other method of catching of any animal or bird may be performed on site<br>5. Vehicles must adhere to a speed limit.<br>6. All construction and maintenance vehicles must stick to properly demarcated and prepared roads. Off-road driving should be strictly prohibited.<br>7. No fires should be allowed at the site.<br>8. No dogs or other domestic pets should be allowed at the site.<br>9. Any fauna (mammal and reptile) that becomes trapped in the excavations or in any construction or operational related activity may not be harmed and must be rescued and |                           |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS            | PHASE        | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SIGNIFICANCE if mitigated |
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|          | Flora and Fauna  | Loss of CBA and ESA habitats | Construction | <b>Medium (-)</b>             | <p>relocated by an experienced person.</p> <ol style="list-style-type: none"> <li>1. The most significant way to mitigate the loss of habitat is to limit the construction footprint within the natural habitat areas remaining. Disturbance of vegetation must be limited to the servitude area acquired for the project.</li> <li>2. Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site.</li> <li>3. Vehicles and construction workers should under no circumstances be allowed outside the site boundaries to prevent impact on the surrounding vegetation.</li> <li>4. All stockpiles, construction vehicles, equipment and machinery should only be situated within the servitudes acquired for the project.</li> <li>5. Prevent contamination of natural areas.</li> <li>6. No structures should be built outside the area demarcated for the development.</li> <li>7. Although it is unavoidable that sections of the project infrastructure development will need to traverse areas of potential high sensitivity, the clearing of vegetation</li> </ol> | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                           | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SIGNIFICANCE if mitigated |
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|          |                  |                                                             |                            |                               | must be limited to the servitude area acquired for the project.<br>8. Where possible, linear infrastructure proposed as part of the development should be aligned with existing infrastructure or routed through already transformed/degraded areas.                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |
|          | Fauna and Flora  | Damage to plant and animal life outside of the project area | Construction & Operational | <b>Medium (-)</b>             | 1. Any fauna (mammal, reptile and amphibian) that becomes trapped in the excavations or in any construction or operational related activity may not be harmed and must be rescued and relocated by an experienced person.<br>2. Proliferation of alien and invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread.<br>3. No unauthorised vehicles should be allowed to drive through the site during the construction activities.<br>4. No trapping or any other method of catching of any animal may be performed on site.<br>5. Illegal hunting is prohibited.<br>6. No dumping of any form is permitted. | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS      | PHASE                    | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SIGNIFICANCE if mitigated |
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|          |                  |                        |                          |                               | 7. No damage and/or removal/trapping/snaring of indigenous plant or animal material for cooking and other purposes will be allowed.<br>8. All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state where possible, in agreement with the Environmental Control Officer (ECO).<br>9. Construction activities should be restricted to the development footprint area and then the compliance in terms of footprint can be monitored by the ECO.<br>10. Natural areas which could be deemed as no go should be clearly marked. |                           |
|          | Fauna            | Disturbance to animals | Construction & Operation | Medium (-)                    | 1. Animals residing within the designated area shall not be unnecessarily disturbed.<br>2. During construction, refresher training can be conducted with construction workers with regards to environmental awareness, including the protection of fauna and flora.<br>3. The Contractor and his/her employees shall not bring                                                                                                                                                                                                                                                                                           | Low (-)                   |



| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                                                                                             | PHASE        | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SIGNIFICANCE if mitigated |
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|          |                  |                                                                                                                               |              |                               | any domestic animals onto site.<br>4. Toolbox talks should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes.<br>5. Maintain proper access control to the construction site.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |
|          | Wildlife         | <ul style="list-style-type: none"> <li>• Habitat loss</li> <li>• Loss of wildlife biodiversity</li> <li>• Land-use</li> </ul> | Construction | <b>Medium (-)</b>             | 1. All breeding camps must have a protective buffer zone adjacent to the fence line of the construction servitude. This must be implemented by the landowner and claimed for.<br>2. Erect new fences on both sides of the pipeline construction corridor and secure wildlife on wildlife ranches and farms;<br>3. Make provision for wildlife movement and migration, where possible.<br>4. Safe translocation of high value wildlife species encountered to areas of protection.<br>5. Preserve high value wildlife species in situ where possible and protect unique wildlife habitats.<br>6. Creating an alternative habitat with high productive potential during rehabilitation procedures by planting pipeline | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS | PHASE | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SIGNIFICANCE if mitigated |
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|          |                  |                   |       |                               | servitude with suitable indigenous grass species that will improve biodiversity.<br>7. Devise and implement a monitoring policy to determine noise impacts on wildlife.<br>8. Implement measures to prevent the use of unauthorised security firearms on the construction site.<br>9. Prohibit the transport of live plants or other animals into natural areas.<br>10. All wildlife must have sufficient space to move away from construction disturbances.<br>11. Rare and expensive wildlife breeding stock should be relocated to alternative camps where noise and disturbance from construction is a matter of concern.<br>12. Planned blasting activities must be communicated to all affected I&APs. Communication methods should be amplified in the method statement.<br>13. Design and Implement standard operating procedures for unexpected cases of emergency and support to ranchers/farmers i.e. |                           |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS | PHASE | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SIGNIFICANCE if mitigated |
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|          |                  |                   |       |                               | <p>unplanned veld fires, fence breaks and wildlife escapes.</p> <p>14. Disruption of activities by functional wildlife enterprises must be avoided, if possible.</p> <p>15. Avoid disruption of functional wildlife enterprises (including game farming operations, hunting and ecotourism activities). Plan pipeline construction phases to select sections with cattle and wildlife farming enterprises during the winter months (May to September), with wildlife eco-tourism and hunting enterprises targeted for construction during the summer months (October to April) if possible and feasible within the constraints of the construction schedule and economy. Where this is not possible affected farmers/ranchers must be informed in writing of the proposed construction schedule to ensure pre-emptive action in mitigating impacts by cancellation of bookings or re-scheduling of planned land-use activities.</p> |                           |

| ACTIVITY | ASPECTS AFFECTED                                     | POTENTIAL IMPACTS                                                                                                                | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SIGNIFICANCE if mitigated |
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|          | Socio-Economic:<br>Health and well being             | <ul style="list-style-type: none"> <li>• Annoyance from dust and noise</li> <li>• Security</li> <li>• Personal safety</li> </ul> | Construction & Operational | <b>Medium (-)</b>             | <ol style="list-style-type: none"> <li>1. Apply dust suppression mitigation measures to vehicle movements, open areas and excavations.</li> <li>2. Prior notice should be given to surrounding communities of blasting events.</li> <li>3. Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing.</li> <li>4. Fence off all construction sites and control access to these sites.</li> <li>5. Clearly mark any hazardous areas and regularly monitor these areas to ensure that they are avoided by people and animals.</li> <li>6. Liaise with the South African Police Services (SAPS) and Community Policing Forums to ensure that construction sites are monitored.</li> </ol> | <b>Low (-)</b>            |
|          | Socio-Economic:<br>Quality of the living environment | <ul style="list-style-type: none"> <li>• Disruptions of daily living;</li> <li>• Damage to property</li> </ul>                   | Construction & Operational | <b>Medium (-)</b>             | <ol style="list-style-type: none"> <li>1. Ensure that, at all times, people have access to their properties as well as to social facilities such as schools, churches, transport, shops, etc.</li> <li>2. Investigate and consult farmers and local communities on the need to provide suitable access</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED                                 | POTENTIAL IMPACTS                                                                                                                                           | PHASE                               | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SIGNIFICANCE if mitigated |
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|          |                                                  |                                                                                                                                                             |                                     |                               | <p>points around the construction sites for people and animals.</p> <p>3. An access survey should be carried out prior to working in a new section of the project and access arrangements should be discussed and agreed to by the landowner.</p> <p>4. If a risk existing of damage taking place on a property as a result of construction, a condition survey should be undertaken prior to construction.</p> <p>5. The contractor is to make good and acknowledge any damage that occurs on any property as a result of construction work.</p> |                           |
|          | Socio-Economic: Economic and material well being | <ul style="list-style-type: none"> <li>• SMME Development</li> <li>• Job creation and skills development;</li> <li>• Indirect employment impacts</li> </ul> | Construction, Operational & Closure | <b>High (+)</b>               | <p>1. A procurement policy promoting the use of local business where possible, should be put in place and applied throughout the construction and operational phases of the project.</p> <p>2. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction.</p> <p>3. The main contractor should employ non-core labour</p>                                                                                       | <b>High (+)</b>           |

| ACTIVITY | ASPECTS AFFECTED                                 | POTENTIAL IMPACTS                                                                                                                              | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SIGNIFICANCE if mitigated |
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|          |                                                  |                                                                                                                                                |                            |                               | local study area as far as possible during the construction phase.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |
|          | Socio-Economic: Economic and material well being | <ul style="list-style-type: none"> <li>Loss of productive land or business value;</li> <li>Recreational or tourism business impacts</li> </ul> | Construction               | <b>Medium (-)</b>             | <ol style="list-style-type: none"> <li>The loss of productive land or of business value is handled in terms of prevailing RSA legislation.</li> <li>Agreement should be reached with each impacted landowner regarding the construction programme and impacts on the property during construction. Where possible, in terms of the overall construction programme, construction could be scheduled during low tourist season on affected game farms. Agreements made prior to construction with respect to property access, the duration of construction and the impacts on the land should be adhered to by both the landowner and the contractor.</li> </ol> | <b>Low (-)</b>            |
|          | Agriculture                                      | <ul style="list-style-type: none"> <li>Loss of grazing land;</li> <li>Loss of agricultural production</li> </ul>                               | Construction               | <b>Low (-)</b>                | <ol style="list-style-type: none"> <li>Keep the footprint as small as possible. Restore and reseed the site.</li> <li>Compensate the farmer for loss of income.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Low (-)</b>            |
|          | Air Quality                                      | Excessive dust levels                                                                                                                          | Construction & Operational | <b>Medium (-)</b>             | <ol style="list-style-type: none"> <li>Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS      | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SIGNIFICANCE if mitigated |
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|          |                  |                        |                            |                               | unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including construction area and access roads. Note that all dust suppression requirements should be based on the results from the dust monitoring and the proximity of sensitive receptors.<br>2. Speed limits to be strictly adhered to.<br>3. The Contractor will take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, pre-notification of affected parties).<br>4. Air quality to be monitored (baseline and during construction) for dust fallout and particulate matter. Sampling locations to consider major sources of dust and sensitive receptors. |                           |
|          | Noise            | Excessive noise levels | Construction & Operational | Medium (-)                    | 1. The provisions of SANS 10103:2008 will apply to all                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Low (-)                   |

| ACTIVITY | ASPECTS AFFECTED                  | POTENTIAL IMPACTS                                | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SIGNIFICANCE if mitigated |
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|          |                                   |                                                  |                            |                               | areas within audible distance of residents.<br>2. Working hours to be agreed upon with Project Manager, so as to minimise disturbance to landowners/occupiers and community members.<br>3. Construction activities generating output levels of 85 dB or more will be confined to normal working hours.<br>4. Noise preventative measures (e.g. screening, muffling, timing, pre-notification of affected parties) to be employed.<br>5. Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.<br>6. Survey potentially affected structures prior to and after blasting.<br>7. Noise to be monitored (baseline and during construction). Sampling locations to consider major noise sources and sensitive receptors. |                           |
|          | Historical and cultural resources | Disturbance of historical and cultural resources | Construction & Operational | Medium (-)                    | 1. Whenever possible, all heritage sites identified during this study with a significance of medium and higher, must be preserved <i>in situ</i> by designing the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Low (-)                   |



| ACTIVITY | ASPECTS AFFECTED        | POTENTIAL IMPACTS                                                | PHASE        | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SIGNIFICANCE if mitigated |
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|          |                         |                                                                  |              |                               | <p>development footprints in such a way that a buffer area of at least 50 m is kept clear between any development footprints and construction activities and these heritage sites.</p> <p>2. Search, rescue and relocation of heritage sites affected by construction.</p> <p>3. For any chance finds, all work will cease in the area affected and the Contractor will immediately inform the Engineer. A registered heritage specialist must be called to site for inspection. The relevant heritage resource agency (SAHRA) must be informed about the finding. Works in the area may only proceed once all the requirements have been met.</p> <p>4. Permits to be obtained in terms of the NHRA if heritage resources are to be impacted on and for the removal of graves.</p> |                           |
|          | Existing Infrastructure | Disruption of existing services and relocation of infrastructure | Construction | <b>High (-)</b>               | <p>1. Identify and record existing services and infrastructure.</p> <p>2. Conform to requirements of relevant service providers and infrastructure custodians (e.g. Transnet, Limpopo Department of Public Works, Roads and</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                                                                                                                                      | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SIGNIFICANCE if mitigated |
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|          |                  |                                                                                                                                                                        |                            |                               | <p>Infrastructure, Eskom, Municipalities, etc.).</p> <ol style="list-style-type: none"> <li>3. Ensure access to infrastructure is available to service providers at all times.</li> <li>4. Immediately notify service providers of disturbance to services. Rectify disturbance to services, in consultation with service providers. Maintain a record of all disturbances and remedial actions on site.</li> <li>5. Notify landowners of any disruptions to essential services.</li> <li>6. Deviate landowners' existing services (e.g. reticulation, irrigation lines), where possible, to accommodate construction activities.</li> <li>7. Adequate reinstatement and rehabilitation of affected environment.</li> </ol> |                           |
|          | Aesthetics       | <ul style="list-style-type: none"> <li>• Reduction of visual quality of receiving environment</li> <li>• Loss of sense of place;</li> <li>• Light pollution</li> </ul> | Construction & Operational | <b>High (-)</b>               | <ol style="list-style-type: none"> <li>1. Lighting must not constitute an eyesore / hazard to users of the road and the surrounding community.</li> <li>2. Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas.</li> <li>3. The site will be shielded / screened to minimise the</li> </ol>                                                                                                                                                                                                                                                                                                                                                                   | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS                                                                                                                                                                                                                                  | PHASE                      | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SIGNIFICANCE if mitigated |
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|          |                  |                                                                                                                                                                                                                                                    |                            |                               | visual impact, where practicable.<br>4. On-going housekeeping to maintain a tidy construction area.<br>5. After the construction phase, the areas disturbed that are not earmarked for operational purposes (part of infrastructure footprint) must be suitably rehabilitated.                                                                                                                                                                                                                                                                                                                                                          |                           |
|          | Traffic & Access | <ul style="list-style-type: none"> <li>• Inadequate road conditions</li> <li>• Disruptions to existing road users</li> <li>• Safety risks</li> <li>• Crossing main roads</li> <li>• Increase in dust levels</li> <li>• Road maintenance</li> </ul> | Construction & Operational | <b>High (-)</b>               | 1. Determine and document the road conditions of the D1649, D3677, R510 and D175 (and all other public roads), as well as all private access roads that will be affected by construction traffic, as relevant. Maintain adequate road conditions.<br>2. Selective upgrade of the relevant access roads to ensure that they are capable of accommodating the type of vehicles and/or mechanical plant using these roads.<br>3. Obtain the necessary approval for road upgrades, wayleave for road construction from the relevant authorities, as applicable.<br>4. Ensure temporary accommodation of traffic where any public or private | <b>Low (-)</b>            |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS | PHASE | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SIGNIFICANCE if mitigated |
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|          |                  |                   |       |                               | <p>roads are to be affected by construction activities.</p> <ol style="list-style-type: none"> <li>5. Make provision for community members to access their properties safely.</li> <li>6. Clearly demarcate all access/ haul roads.</li> <li>7. Proper access control is to be maintained to prevent livestock / game from accessing borrow pits.</li> <li>8. Strict adherence to speed limits by construction vehicles on public roads (including the D1649, D3677, R510 and D175) and access roads. Appropriate speed limits need to be posted on all access roads according to the geometric design and limitations of heavy vehicles.</li> <li>9. The access roads need to provide sufficient width for heavy vehicles to navigate around curves in the road.</li> <li>10. When construction vehicles are required to cross provincial and district roads (as relevant) appropriate safety and traffic calming measures need to be in place. This will include flag men, speed reductions and warning signage.</li> </ol> |                           |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS | PHASE | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SIGNIFICANCE if mitigated |
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|          |                  |                   |       |                               | <p>11. The payloads delivered by heavy vehicles need to be recorded and audited to prevent overloading of heavy vehicles.</p> <p>12. Traffic accommodation to South-African Road Traffic Signs Manual standards where any construction affects an existing road.</p> <p>13. Implement traffic monitoring which includes –</p> <p>13.1 Baseline traffic monitoring, 1 year ahead of construction, to confirm the traffic status quo on the road links that are to be worst affected.</p> <p>13.2 Traffic Monitoring during the construction period, to confirm whether the traffic increase is similar to forecasted increase, whether the contractor complies with activity time restrictions, whether posted speed limits are adhered to, etc.</p> <p>13.3 Overloading Management through auditing of bulk construction material delivery slips to ensure high-level adherence to current legislation.</p> <p>13.4 Monitoring of dangerous locations (e.g.</p> |                           |

| ACTIVITY | ASPECTS AFFECTED | POTENTIAL IMPACTS | PHASE | SIGNIFICANCE if not mitigated | MITIGATION TYPE                                                                                                                                                                                                                                                                                                                                                                                | SIGNIFICANCE if mitigated |
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|          |                  |                   |       |                               | truck crossings, schools, road diversions etc.).<br>13.5 Traffic monitoring after completion of construction (operation phase), 6 months after construction to confirm the new level of traffic resulting from normal operations.<br>13.6 Evidence of the actual impact on the local road network as well as the effect of implemented mitigation measures can then be readily made available. |                           |

## j) Summary of Specialist Reports.

All findings of the specialists have been incorporated into the Baseline Environment Assessment in **Section 1(g)(iv)**. The impact assessments were undertaken by the specialists were added to the impact assessment in **Appendix G**. All recommendations from the specialist reports are presented in the table below. The specific mitigation measures provided by each of the specialists were incorporated in the environmental impact statement in **Section 1(k)** and were the basis of the EMPr in **Part B Section 2** of this EIA Report.

| SPECIALIST STUDIES UNDERTAKEN                                 | RECOMMENDATIONS OF SPECIALIST REPORTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT<br>(Mark with an <b>X</b> where applicable) | REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.                                                                                                                                                     |
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| Baseline Aquatic and Impact Assessment ( <b>Appendix F1</b> ) | <p>Recommended mitigation measures for the BP BS1 and BP 39A follow best practice guidelines, and are presented below:</p> <p><b>Altered Hydrology</b><br/>The minimum flows for the Environmental Water Requirements (EWR) stipulated in the “Preliminary Reserve Determination and Ecological Categorisation for selected Rivers and Wetlands in the Crocodile (West) Catchment (A20)” is recommended for implementation e through the operational phase of the proposed project.</p> <p><b>Impaired Water Quality</b><br/>The following mitigation measures are prescribed:</p> <ul style="list-style-type: none"> <li>• Storm water channels and preferential flow paths should be filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion;</li> <li>• Laydown yards, camps and storage areas must be beyond the water resource areas and associated buffers where applicable;</li> <li>• During construction contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly;</li> </ul> | <p><b>X</b><br/>Recommendations provided in the specialist study have been included in the EIA Report</p>        | <p>Mitigation measures were included in the impact assessment in <b>Section 1(i)</b> and in the detailed impact assessment in <b>Appendix G</b>.</p> <p>All mitigation measures and monitoring requirements have are included in Part B - EMPr</p> |

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|  | <ul style="list-style-type: none"> <li>• As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site;</li> <li>• All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping";</li> <li>• All chemicals and toxicants during construction must be stored in bunded areas;</li> <li>• All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site;</li> <li>• Cofferdams are temporary structures used to displace water and provide dry access to usually submerged areas (such instream construction and maintenance of bridges etc.). They can also be built to prevent water coming into contact with high impact zones (e.g. construction and mining sites) and reduce the amount of sedimentation and pollution;</li> <li>• Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);</li> <li>• Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems;</li> <li>• No dumping of construction material on-site may take place; and</li> <li>• All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.</li> </ul> <p><b>Erosion and Sedimentation</b><br/>The following mitigation measures are prescribed:</p> <ul style="list-style-type: none"> <li>• Storm water channels and preferential flow paths should be filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion;</li> <li>• During the excavation of watercourses, flows should be diverted around active work areas where required. Water diversion must be temporary and re-directed flow must not be diverted towards any stream banks that could cause erosion;</li> <li>• All removed soil and material must not be stockpiled within the system. Stockpiling should take place outside of the water resources. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;</li> </ul> |  |  |
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|                                                                      | <ul style="list-style-type: none"> <li>• A water bar (e.g. Earth Berm Water Bars) diverts water flowing down a surface (e.g. road) to one side. This reduces the volume of water that flows down the surface and the subsequent erosion that occurs;</li> <li>• The placement of culverts in drainage lines should not encourage erosion through increasing water velocity. Energy dissipation must be installed downstream of culverts in drainage lines.</li> <li>• Temporary and permanent erosion control methods may include silt fences, flotation silt curtains, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching;</li> <li>• Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil; and</li> <li>• Riverine sediment management must occur in a manner which replicates natural sediment movements.</li> </ul> <p><b>Alien Invasive Plants</b><br/>The following mitigation measures are prescribed:</p> <ul style="list-style-type: none"> <li>• Quarterly vegetation rehabilitation surveys need to be conducted of the vegetation within the project footprint; and</li> <li>• An alien invasive plant management plan needs to be compiled and implemented prior to construction to control and prevent the spread of invasive aliens.</li> </ul> <p><b>Rehabilitation Plan</b><br/>A rehabilitation plan for the BP SS1 and BP 39A should be established and implemented post-operation, with emphasis on establishing natural vegetation within the riparian zones and ensuring bank stabilisation within the reach to mitigate against further erosion.</p> |                                                                                                                                       |                                                                                                                                                                                                                          |
| <p>Terrestrial Ecological Impact Assessment (<b>Appendix F2</b>)</p> | <ul style="list-style-type: none"> <li>• A permit from LEDET is required before construction commences in order to cut, disturb, destroy or remove these trees noted on the proposed borrow pit sites;</li> <li>• Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring programme to control and/or eradicate newly emerging invasives;</li> <li>• The rehabilitation of disturbed areas should receive high priority and must be included in the EMPr and recommendations regarding the specific plant species used during rehabilitation should be site specific and based on the surrounding vegetation composition;</li> <li>• It is critical that operations are limited to the required footprint only;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p style="text-align: center;"><b>X</b><br/>Recommendations provided in the specialist study have been included in the EIA Report</p> | <p>Mitigation measures were included in the impact assessment in <b>Section 1(i)</b> and in the detailed impact assessment in <b>Appendix G</b>.</p> <p>All mitigation measures and monitoring requirements have are</p> |

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|                                                 | <ul style="list-style-type: none"> <li>• In order to protect Southern African Python on site, should this species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. This remedial action requires the engagement of a herpetologist and or ecologist to oversee the removal of any herpetofauna during the initial ground clearing phase of construction (i.e. initial ground-breaking by earthmoving equipment). However, if this species is found during winter period, when it is in hibernation, then a permit from LEDET would be required in order to catch and release it to a safer environment.</li> <li>• The most significant way to mitigate the loss of habitat is to limit the footprint within the natural habitat areas remaining and that the mitigation measures proposed above be implemented.</li> <li>• Once the proposed borrow pits have been constructed, rehabilitation process needs to take place and should ensure that alien plant emergence and erosion do not occur.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                       | <p>included in Part B - EMPr</p>                                                                                                                                                                                                                   |
| <p>Heritage Impact Assessment (Appendix F4)</p> | <ul style="list-style-type: none"> <li>• Whenever possible, all heritage sites identified during this study with a significance of Medium and higher, must be preserved in situ by designing the development footprints in such a way that a buffer area of at least 50m is kept clear between any development footprints and construction activities and these heritage sites. In cases where the preservation of such sites and buffer areas are not possible, site-specific mitigation measures would be required;</li> <li>• All those areas that could not be accessed during the fieldwork, must be assessed in the field by a heritage specialist / archaeologist before construction commences. These areas were not assessed in the field due to a number of reasons, including cases where the landowners were not willing to provide permission to any of the project consultants to undertake fieldwork on their land, cases where landowners did not respond to messages requesting access to their properties, development footprints and properties for which no landowner details were provided as well as those areas that were not assessed in the field due to the temporal and budget restrictions. Refer Section 1.3 for a detailed list of all the components of the study area that could not be accessed during the fieldwork;</li> <li>• The archaeological research assessment of the Motlhabatsi (Matlabas) drainage basin that was undertaken by Jan Aukema for his masters degree from the University of the Witwatersrand, revealed a substantial number of sites. The proposed Central Pipeline Route passes through a section of the Matlabas drainage basin that represented the area of study for Jan Aukema's archaeological research. As the exact coordinates and site localities for the numerous archaeological sites identified by Aukema are not presently available, it is very difficult to accurately establish the</li> </ul> | <p style="text-align: center;"><b>X</b><br/>Recommendations provided in the specialist study have been included in the EIA Report</p> | <p>Mitigation measures were included in the impact assessment in <b>Section 1(i)</b> and in the detailed impact assessment in <b>Appendix G</b>.</p> <p>All mitigation measures and monitoring requirements have are included in Part B - EMPr</p> |

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|  | <p>distances between the closest of Aukema's archaeological sites and present study area. From the site distribution map published by Huffman (1990:118), it would appear that the following sites are located closest to the present study area: Wn1 on the farm Welgevonden, Ho1 on the farm Haarlem Oost and Gr1 on the farm Groenrivier. It is recommended that all components of the proposed development footprints must be assessed in the field by way of walkthroughs undertaken by a heritage specialist / archaeologist before construction commences;</p> <ul style="list-style-type: none"> <li>• Although significant sections of the pipeline footprints were assessed by vehicle along the railway and road servitudes, the landscape within which this development is proposed is not characterised by a plethora of archaeological and heritage sites. This statement is supported by the fact that although an intensive field assessment was undertaken, which included walkthroughs of almost all the non-pipeline development footprints (i.e. borrow pits, construction camps etc.), only 18 heritage sites could be identified across the entire length of the proposed development footprint which extends over an area in excess of 150km. As a result, it is not deemed necessary for additional walkthroughs to be undertaken apart from the ones required for those areas which were not included in the current fieldwork (see previous bullet item) and the ones required by the previous General Recommendation in proximity to the Matlabas River. Rather, it is recommended that an archaeological and heritage workshop be conducted with the project Environmental Control Officer (ECO) before construction commences to allow the ECO to undertake constant monitoring of construction activities and identify any archaeological and heritage sites which may be located along the pipeline route and which were not identified during the current fieldwork. Additionally, an archaeological watching brief can augment the work of the ECO during construction;</li> <li>• An assessment of the South African Heritage Resources Information System (SAHRIS) of SAHRA was undertaken to establish whether any previous archaeological and heritage impact assessments had revealed archaeological and heritage sites within, and in close proximity, to the present study area footprints. One of these previous reports from the immediate surroundings of the study area identified a cemetery containing four graves located approximately 65m north-west of proposed Borrow Pit 13-14, and 55m south-west of the access road to this borrow pit. The coordinates for this site are as follows: S 23.711420 E 27.497340. Due to the closeness of this cemetery to this borrow pit, the construction team and Environmental Control Officer must be made aware of the position of this site to ensure that it is not disturbed or damaged during construction.</li> <li>• It is important to note that the impact assessment risk calculations undertaken for the identified heritage sites are based on the current layout</li> </ul> |  |  |
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|                                                       | of the proposed pipeline and its alternatives. Should the position and layout of any of the footprints change, the impact assessment calculations will have to be modified.                                                                                                                                                                                               |                                                                                                                                          |                                                                                                                                                                                                                                                    |
| Agricultural Impact Assessment ( <b>Appendix F3</b> ) | <ul style="list-style-type: none"> <li>Keep the footprint as small as possible.</li> <li>Restore and reseed the site.</li> <li>Compensate the farmer for loss of income.</li> </ul>                                                                                                                                                                                       | <p style="text-align: center;"><b>X</b></p> <p>Recommendations provided in the specialist study have been included in the EIA Report</p> | <p>Mitigation measures were included in the impact assessment in <b>Section 1(i)</b> and in the detailed impact assessment in <b>Appendix G</b>.</p> <p>All mitigation measures and monitoring requirements have are included in Part B - EMPr</p> |
| Wildlife Impact Assessment ( <b>Appendix F7</b> )     | <ul style="list-style-type: none"> <li>Affected parties (wildlife ranches and farms) need to be informed well in advance (require 12 months' notice) of impending disruptions; and</li> <li>Where avoidance measures during the peak hunting seasons are not possible, compensation for loss of income due to cancellation of bookings needs to be considered.</li> </ul> | <p style="text-align: center;"><b>X</b></p> <p>Recommendations provided in the specialist study have been included in the EIA Report</p> | <p>Mitigation measures were included in the impact assessment in <b>Section 1(i)</b> and in the detailed impact assessment in <b>Appendix G</b>.</p> <p>All mitigation measures and monitoring requirements have are included in Part B - EMPr</p> |
| Wetland Impact Assessment ( <b>Appendix F5</b> )      | <ul style="list-style-type: none"> <li>Clearance and instream works at Borrow Pit SS1, the site is within the confines of the river bed and no residual impact or risk is foreseen and no mitigation is necessary.</li> </ul>                                                                                                                                             | <p style="text-align: center;"><b>X</b></p> <p>Recommendations provided in the specialist study have been included in the EIA Report</p> | <p>All mitigation measures and monitoring requirements have are included in Part B - EMPr</p>                                                                                                                                                      |

## k) Environmental Impact Statement

### (i) Summary of the key findings of the environmental impact assessment;

A number of significant impacts identified throughout the EIA process, including impacts informed by specialist investigations and I&APs, have been assessed in this EIA Report. **Table 30** summarises the significant potential impacts associated with the proposed development, and the significance of these impacts after mitigation measures have been applied.

**Table 30: Summary of Impact Assessment**

| ASPECTS AFFECTED              | POTENTIAL IMPACTS                                                                                                                                                                                            | PHASE                      | SIGNIFICANCE if mitigated |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------|
| Land Use                      | Land acquisition and servitude restrictions                                                                                                                                                                  | Construction               | Low (-)                   |
|                               | Disruptions and alterations to existing land use                                                                                                                                                             | Construction & Operation   | Low (-)                   |
| Climate                       | Greenhouse gas emissions. Contributions to global warming.                                                                                                                                                   | Construction & Operation   | Unknown                   |
| Soils                         | Soil erosion                                                                                                                                                                                                 | Construction & Operational | Low (-)                   |
|                               | Soil contamination                                                                                                                                                                                           | Construction & Operational | Medium (-)                |
| Geohydrology                  | Contamination of groundwater by poor construction practices.                                                                                                                                                 | Construction & Operational | Low (-)                   |
|                               | Disturbances to aquifer from blasting.                                                                                                                                                                       | Construction & Operational | Low (-)                   |
| Topography                    | Erosion on steep slopes.                                                                                                                                                                                     | Construction & Operational | Low (-)                   |
|                               | Alteration of the natural topography of the borrow area.                                                                                                                                                     | Construction & Operational | Low (-)                   |
| Surface Water - Hydrology     | Impacts to watercourses from temporary diversions.                                                                                                                                                           | Construction               | Low (-)                   |
| Surface Water – Water Quality | Contamination of surface water through sedimentation from in-stream works, silt-laden runoff from disturbed areas, and improper practices (e.g. poor management of waste water and disposal of solid waste). | Construction & Operational | Low (-)                   |
| Flora                         | Loss of plant species of conservation concern                                                                                                                                                                | Construction               | Low (-)                   |
| Fauna                         | Loss of Protected species listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Threatened or Protected Species regulations                                  | Construction               | Low (-)                   |
| Flora                         | Destruction of indigenous flora during site establishment                                                                                                                                                    | Construction               | Low (-)                   |
| Fauna                         | Loss and displacement of animals on site.                                                                                                                                                                    | Construction               | Low (-)                   |

| ASPECTS AFFECTED                  | POTENTIAL IMPACTS                                                                                                                                                      | PHASE                               | SIGNIFICANCE if mitigated |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------|
| Flora                             | Loss of vegetation due to fuel and chemical spills.                                                                                                                    | Construction & Operational          | Low (-)                   |
| Flora                             | Management of alien invasive species                                                                                                                                   | Construction & Operational          | Low (-)                   |
| Flora                             | Loss of topsoil and erosion.                                                                                                                                           | Construction                        | Low (-)                   |
| Flora and Fauna                   | Loss of CBA and ESA habitats                                                                                                                                           | Construction                        | Low (-)                   |
| Fauna and Flora                   | Damage to plant and animal life outside of the project area                                                                                                            | Construction & Operational          | Low (-)                   |
| Fauna                             | Disturbance to animals                                                                                                                                                 | Construction & Operation            | Low (-)                   |
| Flora                             | Rehabilitation of site after construction.                                                                                                                             | Closure                             | Low (-)                   |
| Fauna                             | Disturbance of faunal species                                                                                                                                          | Construction & Operational          | Low (-)                   |
| Wildlife                          | Habitat loss                                                                                                                                                           | Construction                        | Low (-)                   |
| Wildlife                          | Loss of wildlife biodiversity                                                                                                                                          | Construction                        | Low (-)                   |
| Wildlife                          | Land-use                                                                                                                                                               | Construction & Operation            | Low (-)                   |
| Socio-Economic                    | <ul style="list-style-type: none"> <li>• Annoyance from dust and noise;</li> <li>• Security;</li> <li>• Personal safety</li> </ul>                                     | Construction & Operational          | Low (-)                   |
|                                   | <ul style="list-style-type: none"> <li>• Disruptions of daily living;</li> <li>• Damage to property</li> </ul>                                                         | Construction & Operational          | Low (-)                   |
|                                   | <ul style="list-style-type: none"> <li>• SMME Development</li> <li>• Job creation and skills development;</li> <li>• Indirect employment impacts</li> </ul>            | Construction, Operational & Closure | High (+)                  |
|                                   | <ul style="list-style-type: none"> <li>• Loss of productive land or business value;</li> <li>• Recreational or tourism business impacts</li> </ul>                     | Construction                        | Low (-)                   |
| Agriculture                       | <ul style="list-style-type: none"> <li>• Loss of grazing land;</li> <li>• Loss of agricultural production</li> </ul>                                                   | Construction                        | Low (-)                   |
| Air Quality                       | Excessive dust levels                                                                                                                                                  | Construction & Operational          | Low (-)                   |
| Noise                             | Excessive noise levels                                                                                                                                                 | Construction & Operational          | Low (-)                   |
| Historical and cultural resources |                                                                                                                                                                        |                                     | Low (-)                   |
| Existing Infrastructure           | Disruption of existing services and relocation of infrastructure                                                                                                       | Construction                        | Low (-)                   |
| Aesthetics                        | <ul style="list-style-type: none"> <li>• Reduction of visual quality of receiving environment</li> <li>• Loss of sense of place;</li> <li>• Light pollution</li> </ul> | Construction & Operational          | Low (-)                   |
| Traffic & Access                  | <ul style="list-style-type: none"> <li>• Inadequate road conditions</li> <li>• Disruptions to existing road users</li> </ul>                                           | Construction & Operational          | Low (-)                   |

| ASPECTS AFFECTED | POTENTIAL IMPACTS                                                                                                                                              | PHASE | SIGNIFICANCE if mitigated |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------|
|                  | <ul style="list-style-type: none"> <li>• Safety risks</li> <li>• Crossing main roads</li> <li>• Increase in dust levels</li> <li>• Road maintenance</li> </ul> |       |                           |

According to the impact assessment conducted in **Section 1(i)** and **Appendix G**, most impacts caused by the construction and operation of the borrow pits and associated access roads had a **medium/high significant negative impact** on the biophysical, socio-economic and cultural environment in the study area. However, following the implementation of the mitigation measures provided, the overall impact if mitigated resulted in **low significant negative impact**.

### **(ii) Final Site Map**

Refer to **Appendix C** for the Final Site Map.

### **(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;**

Refer to **Table 27** for a summary of all positive and negative impacts associated with the proposed borrow pits and associated access/haul roads.

### **l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;**

All management objectives and outcomes were incorporated into the EMPr, Refer to **Part B, Section 2(e) Table 28** of this EIA Report.

### **m) Final proposed alternatives**

Refer to **Appendix C** for the locality maps of the four final proposed alternative BP sites.

### **n) Aspects for inclusion as conditions of Authorisation**

Refer to the list provided in **Section 1(p)(ii)** for all aspects to be included.

### **o) Description of any assumptions, uncertainties and gaps in knowledge.**

**The following assumptions and limitations accompany the EIA process:**

- ❖ As the design of the project components is still in feasibility stage, and due to the dynamic nature of the planning environment, the dimensions and layout of the infrastructure may change as the project life-cycle advances.
- ❖ Regardless of the analytical and predictive method employed to determine the potential impacts associated with the project, the impacts are only predicted on a probability basis. The accuracy of

the predictions is largely dependent on the availability of environmental data and the degree of understanding of the environmental features and their related attributes.

The specialist investigations had the following assumptions and limitations:

- ❖ The Agriculture Impact Assessment (Index, 2018a) noted the following assumptions:
  - Grazing land will be temporary lost for a 50 metres strip along the path of the pipeline. The browsing value of trees, however, will be lost notwithstanding the grass returning.
  - Fallow and old lands are now mostly upgraded veld grazing. There are some areas along the Crocodile River that are now fallow, but which is potentially irrigable.
  - Irrigated lands are mostly under centre pivot irrigation systems, which has permanent and expensive underground infrastructure that will have to be considered in the routing of the pipeline. Fertility of irrigated land is usually built up over time and must also be taken into consideration in the evaluation. Traversing the pivot irrigation system will lead to a temporary loss of the land along the pipeline and may influence cropping depending on the season when construction takes place.
  - Housing and farming infrastructure is a cost item but will not directly impact on the farming income, unless it is used as packing sheds, which is then part of the production process. Loss of infrastructure should be dealt with under the social assessment of the EIA.
- ❖ The Baseline Aquatic and Impact Study (The Biodiversity Company, 2018) noted the following limitations:
  - A single dry season aquatic survey was completed for this assessment. Thus, temporal trends were not investigated;
  - The aquatic study addressed water courses associated with the project, and not wetlands. NFEPA have been addressed in this report to identify floodplains and pans at a desktop level. Furthermore, buffers for identified NFEPA wetlands have not been provided for in this report;
  - The impact assessment completed in this study was completed in accordance to DWS Risk Assessment Guidelines for Section 21(c) and 21(i);
  - As result of the footprint area and access to the project area, the focus of the in-field assessment was on watercourses directly impacted by the project;
  - Access to Sand River Gauging Weir was limited during the field survey, therefore a downstream site was assessed to characterise the reach; and
  - Riparian assessments were based on available contour data and ground-truthed in the field. The accuracy of the riparian delineation is of low confidence.
- ❖ The Heritage Impact Assessment (PGS, 2018) noted the following assumptions and limitations:
  - Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has



been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below; and

- Areas not assessed need to be investigated in the field by an archaeologist / heritage specialist before construction commences.

❖ The Socio-Economic Impact Assessment (Bews & Chidley, 2018) noted the following assumptions and limitations:

- It is assumed that information obtained during the public participation phase provide a comprehensive account of the community structure and community concerns for the project;
- The study was done with the information available to the specialist at the time of executing the study, within the available time frames and budget. The sources consulted are not exhaustive and additional information which might strengthen arguments, contradict information in this report and/or identify additional information which might exist. However, the specialist did take an evidence-based approach in the compilation of this report and did not intentionally exclude information relevant to the assessment;
- It is assumed that no relocation of families or people will take place for this project.

❖ The Terrestrial Ecological Impact Assessment (Nemai Consulting, 2018) noted the following limitations:

- Given the magnitude of the project and the various extent of erven and portions of farms in the area, some farms/areas were not easily accessible. However, detailed walk down surveys once the final routes have been selected will be required;
- A separate Wildlife Impact Assessment report was conducted by Ben Orban from NABRO Ecological Analysts CC for this EIA Process.
- Fauna species directly or indirectly observed during the site visits were supplemented with those that are likely to occur in the area based on their distribution and habitat preferences; and
- Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage and Nemai Consulting can thus not accept responsibility for conclusions and mitigation measures made in good faith based on information gathered or databases consulted at the time of the investigation. Detailed walk-down surveys once the routes are finalised will be required in order to reduce impacts identified in this report.

**p) Reasoned opinion as to whether the proposed activity should or should not be authorised**

**i) Reasons why the activity should be authorised**

With the adoption of the mitigation measures included in this EIA Report and the dedicated implementation of the suite of EMPr, it is believed that the significant environmental aspects and impacts directly associated with this project can be suitably mitigated. With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the project and that

authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions.

## **ii) Conditions that must be included in the Authorisation**

The following key recommendations, which may also influence the conditions of the Environmental Authorisation (where relevant):

1. Conduct environmental sensitivity walk through survey of entire project footprint prior to construction. Survey team to include the following specialists -
  - a. Terrestrial ecologist;
  - b. Aquatic ecologist;
  - c. Heritage specialist; and
  - d. Social specialist.
2. Specific attention will need to be paid to managing impacts to road users for all public roads (including the D1649, D3677, R510 and D175) and private roads. Traffic monitoring programme to be implemented and roads to be maintained. Safety of road users to be ensured at all times through appropriate safety and traffic calming measures.
3. Properties may not be accessed for construction or operation purposes unless consent has been granted by the landowner, or until the land acquisition process has been concluded and a construction servitude has been registered.
4. The land acquisition and compensation process needs to adhere to all legal requirements, in negotiation with the affected landowners. This process must be undertaken fairly and must commence timeously prior to the construction phase.
5. Additional detailed investigations are required for BP 35 prior to establishing the borrow pit to the proposed alternative BP 35A.
6. The eastern border of the proposed BP 28 must be at least 25m from the boundary fence between the farms Tarentaalpan and Blaauwpan.
7. Specific mitigation measures provided in the Terrestrial Ecological Impact Assessment with regards to loss of protected trees need to be adhered to in order to minimise the impact on Marula trees during the construction and operational phases of BP 43.
8. Construction, operational and closure activities need to be planned and coordinated in consultation with the affected landowners in order to minimise impacts on game farming and ecotourism.
9. Ensure compliance with biosecurity protocols in relation to the construction, operation and closure of the borrow pits and associated access/haul roads on the related directly affected properties.
10. Establish an Environmental Monitoring Committee (EMC) in the pre-construction phase, with suitable representation of authorities, stakeholders and I&APs.
11. It is recommended that a Rehabilitation Management Plan be developed, which should include additional measures identified during construction to supplement the reinstatement and rehabilitation provisions included in the EMPr.
12. As discussed in the EMPr, various forms of monitoring is required to ensure that the receiving environment is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project. The types of monitoring to be undertaken include –

- a. Baseline Monitoring needs to be undertaken to determine to the pre-construction state of the receiving environment, and serves as a reference to measure the residual impacts of the project by evaluating the deviation from the baseline conditions and the associated significance of the adverse effects;
  - b. Environmental Monitoring will entail checking, at pre-determined frequencies, whether thresholds and baseline values for certain environmental parameters are being exceeded; and
  - c. Compliance Monitoring and Auditing by the independent Environmental Control Officer (ECO) to monitor and audit compliance against the EMPr and Environmental Authorisation.
13. Key recommendations from the Baseline Aquatic and Impact Study (The Biodiversity Company, 2018):
- a. Apart from instream structures and activities, all other construction activities should remain outside of the 30 m buffer zone from the edge of the riparian zones of the Crocodile River (West) and Matlabas Rivers, as well as their tributaries;
  - b. A rehabilitation plan for the borrow pit BP BSS1 should be established and implemented post-operation, with emphasis on establishing natural vegetation within the riparian zones and ensuring bank stabilisation within the reach to mitigate against further erosion.
14. Key recommendations from the Heritage Impact Assessment (PGS Heritage, 2018) –
- a. Whenever possible, all heritage sites identified with a significance of medium and higher, must be preserved *in situ* by designing the development footprints in such a way that a buffer area of at least 50m is maintained from construction activities. In cases where the preservation of such sites and buffer areas are not possible, site-specific mitigation measures would be required; and
  - b. Conduct a walk through survey by a heritage specialist / archaeologist before construction commences;
15. Key recommendations from the Terrestrial Ecological Impact Assessment (Nemai Consulting, 2018) –
- a. Undertake a walk through survey of the approved route alternative prior to the start of the construction activities in order to survey the area in detail for any Red Data Listed species. The survey should preferably be undertaken during summer season in order to have a higher probability of detecting species of conservation concern; and
  - b. A permit from LEDET is required before construction commences in order to cut, disturb, destroy or remove these trees noted on the proposed borrow pit sites.
16. Key recommendations from the Wildlife Impact Assessment (NABRO Ecological Analysts, 2018):
- a. Affected parties (wildlife ranches and farms) need to be informed well in advance (require 12 months' notice) of impending disruptions; and
  - b. Where avoidance measures during the peak hunting seasons are not possible, compensation for loss of income due to cancellation of bookings needs to be considered.

## **(1) Specific conditions to be included into the compilation and approval of the EMPr**

Refer to the list of recommendations provided in **Section 1(p)(ii)**.

## **(2) Rehabilitation requirements**

The MCWAP Rehabilitation Performance Criteria for borrow pits and associated newly constructed access roads provides the following requirements for rehabilitation which will be adhered to:

Preparation of Ground Surfaces

The contractor shall demolish and remove everything not forming part of the Permanent Works excluding fencing which will be removed after acceptable cover has been attained and maintenance period is complete. Material generated from the demolition and removal of structures from site shall be appropriately disposed of. In this regard building rubble and soil can be disposed of at the spoil sites, whilst the remaining waste shall be dealt with as per the project solid waste management system.

Shaping

All slopes which do not form part of the Permanent Works shall be graded so that no slope exceeds a maximum gradient of 1:5 or as otherwise directed by the Engineer. Excavation and fills for Temporary Works and spoil areas shall be formed in such a manner that the final profile shall appear as a natural extension to the adjacent, undisturbed ground profiles. Shaping shall include the placement of contour drains or other structures for control of erosion where instructed by the Engineer.

Ripping, Trimming and Scarifying

All soil to be rehabilitated shall be de-compacted by a mechanical ripper to a depth of 300 mm or as per agreement with the Engineer where this is not possible due to the nature of the area (rocky ridges etc.). Trimming shall consist of bringing the existing or previously shaped and ripped ground to a smoothly flowing surface with the final levels generally following the original surface after shaping as directed by the Engineer. Prior to the application of topsoil, the ground surface shall be scarified to breakdown soil clods.

Removal of rock, stones and roots

Large stones and rocks brought to the surface by shaping, ripping, trimming or scarifying shall be removed prior to placing of topsoil as well as the placement thereof if necessary.

Top soiling

Topsoil shall be replaced in the same area from which it was stripped and shall be spread evenly to a depth comparable with that which was originally stripped from the area.

Fertilising

Re-vegetation shall be done with the prescribed seed mix which shall be applied by means of hand seeding and or hydro-seeding. This shall be done in the manner specified in the project Contract Specifications and may include the use of anti-erosion compounds and mulch as required. Protected vegetation species that may have been moved to a nursery during the search and rescue operation are to be replanted as part of the rehabilitation process as specified in the Contract Specification. Where erosion risks are significant temporary re-vegetation shall be instructed by the Engineer. The establishment of an acceptable cover shall include maintaining the surface to the required slopes and levels without erosion or sedimentation, watering, weeding, fertilising, disease and insect pest control and any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous and healthy growth of the plant material on site. The Contractor shall be solely responsible

for establishing and maintaining an acceptable plant cover and for the cost of replanting or re-seeding where acceptable cover is not obtained or maintained.

#### Maintenance of vegetation

The Contractor's liability with regard to the maintenance of the vegetation shall commence when the establishment of an acceptable cover is agreed with the Engineer as defined in the Contract Specification. The maintenance period shall be not less than one year. During this period the Contractor shall maintain the areas through good horticultural practice necessary to ensure normal, vigorous and healthy growth of the plant material and to limit erosion, fires or other forms of damage to the re-vegetation.

#### q) Period for which the Environmental Authorisation is required

|                                  |                             |
|----------------------------------|-----------------------------|
| <b>Mining Period / Schedule:</b> | Mining operations – 3 years |
|                                  | Rehabilitation – 2 years    |

#### r) Undertaking

Refer to **Part B, Section 3** of the report for the complete undertaking of the EIA and EMP sections.

#### s) Financial Provision

Based on a Memorandum of Understanding (MoU) in 2007 between the then Department of Water Affairs and Forestry (DWAF) and the then Department of Minerals and Energy (DME), it was agreed between these parties that for the construction and maintenance of Government Waterworks undertaken by DWS' own Construction Unit, this Department shall be deemed to comply with the requirements of financial provision. Provided that the estimated costs for the management, rehabilitation and closure of such quarries and borrowed areas or works are provided for within the approved budget for such Government Waterworks. Refer to a copy of the MoU in **Appendix L**.

#### i) Explain how the aforesaid amount was derived

The TCTA budget provided for the rehabilitation until close-out to DMR and landowner satisfaction. The financial provision required for the remediation of any environmental damage as per Section 41 of the Act has been incorporated into the overall project budget as per the memorandum of understanding between DWAF and DME.

#### ii) Confirm that this amount can be provided for from the operating expenditure

Not allowable. Closure is required before the handover and/or rehabilitation period.

#### t) Deviations from the approved scoping report and plan of study

There are no deviations from the approved Scoping Report and Plan of Study.

**i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.**

There were no deviations from the methodology used in determining the significance of potential environmental impacts and risks.

**ii) Motivation for the deviation.**

There were no deviations, therefore no motivation is required.

**u) Other Information required by the competent Authority**

**i) Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the -**

**(1) Impact on the socio-economic conditions of any directly affected person**

A Socio-economic Impact Assessment (SEIA) was undertaken as part of the EIA phase (**Appendix F6**). All potential socio-economic impacts were included in the impact assessment in **Section 1(i)**, as well as in the detailed impact assessment contained in **Appendix G**. A summary of the recommendations from the study have been included in **Section 1(j)**.

**(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act**

A Heritage Impact Assessment (HIA) was undertaken as part of the EIA phase (**Appendix F4**). All potential impacts on heritage resources were included in the impact assessment in **Section 1(i)**, as well as in the detailed impact assessment contained in **Appendix G**. A summary of the recommendations from the study were included in **Section 1(j)**.

**v) Other matters required in terms of sections 24(4)(a) and (b) of the Act**

During the public participation process, comments were received from directly affected landowners motivating for the relocation of the proposed BP sites to an alternative location. The alternatives sites provided by the landowners were either situated at an alternative location on the same property, or were situated on neighbouring properties. Refer to **Table 29** for the statement motivation the alternative BP sites.

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## PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

### 2) Draft environmental management programme.

- a) Details of the EAP**, (Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

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Fax No: (011) 781 1731  
E-mail address: DonavanH@nema.co.za

### b) Description of the Aspects of the Activity

Refer to Part A, **Section 1 (g) (iv)** for a description of the aspects of the proposed BPs and their associated access/haul roads.

### c) Composite Map

(Provide a map (**Attached as an Appendix**) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers)

Refer to **Appendix C** for Sensitivity Maps of the proposed BPs.

### d) Description of Impact management objectives including management statements

**i) Determination of closure objectives.**

Refer to **Part A, Section 1(p)(2)** for a list of all closure objectives.

**ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.**

Mitigation measures for potential impacts are provided in **Table 28**. The mitigation measures incorporated in the EMP allow for the management of any potential environmental impacts that could occur from the construction and operation of the borrow pits.

**iii) Potential risk of Acid Mine Drainage.**

The construction and operation of the proposed borrow pits will not result in acid mine drainage.

**iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.**

N/A

**v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.**

N/A

**vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.**

N/A

**vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.**

N/A

**viii) Has a water use licence has been applied for?**

An Integrated Water Use Licence Application (IWULA) has been applied for at the Department of Water and Sanitation, which includes all components of MCWAP-2A. The project entails the following activities that constitute water uses in terms of Section 21 of the NWA:

- Section 21(a) - Taking water from a water resource (water abstraction from the Crocodile River (West) as part of the transfer scheme; taking water for construction purposes);
- Section 21(b) - Storing water (Vlieëpoort abstraction weir);
- Section 21(c) - Impeding or diverting the flow of water in a watercourse (instream works for BP SS1, abstraction works, gauging weirs, access roads' crossings, pipeline crossings, etc.);
- Section 21(i) - Altering the bed, banks, course or characteristics of a watercourse (instream works for BP SS1, abstraction works, gauging weirs, access roads' crossings, pipeline crossings, etc.); and
- Section 21(f) - discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit (scouring sediment back to the Crocodile River (West)).

**ix) Impacts to be mitigated in their respective phases (Refer to Table 31).**



## e) Impact Management Outcomes

Table 31: Impact management outcomes and actions

| ACTIVITIES<br>whether listed or not listed.                                                                                                                                                                                                                                                                                                                                                                                                                                         | ASPECTS AFFECTED | POTENTIAL IMPACTS                                | PHASE / TIME PERIOD FOR IMPLEMENTATION      | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | STANDARD TO BE ACHIEVED<br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.        | COMPLIANCE WITH STANDARDS                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Construction and Operation of borrow pits and associated management area and access/haul roads.</p> <p>The primary activities:</p> <ul style="list-style-type: none"> <li>• Complete detailed geotechnical investigations;</li> <li>• Complete negotiations with affected landowners;</li> <li>• Contractor to confirm the mining process and to develop a mining method statement;</li> <li>• Contractor to develop Mining Plan, which includes the layout of mining</li> </ul> | Land use         | Land acquisition and servitude restrictions      | Pre-construction Phase                      | <ol style="list-style-type: none"> <li>1. Compensation to be determined by an independent valuer, in accordance with the principle set out in Section 25 of the Constitution concurrent with Section 12 of the Expropriation Act.</li> <li>2. Optimisation of borrow pit location to be considered in the design phase to avoid existing structures and buildings, as well as other sensitive features (where possible). Should the changing of the borrow pits' footprints be unfavourable, the existing infrastructure can be relocated to an agreed position or compensation for the market value can be offered upon undertaking of a valuation.</li> </ol> | Compliance with standards and principles set out in Constitution, Expropriation Act and TCTA policy and land acquisition process | <p>Section 25 of the Constitution concurrent with Section 12 of the Expropriation Act</p> <p>TCTA Policy and Land Acquisition process</p> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  | Disruptions and alterations to existing land use | Construction, Operational and Closure Phase | <ol style="list-style-type: none"> <li>1. Construction of borrow pit will only commence following completion of land acquisition process;</li> <li>2. Demarcation and fencing of borrow pit and associated haul roads;</li> <li>3. Construction activities to be restricted to demarcated areas;</li> <li>4. Land disturbed or altered shall be rehabilitated;</li> <li>5. Rehabilitation of the borrow pits and haul roads must be</li> </ol>                                                                                                                                                                                                                  | Rehabilitation objectives and standards to be met                                                                                | <p>DMR Rehabilitation Guidelines</p> <p>Implement Closure Plan objectives and standards</p>                                               |

| ACTIVITIES<br>whether listed or not listed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ASPECTS AFFECTED | POTENTIAL IMPACTS                                          | PHASE / TIME PERIOD FOR IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | STANDARD TO BE ACHIEVED<br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | COMPLIANCE WITH STANDARDS                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| activities and features such as fencing, access arrangements, aggregate stockpiles, topsoil stockpiles, container stores, crushing and screening area, office and support facilities, haul roads, overburden placement, etc.; <ul style="list-style-type: none"> <li>• Understand site drainage and manage stormwater (e.g. construct sediment holding basins and divert up-slope water around the mining area);</li> <li>• Construction of access and haul roads;</li> <li>• Site preparation, including clearing and grubbing;</li> </ul> |                  |                                                            |                                        | undertaken as specified in the EMPr as well as to the satisfaction of the landowner, DWS and DMR; and<br>6. Compensation based on legitimate claims for losses as a result of project-related activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                           |                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Climate          | Greenhouse gas emissions. Contributions to global warming. | Construction & Operational             | <ol style="list-style-type: none"> <li>1. Materials with a high recycled content should be used where possible and the re-use of site materials should be considered.</li> <li>2. The operational performance of site offices and storage facilities on site should be considered so to maximise the efficient use of energy and water.</li> <li>3. Suitable training should be provided to operators to ensure that they maximise the efficiency of the plant and idling is reduced.</li> <li>4. In terms of transportation of workers and staff, collective transportation arrangements should be made to reduce individual car journeys.</li> <li>5. All vehicles used during the project should be properly maintained and in good working order.</li> </ol> | Recycling objectives to be determined.<br><br>Reduce overall carbon footprint associated with the borrow pits.            | Compliance with National Environmental Management: Air Quality Act (Act No. 39 of 2004) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Soils            | Soil erosion                                               | Construction & Operational             | <ol style="list-style-type: none"> <li>1. Stabilisation of cleared areas to prevent and control erosion. The method chosen (e.g. watering, planting, retaining structures, commercial anti-erosion compounds) will be selected</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Stabilisation of cleared areas<br><br>Temporary stormwater control                                                        | Stormwater management plan                                                              |

| <b>ACTIVITIES</b><br>whether listed or not listed.                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b> | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.                                                                                                                                                                       | <b>COMPLIANCE WITH STANDARDS</b>                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Remove and safe storage (temporary stockpiles) of topsoil and remaining overburden material for post-mining rehabilitation;</li> <li>• Manage borrow pits, including side slopes and floor of mined area;</li> <li>• Process the borrowed material (crushing and screening) for use in earthworks;</li> <li>• Load the borrow material into tipper trucks and haul material to pipeline trench, as well as other areas where the material is required;</li> </ul> |                         |                          |                                               | according to the site-specific conditions. Drainage management should also be implemented to ensure the minimization of potential erosion. <ol style="list-style-type: none"> <li>2. Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion during operation phase.</li> <li>3. Install suitable buttressing to prevent future erosion of the structures of the watercourses affected by construction, if required.</li> <li>4. Monitoring to be conducted to detect erosion (e.g. steep sections along access roads, management areas, stockpiles, and mining areas).</li> </ol> | No visual evidence of erosion                                                                                                                                                                                                                                                                          |                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Soils                   | Soil contamination       | Construction & Operational                    | <ol style="list-style-type: none"> <li>1. All hydrocarbons (e.g. fuel, oils and contaminated soil/materials) and other hazardous waste resulting from spills, refuelling and maintenance activities shall be disposed of in a formally licensed hazardous waste site or, where possible, be removed and disposed of by an approved contractor. The Contractor shall provide Safe Disposal Slips issued by the hazardous waste disposal facility.. The Safe Disposal Slips shall be on site at all time.</li> <li>2. Used oil, lubricants, cleaning materials, etc. from the</li> </ol>                       | Effective and safe management of materials on site, in order to minimise the impact of non-hazardous materials on the environment.<br><br>Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.<br><br>Remedial procedures | Rehabilitation objectives.<br><br>Spill procedures.<br><br>Storage and handling of hazardous substances guidelines in the Hazardous Substances Act (Act No. 15 of 1973) as amended. |

| <b>ACTIVITIES</b><br>whether listed or not listed.                                                                                                                                                        | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b>                                     | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.                                           | <b>COMPLIANCE WITH STANDARDS</b>                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Inert and spoil material to be used to old fill borrow area (as necessary);</li> </ul> Closure of borrow pits:                                                     |                         |                                                              |                                               | maintenance of vehicles and machinery may be collected in holding tanks prior to disposal.<br>3. In the event of any hydrocarbon spills the contaminated soil must be removed, placed in a sealed container and disposed of a registered hazardous landfill site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                            |                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Grading of site;</li> <li>Removal of all facilities associated with mining activities; and</li> <li>Stabilise, reinstate and rehabilitate borrow areas.</li> </ul> | Geohydrology            | Contamination of groundwater by poor construction practices. | Construction & Operational                    | <ol style="list-style-type: none"> <li>Suitable protection of groundwater during excavations. Implement mitigation measures suggested as part of the geotechnical investigations for managing groundwater.</li> <li>Vehicles to be in good working order to avoid leaks.</li> <li>Where vehicles/machinery are leaking oil, fuel drip trays must be used to contain the spill. All vehicles and machinery must be repaired as soon as possible.</li> <li>All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.</li> <li>Reduce sediment loads in water from dewatering operations. All dewatering should be done through temporary sediment traps (e.g. constructed out of geo-textiles and hay bales).</li> </ol> | groundwater monitoring results show acceptable levels of parameters tested<br><br>avoid contamination of groundwater<br><br>regular toolbox talks for management of spills | Rehabilitation objectives<br><br>All water discharges to comply with legal requirements associated with the NWA, including GN No. 399.<br><br>Stormwater management |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED | POTENTIAL<br>IMPACTS                                     | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc.                                                          | COMPLIANCE<br>WITH<br>STANDARDS                                                                                        |
|------------------------------------------------|---------------------|----------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|                                                |                     | Disturbances to<br>aquifer from<br>blasting.             | Construction &<br>Operational                | <ol style="list-style-type: none"> <li>6. Implement a groundwater monitoring programme</li> <li>1. Suitable protection of aquifer during blasting. Implement mitigation measures suggested as part of the geotechnical investigations for managing groundwater.</li> <li>2. Baseline monitoring to include existing boreholes.</li> </ol>                                                                                                                                                | <p>Compliance with measures provided by geotechnical investigations.</p> <p>Compliance with blasting-related legislation and standards.</p> <p>No blasting-related impacts to groundwater.</p> | Explosives Regulations (2003) and all relevant SANS standards and health and safety standards for mitigating blasting. |
|                                                | Topography          | Erosion on steep slopes.                                 | Construction &<br>Operational                | <ol style="list-style-type: none"> <li>1. Suitable erosion protective measures to be implemented where the borrow pits are located in steep terrain.</li> <li>2. Undertake rehabilitation of the construction area to minimise visual impacts.</li> <li>3. Although the use of indigenous vegetation is promoted, where there is a risk of soil erosion (e.g. steep slopes) a suitable specialist must be consulted to determine the most appropriate stabilisation measures.</li> </ol> | <p>Compliance with stormwater management plan</p> <p>Stabilisation of steep slopes</p>                                                                                                         | Stormwater management plan                                                                                             |
|                                                | Topography          | Alteration of the natural topography of the borrow area. | Construction &<br>Operational                | <ol style="list-style-type: none"> <li>1. Stockpiling of material will be confined to one designated area.</li> <li>2. All residue deposits will be removed and the borrow areas will be reshaped to blend in with the surrounding environment.</li> </ol>                                                                                                                                                                                                                               | <p>Compliance with stormwater management plan.</p> <p>Stabilisation of steep slopes.</p>                                                                                                       |                                                                                                                        |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED       | POTENTIAL<br>IMPACTS                               | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc.                                                                                                                                                                           | COMPLIANCE<br>WITH<br>STANDARDS                                                                                                                                                                                                             |
|------------------------------------------------|---------------------------|----------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                           |                                                    |                                              | <ol style="list-style-type: none"> <li>3. Unused overburden / spoil material shall be placed back into the excavation and reshaped, where possible, to blend into the surrounding landscape.</li> <li>4. The stockpiled topsoil will be spread over the site.</li> <li>5. Soil stockpiles shall not be higher than 1,5m and the slopes of soil stockpiles shall not have a vertical/horizontal gradient exceeding 1: 1.5.</li> </ol>                                                                                                                                                                                                                                                                                       | Rehabilitation objectives and standards.                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                             |
|                                                | Surface Water - Hydrology | Impacts to watercourses from temporary diversions. | Construction                                 | <ol style="list-style-type: none"> <li>1. Minimise influence to downstream flow regime when diverting and impeding flow for construction and operation of borrow pit and access roads.</li> <li>2. Prevent possible erosion caused by temporary in-stream diversion. Install suitable buttressing / stabilisation structures to prevent future erosion, if required.</li> <li>3. Select most appropriate crossing point based on geotechnical conditions, sensitivity of riparian habitat (e.g. protected trees, large trees that afford bank stabilisation) and in-stream habitat, depending on technical feasibility.</li> <li>4. Adequate rehabilitation and reinstatements of sand bank within watercourse.</li> </ol> | <p>Water quality monitoring results show acceptable levels of parameters tested</p> <p>Pollution avoided</p> <p>Stormwater management plan</p> <p>Bunded storage of HCS, fuels and oils</p> <p>Rehabilitation standards and objectives to be met</p> <p>Conditions as stipulated in Water Use Licence (WUL)</p> | <p>Compliance with WUL conditions and stormwater management plan</p> <p>Comply with guidelines set out in The National Water Act, 1998 (Act No. 36 of 1998) Section 21 (b), (c) and (i), and (f)</p> <p>Aquatic biomonitoring programme</p> |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b>       | <b>POTENTIAL IMPACTS</b>                                                                                                                                                                                     | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.                                                                               | <b>COMPLIANCE WITH STANDARDS</b> |
|----------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                    | Surface Water – Water Quality | Contamination of surface water through sedimentation from in-stream works, silt-laden runoff from disturbed areas, and improper practices (e.g. poor management of waste water and disposal of solid waste). | Construction & Operational                    | <ol style="list-style-type: none"> <li>1. Conduct water quality monitoring (baseline and during construction and operation of BP SS1) at suitable up- and downstream sites on Crocodile River (West);</li> <li>2. All diffuse pollution sources to be managed to prevent pollution of the watercourses in the project area.</li> <li>3. Storage area and ablution facilities to be located 50 m from edge of riparian habitat.</li> <li>4. Where necessary, install in-stream silt traps during construction within the watercourse channel and along the riparian habitat. The style of silt trap will depend on materials used and the water movement patterns.</li> <li>5. Implement suitable storm water measures during construction to manage ingress of runoff into watercourses.</li> <li>6. Ensure proper storage of material (including fuel, paint) that could cause water pollution. Ensure proper storage and careful handling of hazardous substances with spill prevention materials at hand.</li> <li>7. Reduce sediment loads in water from dewatering operations. All dewatering should be done through temporary sediment</li> </ol> | Erosion potential on banks of affected watercourse minimised<br><br>Pollution incidents avoided<br><br>Downstream water quality to remain within acceptable ranges, as determined through baseline monitoring. |                                  |

| ACTIVITIES<br>whether listed or not listed. | ASPECTS AFFECTED | POTENTIAL IMPACTS                                         | PHASE / TIME PERIOD FOR IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | STANDARD TO BE ACHIEVED<br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | COMPLIANCE WITH STANDARDS                                                                                                                                                                               |
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|                                             |                  |                                                           |                                        | traps (e.g. constructed out of geo-textiles and hay bales).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                           |                                                                                                                                                                                                         |
|                                             | Flora            | Loss of plant species of conservation concern             | Construction                           | <ol style="list-style-type: none"> <li>1. Permits from DAFF and LEDET are required before construction commences in order to cut, disturb, destroy or remove the several protected trees noted within the project area.</li> <li>2. It is recommended that search, rescue and relocation be conducted taking into consideration red data, protected and endangered flora and fauna species. For flora species, the following factors need to be considered (amongst others) as part of this plan:               <ol style="list-style-type: none"> <li>2.1 Detailed plan of action (including timeframes, methodology and costs);</li> <li>2.2 Site investigations;</li> <li>2.3 Consultation with authorities and stakeholders;</li> <li>2.4 Marking of species to be relocated;</li> <li>2.5 Applying for permits;</li> <li>2.6 Identification of suitable areas for relocation;</li> <li>2.7 Aftercare; and</li> <li>2.8 Monitoring (including targets and indicators to measure success).</li> </ol> </li> </ol> | <p>Conduct search and rescue</p> <p>Acquire permits from DAFF / LEDET</p>                                                 | <p>Comply with the requirements of NEM:BA, NFA, National Veld and Forest Fire Act (No. 101 of 1998) and LEMA.</p> <p>Comply with measures provided after environmental sensitivity walk-down survey</p> |
|                                             |                  | Destruction of indigenous flora during site establishment | Construction                           | <ol style="list-style-type: none"> <li>1. Clearly demarcate the construction servitude prior.</li> <li>2. Vegetation clearing should be kept to a minimum (restricted to construction servitude), and this</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>Limit site clearance</p> <p>No unpermitted disturbance to protected flora species.</p>                                 | Comply with the requirements of NEM:BA, NFA, National Veld and Forest Fire Act                                                                                                                          |



| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b> | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | <b>COMPLIANCE WITH STANDARDS</b> |
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|                                                    |                         |                          |                                               | should only occur where it is absolutely necessary.<br>3. Rehabilitate all disturbed areas as soon as the construction is completed on the proposed development sites.<br>4. Ensure that all personnel have the appropriate level of environmental awareness and competence.<br>5. Vehicles and construction workers should under no circumstances be allowed outside the construction servitude to prevent impact on the surrounding vegetation.<br>6. Prevent contamination of natural areas.<br>7. Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site.<br>8. Proliferation of alien and invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread.<br>9. No storage of any construction material on sensitive areas.<br>10. Avoid translocating stockpiles of topsoil from one place to sensitive areas in order to avoid translocating soil seed banks of alien species.<br>Disturbance of vegetation must be limited to the servitude area acquired for the project. |                                                                                                                                  | (No. 101 of 1998) and LEMA.      |

| ACTIVITIES<br>whether listed or not listed. | ASPECTS AFFECTED | POTENTIAL IMPACTS                                   | PHASE / TIME PERIOD FOR IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | STANDARD TO BE ACHIEVED<br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.                                                          | COMPLIANCE WITH STANDARDS                                                                                                                                                                                                                                                   |
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|                                             |                  | Loss of vegetation due to fuel and chemical spills. | Construction & Operational             | <ol style="list-style-type: none"> <li>Appropriate measures should be implemented in order to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person.</li> <li>Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use.</li> </ol> | <p>Minimise potential for HCS spills</p> <p>Avoid leaks of fuels and oils on site</p> <p>Maintenance of vehicles stored on site</p> <p>Spills to be cleaned up within 24 hours</p> | <p>Compliance with Hazardous Substances Act (Act No. 15 of 1973)</p> <p>Compliance with emergency response procedure for spills</p>                                                                                                                                         |
|                                             |                  | Management of alien invasive species                | Construction & Operational             | <ol style="list-style-type: none"> <li>Control of alien invasive species and noxious weeds for areas disturbed by the construction activities, in accordance with the requirements of the NEM:BA Alien and Invasive Species Regulations. Eradication method to be approved by the Project Manager.</li> <li>To prevent unnecessary alien plant infestations, an alien plant monitoring and eradication programme needs to be in place, at least until the disturbed areas have recovered and properly stabilised. Promote awareness of all personnel.</li> </ol>     | <p>No unpermitted disturbance to protected flora species.</p> <p>Ongoing eradication of alien plants and noxious weeds.</p>                                                        | <p>Control of alien invasive species and noxious weeds for disturbed areas, in accordance with the requirements of the Conservation of Agricultural Resources Act (No. 43 of 1983) and GN No. R. 598 (Alien and Invasive Species Regulations, 2014) in terms of NEM:BA.</p> |
|                                             |                  | Loss of topsoil and erosion.                        | Construction                           | <ol style="list-style-type: none"> <li>During site preparation, topsoil and subsoil are to be stripped separately from each other and</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>At least 95% of recovered topsoil from disturbed areas</p>                                                                                                                      | <p>Compliance with stormwater</p>                                                                                                                                                                                                                                           |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b> | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.                                                 | <b>COMPLIANCE WITH STANDARDS</b>                                                |
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|                                                    |                         |                          |                                               | must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. An ecologically-sound storm water management plan must be implemented during construction and appropriate water diversion systems put in place.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | is to be stored for future use.<br><br>No visual evidence of erosion from topsoil stockpiles.<br><br>No visual evidence of erosion from areas where topsoil has been reinstated. | management plan                                                                 |
|                                                    |                         | Rehabilitation of site   | Operation & Closure                           | <ol style="list-style-type: none"> <li>1. Bare surfaces should be grassed as soon as possible after construction to minimise time of exposure. Locally occurring, indigenous grasses should be used.</li> <li>2. The rehabilitated and seeded areas must be harrowed after spreading the topsoil and fertilizer uniformly.</li> <li>3. Inspect rehabilitated area at three monthly intervals during the first and second growing season to determine the efficacy of rehabilitation measures.</li> <li>4. Take appropriate remedial action where vegetation establishment has not been successful or erosion is evident.</li> <li>5. Only locally indigenous vegetation is to be used for rehabilitation.</li> <li>6. All waste generated by the construction activities will be stored in a temporary demarcated storage area, prior</li> </ol> | Complete site clean-up.<br><br>Reinstatement and rehabilitate areas disturbed by construction activities.                                                                        | Comply and implement Rehabilitation Management Plan and closure plan objectives |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED | POTENTIAL<br>IMPACTS                                                                                                                                                        | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc.               | COMPLIANCE<br>WITH<br>STANDARDS                                                                                              |
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|                                                |                     |                                                                                                                                                                             |                                              | <p>to disposal thereof at a licensed registered landfill site.</p> <p>All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state where possible, in agreement with the ECO</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                     |                                                                                                                              |
|                                                | Fauna               | Loss of Protected species listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Threatened or Protected Species regulations | Construction                                 | <ol style="list-style-type: none"> <li>In order to protect Southern African Python on or around the site, should this species be encountered or exposed during the construction phase, it should be removed and relocated to natural areas in the vicinity. This remedial action requires the engagement of a herpetologist and or ecologist to oversee the removal of any herpetofauna during the initial ground clearing phase of construction (i.e. initial ground-breaking by earthmoving equipment). However, if this species is found during winter period, when it is in hibernation, then a permit from LEDET would be required in order to catch and release it to a safer environment.</li> <li>The desktop study shows that spider species such as <i>Ceratogyrus darlingi</i> are expected to occur in the area, and it is therefore suggested that during the walk down survey, if any of these are found, a permit from LEDET will be</li> </ol> | <p>No direct / indirect harm to animals from construction activities.</p> <p>Acquire necessary permits for removal of sensitive species on site</p> | <p>Permit from LEDET</p> <p>Comply with the requirements of the NEM:BA, LEMA and Animal Protection Act (No. 71 of 1962).</p> |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b>                  | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | <b>COMPLIANCE WITH STANDARDS</b>                                                                                                                   |
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|                                                    |                         | Loss and displacement of animals on site. | Construction                                  | required before relocation can take place.<br><br>1. If any herpetological species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. This remedial action requires the employment of a herpetologist and or ecologist to oversee the removal of any herpetofauna during the initial ground clearing phase of construction (i.e. initial ground-breaking by earthmoving equipment).<br>2. Training of construction workers to recognise threatened animal species will reduce the probability of fauna being harmed unnecessarily.<br>3. The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase.<br>4. No trapping or any other method of catching of any animal or bird may be performed on site<br>5. Vehicles must adhere to a speed limit.<br>6. All construction and maintenance vehicles must stick to properly demarcated and prepared roads. Off-road driving should be strictly prohibited.<br>7. No fires should be allowed at the site | Direct or indirect harm to animals avoided<br><br>Safe relocation of animals                                                     | Comply with the requirements of the NEM:BA, LEMA and Animal Protection Act (No. 71 of 1962).<br><br>Toolbox talks on management of animals on site |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b>     | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | <b>COMPLIANCE WITH STANDARDS</b>                                                                                                  |
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|                                                    |                         |                              |                                               | 8. No dogs or other domestic pets should be allowed at the site.<br>9. Any fauna (mammal and reptile) that becomes trapped in the excavations or in any construction or operational related activity may not be harmed and must be placed rescued and relocated by an experienced person.                                                                                                                                                                                                                               |                                                                                                                                  |                                                                                                                                   |
|                                                    |                         | Disturbance to animals       | Construction & Operation                      | 1. Animals residing within the designated area shall not be unnecessarily disturbed.<br>2. During construction, refresher training can be conducted with construction workers with regards to environmental awareness, including the protection of fauna and flora..<br>3. The Contractor and his/her employees shall not bring any domestic animals onto site.<br>4. Toolbox talks should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes. | No direct / indirect harm to animals from construction/operation activities.                                                     | Compliance with toolbox talks                                                                                                     |
|                                                    | Flora and Fauna         | Loss of CBA and ESA habitats | Construction                                  | 1. The most significant way to mitigate the loss of habitat is to limit the construction footprint within the natural habitat areas remaining. Disturbance of vegetation must be limited to the servitude area acquired for the project.                                                                                                                                                                                                                                                                                | Impacts to CBA and ESA habitats minimised                                                                                        | Implement a Biodiversity Protection Policy.<br><br>Comply with the requirements of NEM:BA, NFA, National Veld and Forest Fire Act |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b>        | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | <b>COMPLIANCE WITH STANDARDS</b>            |
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|                                                    |                         |                                 |                                               | 2. Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site.<br>3. Vehicles and construction workers should under no circumstances be allowed outside the site boundaries to prevent impact on the surrounding vegetation.<br>4. All stockpiles, construction vehicles, equipment and machinery should only be situated within the servitudes acquired for the project.<br>5. Prevent contamination of natural areas.<br>6. No structures should be built outside the area demarcated for the development.<br>7. Although it is unavoidable that sections of the project infrastructure development will need to traverse areas of potential high sensitivity, the clearing of vegetation must be limited to the servitude area acquired for the project.<br>8. Where possible, linear infrastructure proposed as part of the development should be aligned with existing infrastructure or routed through already transformed/degraded areas. |                                                                                                                                  | (No. 101 of 1998) and LEMA.                 |
|                                                    | Fauna and Flora         | Damage to plant and animal life | Construction & Operational                    | 1. Any fauna (mammal, reptile and amphibian) that becomes trapped in the excavations or in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Impacts to animals and plants outside borrow pits avoided                                                                        | Comply with the requirements of the NEM:BA, |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b>    | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | <b>COMPLIANCE WITH STANDARDS</b>                                                                                                                                                                                                                                                                                             |
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|                                                    |                         | outside of the project area |                                               | any construction or operational related activity may not be harmed and must be rescued and relocated by an experienced person.<br>2. Proliferation of alien and invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread.<br>3. No unauthorised vehicles should be allowed to drive through the site during the construction activities.<br>4. No trapping or any other method of catching of any animal may be performed on site.<br>5. Illegal hunting is prohibited.<br>6. No dumping of any form is permitted.<br>7. No damage and/or removal/trapping/snaring of indigenous plant or animal material for cooking and other purposes will be allowed.<br>8. All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state where possible, in agreement with the ECO.<br>9. Construction activities should be restricted to the development footprint area and then the | Control alien plants and noxious weeds                                                                                           | LEMA and Animal Protection Act (No. 71 of 1962).<br><br>Control of alien invasive species and noxious weeds for disturbed areas, in accordance with the requirements of the Conservation of Agricultural Resources Act (No. 43 of 1983) and GN No. R. 598 (Alien and Invasive Species Regulations, 2014) in terms of NEM:BA. |



| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED | POTENTIAL<br>IMPACTS | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc. | COMPLIANCE<br>WITH<br>STANDARDS                                                                                                                                                                                                                                                                                                                                                 |
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|                                                |                     |                      |                                              | <p>compliance in terms of footprint can be monitored by ECO.</p> <p>10. Natural areas which could be deemed as no go should be clearly marked.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                | Wildlife            | Habitat loss         | Construction, Operational and Closure Phase  | <p><u>Avoidance measures:</u></p> <ol style="list-style-type: none"> <li>1. Unauthorized access to adjacent fenced-off properties must be avoided.</li> <li>2. Unauthorized use of natural resources from adjacent properties must be avoided and strictly enforced.</li> <li>3. All wildlife must be protected, with snaring or hunting strictly prohibited with stated consequences and penalties enforced.</li> <li>4. Unauthorized access to the construction site and adjacent properties must be avoided.</li> <li>5. Construction must be restricted to the construction zone and spill-over to adjacent properties avoided.</li> <li>6. Existing vegetation must be left in place where possible.</li> <li>7. Avoiding unnecessary disturbance of stable vegetated surfaces.</li> <li>8. Avoiding unnecessary clearance of vegetation.</li> <li>9. Avoid all pollution and spill-over into adjacent natural environment.</li> </ol> <p><u>Minimisation measures:</u></p> | Minimise habitat loss within borrow pit.                                                                                              | <p>Comply with the requirements of the NEM:BA, LEMA and Animal Protection Act (No. 71 of 1962).</p> <p>Control of alien invasive species and noxious weeds for disturbed areas, in accordance with the requirements of the Conservation of Agricultural Resources Act (No. 43 of 1983) and GN No. R. 598 (Alien and Invasive Species Regulations, 2014) in terms of NEM:BA.</p> |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED | POTENTIAL<br>IMPACTS          | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc. | COMPLIANCE<br>WITH<br>STANDARDS                                        |
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|                                                |                     |                               |                                              | <ol style="list-style-type: none"> <li>1. All breeding camps must have a protective buffer zone adjacent to fence line;</li> <li>2. Disturbance of river or stream banks must be kept to the minimum necessary and where required must be carefully planned to minimise any potential disruption to existing water flow and disturbance of riparian vegetation.</li> <li>3. Reduce potential impacts, such as soil compaction, by selecting those areas with high alien plant infestations/ encroaching species as first options in location selection.</li> <li>4. Each of these footprints must be buffered and where possible fenced off to reduce the potential of accidental spill-over into surrounding areas.</li> <li>5. Implement an alien plant control programme in eradicating existing alien plant infestations and limiting potential spread to other natural areas.</li> <li>6. Impact can be reduced by establishing a high productive herbaceous canopy cover using grass species suited to the soils and climate.</li> </ol> |                                                                                                                                       |                                                                        |
|                                                |                     | Loss of wildlife biodiversity | Construction                                 | <ol style="list-style-type: none"> <li>1. Pre-construction walk-down and faunal surveys must be undertaken prior to construction site and borrow pit selection to identify medium to high value</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Avoid impacts to sensitive wildlife.                                                                                                  | Comply with the requirements of the NEM:BA, LEMA and Animal Protection |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED                      | POTENTIAL<br>IMPACTS                                                                                                               | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc. | COMPLIANCE<br>WITH<br>STANDARDS                                                                                                                                                                                                                                       |
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|                                                |                                          |                                                                                                                                    |                                              | <p>wildlife species and necessary action taken to avoid areas where they occur.</p> <ol style="list-style-type: none"> <li>2. Preserve high value wildlife species in situ where possible and protect unique wildlife habitats;</li> <li>3. Implement a Biodiversity Protection Policy.</li> </ol>                                                                                                                                                                                                                                                                                |                                                                                                                                       | Act (No. 71 of 1962).                                                                                                                                                                                                                                                 |
|                                                |                                          | Land-use                                                                                                                           | Construction & Operation                     | <ol style="list-style-type: none"> <li>1. Disruption of activities by functional wildlife enterprises must be avoided if possible.</li> <li>2. Avoid disruption of hunting activities by safari operators during the months of May to September (hunting season).</li> <li>3. Avoid disruption of eco-tourism activities by wildlife ranchers.</li> </ol>                                                                                                                                                                                                                         | Avoid impact to eco-tourism and hunting activities on farms.                                                                          | Comply with agreements with landowners                                                                                                                                                                                                                                |
|                                                | Socio-Economic:<br>Health and well being | <ul style="list-style-type: none"> <li>• Annoyance from dust and noise;</li> <li>• Security;</li> <li>• Personal safety</li> </ul> | Construction & Operational                   | <ol style="list-style-type: none"> <li>1. Apply dust suppression mitigation measures to vehicle movements, open areas and excavations.</li> <li>2. Prior notice should be given to surrounding communities of blasting events.</li> <li>3. Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing.</li> <li>4. Fence off all construction sites and control access to these sites.</li> <li>5. Clearly mark any hazardous areas and regularly monitor these areas to ensure that they</li> </ol> | <p>Avoid disturbances from dust</p> <p>Ensure no incidents</p>                                                                        | <p>Compliance with South African Police Services (SAPS) and Community Policing Forums policies and objectives</p> <p>Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2014) and other relevant regulations.</p> |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED                                          | POTENTIAL<br>IMPACTS                                                                                           | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION   | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc.                                                                  | COMPLIANCE<br>WITH<br>STANDARDS                                                             |
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|                                                |                                                              |                                                                                                                |                                                | <p>are avoided by people and animals.</p> <p>6. Liaise with the South African Police Services (SAPS) and Community Policing Forums to ensure that construction sites are monitored.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                        | <p>Comply with Health and Safety Plan</p> <p>Comply with ASTM D1739; SANS 1929, SANS 69</p> |
|                                                | <p>Socio-Economic:<br/>Quality of the living environment</p> | <ul style="list-style-type: none"> <li>• Disruptions of daily living;</li> <li>• Damage to property</li> </ul> | <p>Construction &amp; Operational</p>          | <ol style="list-style-type: none"> <li>1. Ensure that, at all times, people have access to their properties as well as to social facilities such as schools, churches, transport, shops, etc.</li> <li>2. Investigate and consult farmers and local communities on the need to provide suitable access points around the construction sites for people and animals.</li> <li>3. An access survey should be carried out prior to working in a new section of the project and access arrangements should be discussed and agreed to by the landowner.</li> <li>4. If a risk existing of damage taking place on a property as a result of construction, a condition survey should be undertaken prior to construction.</li> <li>5. The contractor is to make good and acknowledge any damage that occurs on any property as a result of construction work.</li> </ol> | <p>No unwarranted complaints regarding adverse impacts to existing services and infrastructure</p> <p>No complaints with regards to restricted access</p> <p>Condition survey</p> <p>Access survey</p> | <p>Comply with all arrangements made with landowners with regards to access to farms.</p>   |
|                                                | <p>Socio-Economic:<br/>Economic</p>                          | <ul style="list-style-type: none"> <li>• SMME Development</li> </ul>                                           | <p>Construction, Operational &amp; Closure</p> | <ol style="list-style-type: none"> <li>1. A procurement policy promoting the use of local business where possible, should be put in place</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>Optimise the use of local labour.</p>                                                                                                                                                               | <p>Comply and Implement</p>                                                                 |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b>                          | <b>POTENTIAL IMPACTS</b>                                                                                                                           | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | <b>COMPLIANCE WITH STANDARDS</b>                                                                                |
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|                                                    | and material well being                          | <ul style="list-style-type: none"> <li>• Job creation and skills development;</li> <li>• Indirect employment impacts</li> </ul>                    |                                               | and applied throughout the construction and operational phases of the project.<br>2. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction.<br>3. The main contractor should employ non-core labour local study area as far as possible during the construction phase.                                                                                                                                                                                               | Provide a work environment that is conducive to effective labour relations.                                                      | procurement policy<br><br>Implement skills transfer plan for all local labour                                   |
|                                                    | Socio-Economic: Economic and material well being | <ul style="list-style-type: none"> <li>• Loss of productive land or business value;</li> <li>• Recreational or tourism business impacts</li> </ul> | Construction                                  | 1. The loss of productive land or of business value is handled in terms of prevailing RSA legislation.<br>2. Agreement should be reached with each impacted landowner regarding the construction programme and impacts on the property during construction. Where possible in terms of the overall construction programme construction could be scheduled during low tourist season on affected game farms. Agreements made prior to construction with respect to property access, the duration of construction and the impacts on the land should be adhered to by both the landowner and the contractor. | Avoid loss of productive land<br><br>avoid recreational, tourism or business impacts                                             | Compliance with agreements made with landowners<br><br>Compliance with TCTA policy and land acquisition process |

| ACTIVITIES<br>whether listed or not listed. | ASPECTS AFFECTED | POTENTIAL IMPACTS                                                                                                    | PHASE / TIME PERIOD FOR IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | STANDARD TO BE ACHIEVED<br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                             | COMPLIANCE WITH STANDARDS                                                                           |
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|                                             | Agriculture      | <ul style="list-style-type: none"> <li>• Loss of grazing land;</li> <li>• Loss of agricultural production</li> </ul> | Construction                           | <ol style="list-style-type: none"> <li>1. Keep the footprint as small as possible. Restore and reseed the site.</li> <li>2. Compensate the farmer for loss of income.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Impacts to grazing land and agricultural production avoided<br><br>Rehabilitation management plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Comply with rehabilitation management plan                                                          |
|                                             | Air Quality      | Excessive dust levels                                                                                                | Construction & Operational             | <ol style="list-style-type: none"> <li>1. Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including construction area and access roads. Note that all dust suppression requirements should be based on the results from the dust monitoring and the proximity of sensitive receptors.</li> <li>2. Speed limits to be strictly adhered to.</li> <li>3. The Contractor will take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, pre-notification of affected parties).</li> <li>4. Air quality to be monitored (baseline and during construction) for dust fallout and particulate matter. Sampling locations to consider major</li> </ol> | Pollution minimised<br><br><b>Dust fallout -</b> <ol style="list-style-type: none"> <li>a. Fenceline sites = Industrial Band (600 to 1200 mg/m<sup>2</sup>/day);</li> <li>b. Community sites = Residential Band (&lt; 600 mg/m<sup>2</sup>/day);</li> <li>c. Comply with ASTM D1739; SANS 1929, SANS 69.</li> </ol> <b>Particulate matter (PM10) -</b> <ol style="list-style-type: none"> <li>a. 24 hr = 120 µg/m<sup>3</sup> (more than four times a year);</li> <li>b. Annual = 50 µg/m<sup>3</sup>;</li> <li>c. Comply with the National Ambient Air Quality Standards.</li> </ol> | Comply with the National Ambient Air Quality Standards.<br><br>Compliance with monitoring standards |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED               | POTENTIAL<br>IMPACTS                             | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc.                                                                                                                                                                                                                                                                                                 | COMPLIANCE<br>WITH<br>STANDARDS                                              |
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|                                                |                                   |                                                  |                                              | sources of dust and sensitive receptors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                              |
|                                                | Noise                             | Excessive noise levels                           | Construction & Operational                   | <ol style="list-style-type: none"> <li>1. The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents.</li> <li>2. Working hours to be agreed upon with Project Manager, so as to minimise disturbance to landowners/occupiers and community members.</li> <li>3. Construction activities generating output levels of 85 dB or more will be confined to normal working hours.</li> <li>4. Noise preventative measures (e.g. screening, muffling, timing, pre-notification of affected parties) to be employed.</li> <li>5. Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.</li> <li>6. Survey potentially affected structures prior to and after blasting.</li> <li>7. Noise to be monitored (baseline and during construction). Sampling locations to consider major noise sources and sensitive receptors.</li> </ol> | <p><b>Noise -</b></p> <ol style="list-style-type: none"> <li>a. LAeq (equivalent continuous sound level) during daytime hours (06:00 to 22:00) = 45 dBA;</li> <li>b. LAeq during night-time hours (22:00 to 06:00) = 35 dBA;</li> <li>c. Comply with SANS 10103:2008.</li> </ol> <p>Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.</p> | <p>Comply with SANS 10103:2008.</p> <p>Compliance with set working hours</p> |
|                                                | Historical and cultural resources | Disturbance of historical and cultural resources | Construction & Operational                   | <ol style="list-style-type: none"> <li>1. Whenever possible, all heritage sites identified during this study with a significance of Medium and higher, must be preserved in situ by designing the</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | No archaeological and cultural resources or graves damaged during construction                                                                                                                                                                                                                                                                                                                                                        | Comply with SAHRA / LIHRA standards and objectives.                          |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED | POTENTIAL<br>IMPACTS | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc. | COMPLIANCE<br>WITH<br>STANDARDS                                                                                                                      |
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|                                                |                     |                      |                                              | <p>development footprints in such a way that a buffer area of at least 50 m is kept clear between any development footprints and construction activities and these heritage sites.</p> <ol style="list-style-type: none"> <li>2. Search, rescue and relocation of heritage sites affected by construction.</li> <li>3. For any chance finds, all work will cease in the area affected and the Contractor will immediately inform the Engineer. A registered heritage specialist must be called to site for inspection. The relevant heritage resource agency (SAHRA) must be informed about the finding. Works in the area may only proceed once all the requirements have been met.</li> <li>4. Permits to be obtained in terms of the NHRA if heritage resources are to be impacted on and for the removal of graves.</li> </ol> <p><b>Site mitigation measures for MCWAP Site 10:</b></p> <ol style="list-style-type: none"> <li>5. The site must be recorded with photographs and a layout plan.</li> <li>6. A permit application must be lodged with the South African Heritage Resources Agency (SAHRA) to allow for the subsequent mitigation measures to be implemented.</li> </ol> | <p>and operation of borrow pits.</p> <p>Impacts to MCWAP Site 10 avoided.</p> <p>Acquire permit from SAHRA.</p>                       | <p>Follow measures provided in Heritage Impact Assessment (PGS, 2018) with regards to management of heritage resource situated at MCWAP Site 10.</p> |



| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED     | POTENTIAL<br>IMPACTS                                             | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc.                       | COMPLIANCE<br>WITH<br>STANDARDS                                                                                                   |
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|                                                |                         |                                                                  |                                              | <ol style="list-style-type: none"> <li>7. Once the permit is received, archaeological mitigation of the site can be undertaken. Such archaeological mitigation may include Surface Collection, Shovel Test Pits (STP's) and archaeological excavation. These techniques will be used to further assess and interpret the site.</li> <li>8. A Phase 2 Archaeological Mitigation report must be compiled.</li> <li>9. The abovementioned report and destruction permit application must be lodged with the South African Heritage Resources Agency (SAHRA).</li> <li>10. The mitigation proposed here may only be undertaken under the auspices of a suitably qualified and experienced archaeologist.</li> </ol> |                                                                                                                                                             |                                                                                                                                   |
|                                                | Existing Infrastructure | Disruption of existing services and relocation of infrastructure | Construction & Operational Phase             | <ol style="list-style-type: none"> <li>1. Identify and record existing services and infrastructure.</li> <li>2. Conform to requirements of relevant service providers and infrastructure custodians (e.g. Transnet, Limpopo Department of Public Works, Roads and Infrastructure, Eskom, Municipalities, etc.).</li> <li>3. Ensure access to infrastructure is available to service providers at all times.</li> <li>4. Immediately notify service providers of disturbance to</li> </ol>                                                                                                                                                                                                                       | <p>Impacts to existing structures and infrastructure avoided.</p> <p>No complaints from landowners/service providers with regards to services affected.</p> | <p>Compliance with wayleaves from service providers.</p> <p>Adherence to agreements made with landowners / service providers.</p> |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b>                                                                                                                                               | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.                             | <b>COMPLIANCE WITH STANDARDS</b>                         |
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|                                                    |                         |                                                                                                                                                                        |                                               | services. Rectify disturbance to services, in consultation with service providers. Maintain a record of all disturbances and remedial actions on site.<br>5. Notify landowners of any disruptions to essential services.<br>6. Deviate landowners' existing services (e.g. reticulation, irrigation lines), where possible, to accommodate construction activities.<br>7. Adequate reinstatement and rehabilitation of affected environment.                                                                                                                                                                                                         |                                                                                                                                                              |                                                          |
|                                                    | Aesthetics              | <ul style="list-style-type: none"> <li>• Reduction of visual quality of receiving environment</li> <li>• Loss of sense of place;</li> <li>• Light pollution</li> </ul> | Construction & Operational                    | <ol style="list-style-type: none"> <li>1. Lighting must not constitute an eyesore / hazard to users of the road and the surrounding community.</li> <li>2. Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas.</li> <li>3. The site will be shielded / screened to minimise the visual impact, where practicable.</li> <li>4. On-going housekeeping to maintain a tidy construction area.</li> <li>5. After the construction phase, the areas disturbed that are not earmarked for operational purposes (part of infrastructure footprint) must be suitably rehabilitated.</li> </ol> | Minimise impacts to the aesthetics / visual quality.<br><br>Ensure that the visual appearance of the construction site is not an eyesore the adjacent areas. | Compliance with rehabilitation standards and objectives. |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED | POTENTIAL<br>IMPACTS                                                                                                                                                                                                                               | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc.                                                                                                                                                                                                                                                                                                                                                                  | COMPLIANCE<br>WITH<br>STANDARDS                                                                                                                                                                                                                                                                                                                                          |
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|                                                | Traffic &<br>Access | <ul style="list-style-type: none"> <li>• Inadequate road conditions</li> <li>• Disruptions to existing road users</li> <li>• Safety risks</li> <li>• Crossing main roads</li> <li>• Increase in dust levels</li> <li>• Road maintenance</li> </ul> | Construction &<br>Operational                | <ol style="list-style-type: none"> <li>1. Determine and document the road conditions of the D1649, D3677, R510 and D175 (and all other public roads), as well as all private access roads that will be affected by construction traffic, as relevant. Maintain adequate road conditions.</li> <li>2. Selective upgrade of the relevant access roads to ensure that they are capable of accommodating the type of vehicles and/or mechanical plant using these roads.</li> <li>3. Obtain the necessary approval for road upgrades, wayleave for road construction from the relevant authorities, as applicable.</li> <li>4. Ensure temporary accommodation of traffic where any public or private roads are to be affected by construction activities.</li> <li>5. Make provision for community members to access their properties safely.</li> <li>6. Clearly demarcate all access/haul roads.</li> <li>7. Proper access control is to be maintained to prevent livestock / game from accessing borrow pits.</li> <li>8. Strict adherence to speed limits by construction vehicles on public roads (including the D1649, D3677, R510 and D175)</li> </ol> | <ol style="list-style-type: none"> <li>1. No reports of construction vehicles using other unauthorised routes.</li> <li>2. No complaints regarding blocking of access to properties.</li> <li>3. No direct harm to livestock / game / wild animals due to inadequate access control.</li> <li>4. No transporting of unsafe loads. Permits are to be obtained for abnormal loads.</li> <li>5. No speeding.</li> <li>6. No accidents.</li> <li>7. Impacts to local and private roads avoided.</li> </ol> | <p>Obtain the necessary approvals from the Roads Agency Limpopo (RAL) and any other Roads Authority, as required.</p> <p>Comply with speed limits.</p> <p>Maintain adequate road conditions.</p> <p>Compliance with biosecurity protocols and agreements with landowners with regards to access to private properties.</p> <p>Comply with dust suppression measures.</p> |

| ACTIVITIES<br>whether listed or not<br>listed. | ASPECTS<br>AFFECTED | POTENTIAL<br>IMPACTS | PHASE / TIME<br>PERIOD FOR<br>IMPLEMENTATION | MITIGATION MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | STANDARD TO BE<br>ACHIEVED<br>(Impact avoided, noise<br>levels, dust levels,<br>rehabilitation standards,<br>end use objectives) etc. | COMPLIANCE<br>WITH<br>STANDARDS |
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|                                                |                     |                      |                                              | <p>and access roads. Appropriate speed limits need to be posted on all access roads according to the geometric design and limitations of heavy vehicles.</p> <p>9. The access roads need to provide sufficient width for heavy vehicles to navigate around curves in the road.</p> <p>10. When construction vehicles are required to cross provincial and district roads (as relevant) appropriate safety and traffic calming measures need to be in place. This will include flag men, speed reductions and warning signage.</p> <p>11. The payloads delivered by heavy vehicles need to be recorded and audited to prevent overloading of heavy vehicles.</p> <p>12. Traffic accommodation to South-African Road Traffic Signs Manual standards where any construction affects an existing road.</p> <p>13. Implement traffic monitoring which includes –</p> <p>13.1 Baseline traffic monitoring, 1 year ahead of construction, to confirm the traffic status quo on the road links that are to be worst affected.</p> <p>13.2 Traffic Monitoring during the construction period, to confirm whether the traffic increase is similar to forecasted increase,</p> |                                                                                                                                       |                                 |

| <b>ACTIVITIES</b><br>whether listed or not listed. | <b>ASPECTS AFFECTED</b> | <b>POTENTIAL IMPACTS</b> | <b>PHASE / TIME PERIOD FOR IMPLEMENTATION</b> | <b>MITIGATION MEASURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>STANDARD TO BE ACHIEVED</b><br>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. | <b>COMPLIANCE WITH STANDARDS</b> |
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|                                                    |                         |                          |                                               | whether the contractor complies with activity time restrictions, whether posted speed limits are adhered to, etc.<br>13.3 Overloading Management through auditing of bulk construction material delivery slips to ensure high-level adherence to current legislation.<br>13.4 Monitoring of dangerous locations (e.g. truck crossings, schools, road diversions etc.).<br>13.5 Traffic monitoring after completion of construction (operation phase), 6 months after construction to confirm the new level of traffic resulting from normal operations.<br>13.6 Evidence of the actual impact on the local road network as well as the effect of implemented mitigation measures can then be readily made available. |                                                                                                                                  |                                  |

**f) Impact Management Actions**

Refer to **Table 31** for a list of all impact management actions.

**g) Financial Provision**

**(1) Determination of the amount of Financial Provision.**

Based on a Memorandum of Understanding (MoU) in 2007 between the then Department of Water Affairs and Forestry (DWAF) and the then Department of Mineral and Energy (DME), it was agreed between these parties that for the construction and maintenance of Government Waterworks undertaken by DWS' own Construction Unit, this Department shall be deemed to comply with the requirements of financial provision. Provided that the estimated costs for the management, rehabilitation and closure of such quarries and borrowed areas or works are provided for within the approved budget for such Government Waterworks. Refer to a copy of the MoU in **Appendix L**.

**(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.**

Closure objectives will be aligned to the MCWAP Rehabilitation Performance Criteria for borrow pits and associated newly constructed access roads as stipulated in **Section 1(p)(2)**. The intended end use would entail returning the borrow pit management area to the landowner in a state that would allow him to continue his/ her original use for it prior to the establishment of a borrow pit management area. Therefore the landowner should be able to continue his daily activities on the portion of affected land. The area is to blend as far as possible with the surrounding landform and land use and will be vegetated. Initially tree species will not be planted unless required by the landowner in their special conditions, but these will be allowed to repopulate the area over time. Grass cover is to match the surrounding areas. No steep slopes that are not part of the existing natural landscape will be allowed.

**(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.**

A Closure Plan will be compiled before the Closure Phase of the proposed BPs. This Closure Plan will incorporate all comments from authorities (DMR, DAFF, DWS, etc.) and directly affected landowners.

**(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.**

Refer to **Section 1(p)(2)** for the MCWAP Rehabilitation Performance Criteria for BPs and associated newly constructed access roads.

**(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.**

The Rehabilitation Plan objectives are compatible as it will allow a complete site clean-up during the closure phase, allowing the borrow pit area to blend in with the surrounding environment as far as possible.

**(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.**

Refer to **Section 2(g)(1)(a)** with regards to financial provision for MCWAP-2A.

**(f) Confirm that the financial provision will be provided as determined.**

Refer to **Section 2(g)(a)** with regards to financial provision for MCWAP-2A.

**h) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including**

| SOURCE ACTIVITY                                                                                   | IMPACTS REQUIRING MONITORING PROGRAMMES                                                                                        | FUNCTIONAL REQUIREMENTS FOR MONITORING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ROLES AND RESPONSIBILITIES<br>(FOR THE EXECUTION OF THE MONITORING PROGRAMMES) | MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS            |
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| Construction and operation of borrow pits and associated management areas and access / haul roads | Surface water pollution from construction and operation of borrow pits in proximity to watercourses (e.g. BP SS1 and BP 39A ). | <p><u>Monitoring Location</u></p> <p>a. All major watercourses to be affected by the project, including the Crocodile River (West), Matlabas River and drainage lines. Sites to be located at suitable spots up- and downstream of the construction sites and in-stream works, to be determined in consultation with the ECO.</p> <p>b. <i>In situ</i> water quality monitoring and biomonitoring to be conducted.</p> <p><u>Requirements</u><br/>Comply with relevant standards - SANS 5667.</p> <p>Water Quality variables to be tested include:</p> <ul style="list-style-type: none"> <li>• Chemical oxygen demand</li> <li>• Total ammonia</li> </ul> | Contractor and ECO                                                             | Bi-annually monitoring of Crocodile River (West) during the construction, operational and closure phases. |



|  |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |                                                                                 |
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|  |                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Copper</li> <li>• Iron</li> <li>• Lead</li> <li>• Nitrite/Nitrate</li> <li>• Orthophosphate</li> <li>• Zinc</li> <li>• Faecal coliform bacteria</li> <li>• Sodium (Na)</li> <li>• Soap, oil and grease</li> <li>• Manganese</li> <li>• Fluoride</li> </ul>                                                                                                                                                                                                                                                                                                                                              |                           |                                                                                 |
|  | <p>Air pollution from dust generation during the construction and operation of the borrow pits and associated management areas and access / haul roads.</p> | <p><u>Monitoring location</u></p> <p>a. Dust fallout units to be located taking into consideration significant sources of air pollution, sensitive receptors, and dominant wind direction. Dust fallout to be measured at / around the following sites (as a minimum) –</p> <ul style="list-style-type: none"> <li>i. Stockpiles;</li> <li>ii. Screening area;</li> <li>iii. Sites where large areas have been cleared;</li> <li>iv. Mining areas;</li> <li>v. Access/haul roads</li> <li>vi. Sensitive features on site and adjacent to borrow pit.</li> </ul> <p>Particulate matter (PM10) – strategic monitoring point(s) to be selected.</p> | <p>Contractor and ECO</p> | <p>Bi-weekly monitoring during construction, operational and closure phase.</p> |

|  |                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                                                  |
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|  |                                                                                                         | <p><u>Requirements</u><br/>                 Dust fallout – comply with ASTM D1739; SANS 1929, SANS 69.</p> <p>Dust fallout -</p> <p>a. Fenceline sites = Industrial Band (600 to 1200 mg/m<sup>2</sup>/day);</p> <p>b. Community sites = Residential Band (&lt; 600 mg/m<sup>2</sup>/day).</p> <p>Particulate matter (PM10) – comply with the National Ambient Air Quality Standards.</p> <p>Particulate matter (PM10) -</p> <p>a. 24 hr = 120 µg/m<sup>3</sup> (more than four times a year);</p> <p>b. Annual = 50 µg/m<sup>3</sup>;</p> |                    |                                                                  |
|  | Groundwater pollution                                                                                   | <p>Monitor the actual situation regarding sediment conveyance against the established baseline for sediment in suspension downstream of the proposed borrow pit SS1.</p> <p>Baseline monitoring of boreholes.</p>                                                                                                                                                                                                                                                                                                                          | Contractor and ECO | Bi-annually monitoring during construction and operational phase |
|  | Noise / Vibration from blasting and construction and operation of borrow pits and associated activities | <p><u>Monitoring locations</u><br/>                 Noise and vibration monitoring sampling sites to be located taking into consideration significant sources of noise,</p>                                                                                                                                                                                                                                                                                                                                                                | Contractor and ECO | Weekly monitoring during construction and operational phase      |

|  |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |
|--|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|  |                | <p>sensitive receptors (e.g. see sensitive features listed under Air Quality above), and dominant wind direction. Sites to coincide with dust fallout sites (where relevant).</p> <p><u>Requirements</u><br/>                 Noise -</p> <ol style="list-style-type: none"> <li>a. LAeq (equivalent continuous sound level) during daytime hours (06:00 to 22:00) = 45 dBA;</li> <li>b. LAeq during night-time hours (22:00 to 06:00) = 35 dBA;</li> <li>c. Comply with SANS 10103:2008.</li> </ol> <p>Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.</p> |  |  |
|  | <p>Traffic</p> | <p>Specific requirements from RAL and SANRAL</p> <p>Implement traffic monitoring which includes baseline traffic monitoring, 1 year ahead of construction, to confirm the traffic status quo on the road links that are to be affected.</p>                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |

**Note:** Compliance monitoring will commence in the pre-construction phase, where those conditions in the Environmental Authorisation that need to be adhered to prior to project implementation will need to be checked and recorded, as well as to check compliance with the provisions in the EMP. Compliance monitoring will be completed at the end of the defects liability period to check the performance of rehabilitation measures and whether the related objectives have been met.

It is recommended that the ECO undertake weekly inspections of the site, monthly monitoring and biannual full compliance auditing, including an audit at the end of construction and one at the end of the defects notification period. Auditing of compliance with the Environmental Authorisation and EMP must be conducted in accordance with Regulation 34 of GN No. R 982 (4 December 2014).

**i) Indicate the frequency of the submission of the performance assessment report.**

It is recommended that the ECO undertake weekly inspections of the site, monthly monitoring and biannual full compliance auditing, including an audit at the end of construction and one at the end of the defects notification period. Auditing of compliance with the Environmental Authorisation and EMPr must be conducted in accordance with Regulation 34 of GN No. R 982 (4 December 2014).

**j) Environmental Awareness Plan****(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.**

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project. Awareness creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The various means of creating environmental awareness during the construction and operational phases of the project may include:

- ❖ Induction course for all workers before commencing work on site;
- ❖ Refresher courses (as and when required);
- ❖ Daily toolbox talks, focusing on particular environmental issues (task- and area specific);
- ❖ Courses must be provided by suitably qualified persons and in a language and medium understood by the workers. It is noted that Sepedi and Setswana are the dominant languages in the area;
- ❖ Erect signage and barricading (where necessary) at appropriate points in the construction domain, highlighting sensitive environmental features (e.g. grave sites, protected trees); and
- ❖ Place posters containing environmental information at areas frequented by the construction workers (e.g. eating facilities).

Training and awareness creation will be tailored to the audience, based on their designated roles and responsibilities. Records will be kept of the type of training and awareness creation provided, as well as containing the details of the attendees. The Contractor must compile a project-specific Environmental Training and Awareness Programme, taking into consideration the abovementioned factors, to be approved by the Engineer.

**(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.**

Site specific mitigation measures that have been incorporated in to the EMPr, must be considered as an essential tool, to ensure that the least adverse impact on the environment is caused as a result of the borrow pits and associated access roads. All employees must be able to have access to the EMPr, and the importance of the EMPr and mitigation measures contained in the EMPr should be emphasised during toolbox talks.

**k) Specific information required by the Competent Authority**

No specific information has been requested by the Competent Authority

### 3) UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports
- b) the inclusion of comments and inputs from stakeholders and I&APs ;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;

**-END-**

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# APPENDICES

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