WorleyParsons
resources & energy

EcoNomics

Environmental Management Plan

Borrow Pit G

232420PWE

COMPILED FOR:

Department of Mineral Resources

Vaal University of Technology Building, c/o Voortrekker & Margaretha Prinsloo Streets,

KLERKSDORP, 2570

Private Bag A 1, KLERKSDORP, 2570

Telephone: +27 (0) 18 487 9830
Facsimile: +27 (0) 18 462 9039

COMPILED BY:

WorleyParsons RSA (Pty) Ltd
Contact person: JC Pretorius
Cnr Corobay & Aramist Ave,
Waterkloof Glen, Pretoria, 0181,
South Africa
Telephone: +27 (0)12 425 6300
Facsimile: +27 (0)12 460 1336
email: jc.pretorius@worleyparsons.com
ABN 61 001 279 812

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PROJECT 232420PWE - ENVIRONMENTAL MANAGEMENT PLAN

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
A	DRAFT	JHINE	JCPretorius	N/A	2012-07-30	N/A	

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mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

NAME OF APPLICANT: North West Provincial Government Dept: Public Works; Road & Transport

REFERENCE NUMBER:

ENVIRONMENTAL MANAGEMENT PLAN

SUBMITTED

IN TERMS OF SECTION 39 AND OF REGULATION 52 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002,

(ACT NO. 28 OF 2002) (the Act)

STANDARD DIRECTIVE

Applicants for prospecting rights or mining permits, are herewith, in terms of the provisions of Section 29 (a) and in terms of section 39 (5) of the Mineral and Petroleum Resources Development Act, directed to submit an Environmental Management Plan strictly in accordance with the subject headings herein, and to compile the content according to all the sub items to the said subject headings referred to in the guideline published on the Departments website, within 60 days of notification by the Regional Manager of the acceptance of such application. This document comprises the standard format provided by the Department in terms of Regulation 52 (2), and the standard environmental management plan which was in use prior to the year 2011, will no longer be accepted.

IDENTIFICATION OF THE APPLICATION IN RESPECT OF WHICH THE ENVIRONMENTAL MANAGEMENT PLAN IS SUBMITTED.

ITEM	COMPANY CONTACT DETAILS
Name	Mr T Mthembu, North West Provincial Government, Department: Public Works; Roads and Transport.
Tel no	018 388 1395 / 2045
Fax no:	018 387 1395
Cellular no	
E-mail address	
Postal address	Modiri Molema Road, Old Parliament Complex, Mmabatho, 2735, Private Bag X 2080, Mmabatho.

ITEM	CONSULTANT CONTACT DETAILS (If applicable)
Name	Mr JC Pretorius - WorleyParsons RSA (Pty) Ltd
Tel no	+27 (0)12 425 6300
Fax no:	+27 (0)12 460 1336
Cellular no	0834 925 504
E-mail address	Jc.pretorius@worleyparsons.com
Postal address	Cnr Corobay & Aramist Ave, Waterkloof Glen, Pretoria, 0181, South Africa.

1 REGULATION 52 (2): DESCRIPTION OF THE ENVIRONMENT LIKELY TO BE AFFECTED BY THE PROPOSED PROSPECTING OR MINING OPERATION

This Environmental Management Plan (EMP) has been compiled for the development of Borrow Pit G. Borrow Pit G represents one of a total of five borrow pit sites that will be developed by the Department of` Public Works; Roads and Transport for the upgrade of the P12-2 (R34) Road between Schweizer Reneke and Vryburg, NW Province.

The site address is: Borrow Pit G, Moredou No. 395 – HO. (Grid Reference: 27° 9' 46.84" S, 25° 16' 36.72" E).

1.1 The environment on site relative to the environment in the surrounding area

The site is located approximately 10 metres north of the R 34 Road. Figure 1 illustrates the location of the proposed site relative to the R34 Road and environmental setting with respect to proximal land use. The site and surrounding land use are classified as agricultural. Visual signs of former borrow pit / quarrying activity is evident approximately 150 metres east of the proposed site and an assumed private airstrip is noted approximately 800 metres due east.

Site surface topography is relatively flat with an approximate natural gradient of 1:50 to 1:20. Groundcover within the proposed site and across the adjoining agricultural land is classified as primary Schweizer-Reneke Bushveld corresponding to the Eastern Kalahari Bushveld Bioregion. No threatened or near threatened species have been identified within the proposed site perimeter.

A detailed description of the environmental status is presented in the Ecological Evaluation and Specialist Heritage Impact Assessment reports, Appendix I.

Figure 1 Location and environmental setting for proposed Borrow Pit G.

1.2 The specific environmental features on the site applied for which may require protection, remediation, management or avoidance

Specialist Heritage Impact Assessment and Ecological Evaluation reports were conducted in the development of this EMP (Appendix I). The following summarises the findings of the surveys:

- No archaeological or heritage features were identified on or in close proximity to the site;
- The site is generally classified as low-medium ecological sensitivity with a central and north western portion which has been classified as highly sensitive for the following reasons:
    - The vegetation community and composition support a high species richness while approximately 60% of the basal cover is represented by late-successional taxa (e.g. Themeda triandra);

- The structure and floristic composition provides habitat for two near-threatened bird species (e.g. Short-clawed Lark Certhilauda chuana and Melodious Lark Mirafra cheniana);
- The study site support exceptional high densities of burrowing/fossorial mammal taxa (Aardvark, Cape Porcupine & Yellow Mongoose); and,
- The study site sustains prime examples of mature Acacia erioloba specimens.

- No threatened or near threatened species have been identified within the proposed site perimeter.

1.3 Map showing the spatial locality of all environmental, cultural/heritage and current land use features identified on site

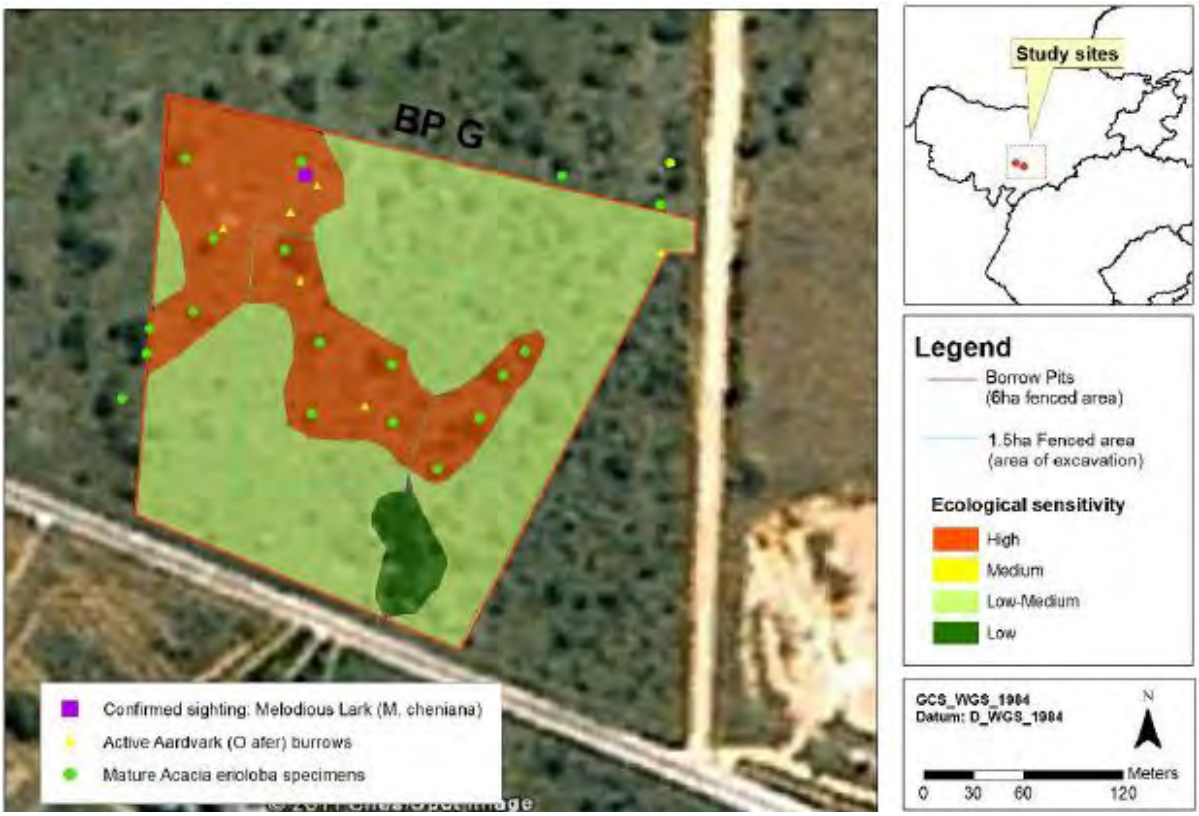

Figure 2 – Illustration of ecological sensitivity within the proposed site

1.4 Confirmation that the description of the environment has been compiled with the participation of the community, the landowner and interested and affected parties

WorleyParsons has identified the following as interested and affected parties within the participation process:

a) Site landowner: Mr H Kotze;

b) Farmsteads located within 1.5 kilometres of the proposed site;

c) North West Provincial Government, Department: Public Works; Roads and Transport;

d) Department of Mineral Resources (DMR);

e) Department of Economic Development, Environment, Conservation & Tourism (DEDECT);

f) South African Heritage Resource Agency (SAHRA);

g) Department of Agriculture, Forestry & Fisheries (DAFF);

h) Mamusa Local Municipality; and,

i) Dr Ruth S Mompati District Municipality.

The nearest residential community area of significance to Borrow Pit G is the town of Schweizer-Reneke, located 4 kilometres to the east. With due regard to the scale of the proposed operation, WorleyParsons considers the site to be practically isolated from Schweizer-Reneke and has therefore not entered into detailed public participation with the community.

Three farmsteads have been identified within 1.5 kilometres of the site; the closest of these is located some 50 metres due south of the site. Notice of intent to develop a borrow pit at the proposed location has been erected on the site. A copy of the notice is provided in Appendix II. Figure 3 illustrates the locations of identified farmsteads and access roads relative to Borrow Pit G.

Application for Environmental Authorisation was submitted to DEDECT on the 27th February 2012. (Ref: NWP/EIA/162/2011). Confirmation of receipt of the application was received by WorleyParsons on the 5th March 2012. DEDECT confirm that Authorisations will be processed through DMR however, DEDECT remain an interested party.

A copy of this draft report has been forwarded to all interested parties listed e to i above.

A copy of letters of notification and confirmation of receipt is provided in Appendix III.

Figure 3 Location of farmsteads identified within 1.5 kilometres of the proposed Borrow Pit site.

2 REGULATION 52 (2) (B): ASSESSMENT OF THE POTENTIAL IMPACTS OF THE PROPOSED PROSPECTING OR MINING OPERATION ON THE ENVIRONMENT, SOCIO- ECONOMIC CONDITIONS AND CULTURAL HERITAGE.

2.1 Description of the proposed prospecting or mining operation

Development of a Borrow Pit involving the mechanical excavation of naturally occurring gravels to be used for the upgrade of the P12-2 (R34) Road between Schweizer Reneke and Vryburg, NW Province. This site (Borrow Pit G) represents 1 of a total of 5 borrow pit sites to be used for the road upgrade. Approximately 17800 m^3 of gravel will be removed from Borrow Pit B using mechanical excavators, loaded direct to dump trucks and hauled offsite. Total excavation volume including overburden is approximated at 31400 m^3.

2.1.1 The main prospecting activities (e.g. access roads, topsoil storage sites and any other basic prospecting design features)

The main activities and design features associated with the development and operation of Borrow Pit G are summarised as follows:

- Prior to commencement of works vegetation strip will be conducted across the site area. Approximately 150 mm depth of surface soil / topsoil will be removed and temporarily stockpiled on site for subsequent site rehabilitation. Vegetation waste arising from the operation will be shredded and used on site as surface mulch material;
- Temporary stockpiling of overburden and waste rock, to be used for infill during site rehabilitation;
- Temporary mobile tool storage and hygiene facilities will be erected on site for the duration of the project;
- A designated temporary refuelling and fuel/oil storage area will be constructed during the site setup phase of works; and,
- The site is located on an unmade road proximal to the P12-2 (R34) Road. Proposed access location is illustrated on Drawing WSP, NWTR 133 07 P12-2 BP4, (Appendix IV).

2.1.2 Plan of the main activities with dimensions

As built drawings are presented as Drawings WSP, NWTR 133 07 P12-2 BP4 (Appendix IV).

2.1.3 Description of construction, operational, and decommissioning phases

The quarrying operation will broadly consist of the following four phases:

- Phase 1 - Site establishment;
- Phase 2 - Quarrying;
- Phase 3 - Decommissioning; and,
- Phase 4 - Site rehabilitation and reinstatement.

The purpose of the quarrying operation is solely to provide aggregate material for the upgrade of the P12-2 (R34) Road between Schweizer Reneke and Vryburg (Section 1). At this stage a final programme and timeframe for the upgrade works has not been finalised; it is envisaged however that the works will commence in June 2013 and extend over a period of approximately 30-months.

A summary of the various activities and timeframes associated with the quarrying operation follows. Potential impacts identified for the various phases and activities are discussed in detail in Section 2.2 of this document.

Site establishment

Construction and enabling works will consist of the following activities:

- Erection of temporary perimeter fence (diamond mesh on steel posts) and signage;
- Vegetation clearance and mulching;
- Surface soil strip across the whole of the site;
- Construction of temporary vehicular and pedestrian access route between the unmade road and the site.
- Erection of a temporary site office and hygiene facilities;
- Construction of a temporary refuelling and fuel/oil storage area; and,
- Stockpiling of vegetation mulch and surface soils / topsoil.

The site establishment phase of works will extend over a period of approximately 5 working days.

Quarrying operation

The quarrying operation will consist of the following activities:

- Extraction of natural gravels from a predefined area using mechanical excavators;
- Temporary stockpiling of quarried gravels suitable for road improvement works;

- Temporary stockpiling of quarried materials considered unsuitable for road improvement works; and,
- Loading of suitable quarried materials to haulage wagons for offsite use;

It is noted that quarrying techniques will be limited to mechanical extraction; blasting or other forms of quarrying will not be employed.

Decommissioning

Decommissioning will be carried out on completion of the quarrying operation and will consist of the following activities:

- Removal of temporary facilities and structures;
- Removal and appropriate disposal of waste materials;
- Removal of quarrying plant and equipment; and,
- Removal of temporary perimeter fencing and signage.

The decommissioning phase of works will take approximately 5 working days to complete.

Rehabilitation

On completion of works, the quarried open void will be reshaped to allow free drainage. Quarry walls will be battered back to 45 degrees or alternatively terraced to improve wall stability, reduce potential erosion and minimise health and safety risk. It is not envisaged that the void space will be backfilled and reinstated with imported fill material.

The remainder of the site will be re-graded and surfaced with previously stockpiled surface soils and mulch material. The site will be re-vegetated with species indigenous to primary Schweizer-Reneke Bushveld (Section 1.1).

It is envisaged that the rehabilitation phase of works will be completed over a period of 4-weeks. Post rehabilitation vegetation monitoring will be conducted over a period of 24-months. The works are summarised as follows:

- Reshaping of the open void space;
- Re-grading and resurfacing of the site;
- Re-planting; and,
- Post rehabilitation monitoring.

2.1.4 Listed activities (in terms of the NEMA EIA regulations)

Table A summarises all listed activities in terms of the relevant NEMA EIA regulations.

Table A

Regulation	Number	Listed Activity
GN No. R544, 18 June 2010	20	The development and operation or renewal of borrow pits for the roads upgrade of Road P12-2 which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

2.2 Identification of potential impacts

2.2.1 Potential impacts per activity and listed activities

The potential environmental impacts arising from all four phases of the operation have been identified as:

1. Dust generation and settlement arising from the quarrying operation and movement of plant and vehicles;
2. Noise disturbance arising from the use of heavy plant and machinery;
3. Potential hydrocarbon contamination of soils arising from refuelling operations, fuel and oil storage and leakage from plant and machinery;
4. Vehicle and plant exhaust emissions; and,
5. Destruction of flora and fauna habitats, arising from vegetation strip and quarrying activities. These consist off the following:
    - Removal of mature Acacia erioloba within the central and northwest portions of the site. A erioloba is listed by the National Forests Act, 1998 as a declared protected tree species;
    - Removal of burrows and habitat frequented by Aardvark (Orycteropusafer), Cape Porcupine (Hystrix africaaustralis) and Yellow Mongoose (Cynictis penicillata);
    - Destruction of Hypoxis hemerocallidea; and,
    - The destruction of habitats for two near-threatened bird species (e.g. Short-clawed Lark Certhilauda chuana and Melodious Lark Mirafra cheniana).

Table B summarises the potential environmental risks and impacts associated with the various phases and tasks associated with the quarrying operation.

Table B

Phase	Activity	Potential impact
Phase 1 Site establishment	Vegetation clearance and surface soils strip	• Dust generation and settlement • Removal of mature Acacia erioloba within the central portion of the site • Removal of habitats frequented by burrowing mammals • Destruction of Hypoxis hemerocallidea • The destruction of habitats for two near-threatened bird species • Noise disturbance • Hydrocarbon contamination of surface soils • Exhaust emissions
	Construction of temporary access route	
Phase 2 Quarrying	Extraction of gravels	• Dust generation and settlement • Noise disturbance • Hydrocarbon contamination of surface soils • Exhaust emissions
	Stockpiling	
	Loading and offsite haulage	
Phase 3	Removal of facilities	• Noise disturbance

Phase	Activity	Potential impact
Decommissioning	Removal of plant and equipment	• Hydrocarbon contamination of surface soils • Exhaust emissions
	Removal of waste materials	
Phase 4 Rehabilitation	Reshaping of open void space	• Dust generation and settlement • Noise disturbance
	Re-grading and resurfacing	• Hydrocarbon contamination of surface soils • Exhaust emissions

2.2.2 Potential cumulative impacts

No significant cumulative impacts have been identified relating to any of the four phases of the proposed quarrying operation.

Dust arising from the quarrying operation will have some minor cumulative effect with respect to dust generated during upgrade of the P12-2 (R34) Road. However, proposed dust mitigation measures (Section 3.2) will reduce dust concentrations from the quarrying operation to acceptable levels and residual dust concentrations will be insignificant in the context of the broader road upgrade project. Cumulative dust impact is therefore not considered significant and not discussed further in the document.

Some visual cumulative impact may occur as a result of the close proximity of the site to former borrow pit activity however, this will be a short-term impact and the proposed rehabilitation plan for the site will reduce visual impact significantly.

2.2.3 Potential impact on heritage resources

A heritage assessment was conducted by specialist consultants as part of the development of this EMP. The assessment was carried out in accordance with the requirement to involve and liaise with external stakeholders, landowners, local communities and SAHRA. No cultural, archaeological or heritage resources were identified on the site or within close proximity to the site during the study. Results of the study are presented in Appendix I.

2.2.4 Potential impacts on communities, individuals or competing land uses in close proximity

It is considered that the development of Borrow Pit G will have negligible impact on communities, individuals and competing land use within close proximity to the quarrying activity for the following reasons:

- Any impacts arising from the operation will be minimal and localised. The greatest risks/impacts arising from the operation have been identified as dust deposition and noise (Section 2.2.1). The site is located some 4 kilometres from the town of Shweizer-Reneke and therefore the quarrying operation is considered for practical purposes to be isolated from the nearest large community;
- The quarrying operation will be carried out over a relatively short time period (approximately 12-24 months duration). The impact of noise and dust deposition arising from the operation is therefore considered to be a short-term impact;
- Cumulative impacts have been assessed and are considered negligible; Impacts arising from both dust and noise disturbance are relatively small when compared to the potential impacts of the broader road upgrade project;
- A number of farmsteads have been identified within 1.5 kilometres of the site (Figure 3); the nearest of these is located approximately 50 metres from the proposed site. An arbitrary 1.5 kilometres radius of the site has been adopted and is considered to be a conservative figure with respect to the spatial extent of impact. The EMP has been developed in consultation with the local farming community who are aware of the possibility of nuisance noise and dust during the works. Generally it is considered that the long-term benefit of road upgrade outweigh the short-term impacts of noise disturbance. Noise mitigation measures will be implemented to reduce nuisance to an acceptable level (Section 3).
- The proposed operation is not considered to compete for land use for the following reasons:
    - The site footprint is relatively small (site footprint approximately 63540 m^2; borrow pit footprint approximately 14870 m^2) relative to the wider agricultural land use within the area;
    - Farming practices on adjacent agricultural land can continue up to the site perimeter undisturbed during the quarrying operation;
    - The proposed site footprint is relatively small in the context of the broader Schweizer-Reneke Bushveld which is well represented across the region (Section 1.2); and,
    - The site will be reinstated to Schweizer-Reneke Bushveld biome for agricultural end use within 24-months of inception of rehabilitation.

2.2.5 Confirmation that the list of potential impacts has been compiled with the participation of the landowner and interested and affected parties

The list of potential impacts summarised in Section 2.2.1 has been compiled with the participation of the landowner and the farming community located within a 1.5 kilometre radius of the site (Figure 3). Written communication describing the proposed activities and the potential impacts arising from the activities was forwarded to all potentially affected parties. A copy of the communications along with comments received is presented in Appendix III.

2.2.6 Confirmation of specialist report appended

A copy of the Heritage Assessment Report (Section 2.2.3) and the Ecological Evaluation Report (Section 1.2) are presented in Appendix I.

3 REGULATION 52 (2) (C): SUMMARY OF THE ASSESSMENT OF THE SIGNIFICANCE OF THE POTENTIAL IMPACTS AND THE PROPOSED MITIGATION MEASURES TO MINIMISE ADVERSE IMPACTS.

3.1 Assessment of the significance of the potential impacts

The following sections summarise our adopted assessment criteria and the derivation of potential risk and environmental impact severity.

3.1.1 Criteria of assigning significance to potential impacts

The following provides an overview of the key parameters used for assigning environmental impact severity arising from the Borrow Pit G project. This approach is discussed in more detail in Appendix V.

1. **Status of impacts** – determines whether the potential impact is positive (positive gain to the environment), negative (negative impact on the environment), or, neutral (i.e. no cost or benefit to the environment);
2. **Spatial scale of impacts** – determines the extent of the impact on a scale of localised to global effect. Potential impact is expressed numerically on a scale of 1 to 4;
3. **Temporal scale of impacts** – determines the extent of the impact in terms of timescale and longevity. Potential impact is expressed numerically on a scale of 1 to 4;
4. **Probability of impacts** – quantifies the impact in terms of the likelihood of the impact occurring on a percentage scale of 0% to > 90%;
5. **Severity of impacts** – quantifies the impact in terms of the magnitude of effect on environment (receptor) and is derived by consideration of points 1, 2 and 3 above. For this particular study, a conservative approach is adopted for severity (e.g. where spatial impact was considered to be 2 and temporal impact was considered to be 3, a value of 3 would be adopted for severity of impact); and,
6. **Calculated impact** – determines the overall impact on (or risk to) a specified receptor and is calculated as: the product of the probability (P) of the impact occurring and the severity (S) of the impact if it were to occur (Impact = P × S). This is a widely accepted methodology for calculating risk.

3.1.2 Potential impact of each main activity in each phase, and corresponding significance assessment

Table C summarises the significance of impacts for the various activities listed in Table B. Detailed discussion of how a value for significance is derived is presented in Appendix V.

Table C

Activity	Potential Impact	Significance
• Vegetation clearance and surface soils strip • Construction of temporary access route	Removal of mature Acacia erioloba	High
	Removal of habitats frequented by burrowing mammals	Medium-High
	Destruction of Hypoxis hemerocallidea	High
	The destruction of habitats for two near-threatened bird species	High
	Dust generation and settlement	Medium-High
	Noise disturbance	Medium
	Hydrocarbon contamination of surface soils	Medium
	Exhaust emissions	Medium-High
• Extraction of gravels • Stockpiling • Loading and offsite haulage • Removal of facilities • Removal of plant and	Removal of mature Acacia erioloba within the north western portion of the site	High
	The destruction of habitats for two near-threatened bird species	High

Activity	Potential Impact	Significance
equipment • Removal of waste materials • Reshaping of open void space • Re-grading and resurfacing	Destruction of Hypoxis hemerocallidea	High
	Dust generation and settlement	Medium-High
	Noise disturbance	Medium
	Hydrocarbon contamination of surface soils	Medium
	Exhaust emissions	Medium-High

3.1.3 Assessment of potential cumulative impacts

No cumulative impacts have been identified for this project (Section 222).

3.2 Proposed mitigation measures to minimise adverse impacts

3.2.1 List of actions, activities, or processes that have sufficiently significant impacts to require mitigation

Significant impacts (i.e. impacts with a medium or high significance are tabulated in Table C (Section 3.1.2) and in Table D alongside recommended mitigation measures (Section 3.2.2).

3.2.2 Concomitant list of appropriate technical or management options

Table D summarises proposed mitigation measures and the perceived impact on environment, pre and post mitigation where:

- Impact is the perceived impact pre-mitigation;

- Residual impact is the level of impact remaining post-mitigation;
- L = low impact;
- ML = medium/low impact;
- M = medium impact; and,
- MH = medium/high impact.

Table D

Potential impact	Impact	Mitigation measure	Residual impact
Removal of mature Acacia erioloba	H	• Where reasonably practicable, minimise quarrying activity within the northern portion of the site to conserve habitats • Create a fenced protection zone around the remaining north western portion of the site and protect habitats in this area • Redesign access roads and stockpiling areas (where reasonably practicable) to avoid encroachment into the northern western portion of the site • Remove Hypoxis hemerocallidea from areas of risk and relocate to a suitable area within or outside the site. This work should be undertaken under the supervision of a specialist consultant	
Removal of habitats frequented by burrowing mammals	MH		
Destruction of Hypoxis hemerocallidea	H		
The destruction of habitats for two near-threatened bird species	H		

Potential impact	Impact	Mitigation measure	Residual impact
		• Implementation of an appropriate rehabilitation and replanting scheme • Conduct vegetation and surface soil removal carefully and with due care for burrowing mammals and relocate any mammals encountered to an appropriate local habitat	
Dust generation and settlement	MH	• Dust suppression (where appropriate) • Vehicle speed restrictions • Nuisance dust monitoring (as considered necessary by the RE)	M
Noise disturbance	M	• Maintain plant in good working order • Ensure silencers / baffles are fitted and fit for purpose • Speed restrictions • Switch off all plant when not in use • Limit noisy operations between the hours of 07:00 and 17:30 • Nuisance noise monitoring (as considered necessary by the RE)	M
Hydrocarbon contamination of surface soils	M	• Construction of a bunded fuel & oil storage area	L

Potential impact	Impact	Mitigation measure	Residual impact
		• Designated refuelling area • Provision of spill kits at fuel storage and fuelling areas and on all plant • Housekeeping - clean up all spillages and dispose of contaminated material appropriately	
Exhaust emissions	MH	• Maintain plant in good working order • Vehicle speed restrictions • Switch off all plant when not in use • Ensure all plant is routinely serviced	M

3.2.3 Review the significance of the identified impacts

Table D (Section 3.2.2) provides a summary of identified pre-mitigation impact significance relative to post-mitigation impact significance (i.e. residual impact significance following implementation of recommended mitigation measures).

The methodology used to quantify both pre-mitigation and residual impact is presented in Appendix V.

4 REGULATION 52 (2) (D): FINANCIAL PROVISION. THE APPLICANT IS REQUIRED TO-

4.1 Plans for quantum calculation purposes

As Built Drawing NWTR 133 07 P12-2 BP4 (Appendix IV) provides the following information with respect to site location, aerial extent and anticipated activities associated with the quarrying operation. These are briefly summarised as follows:

- Site location;
- Area of site (6.354 ha);
- Area to be excavated (1.487 ha);
- Location of designated topsoil stockpiling areas;
- Location of temporary structures; and,
- Site access location point.

4.2 Alignment of rehabilitation with the closure objectives

The post closure objective for Borrow pit G is to return the site, as far as is reasonably practicable, to its original condition. Detailed post closure rehabilitation planning will be developed to achieve these criteria and broadly considers the following:

- Reshaping of the open void space;
- Re-grading and resurfacing of the site;
- Re-planting of native flora; and,
- Post rehabilitation monitoring.

Refer to Section 2.1.3 for additional detail.

4.3 Quantum calculations

The estimated cost of the project is reflected in the Financial and Technical Competence Report contained in Appendix VI.

4.4 Undertaking to provide financial provision

Should the authorisation for the proposed project be granted it is anticipated that for the successful completion of the project an estimated amount of R 326000 will be required. The proof of the availability of the required funds is contained in Appendix VII.

5 REGULATION 52 (2) (E): PLANNED MONITORING AND PERFORMANCE ASSESSMENT OF THE ENVIRONMENTAL MANAGEMENT PLAN

5.1 List of identified impacts requiring monitoring programmes

The following list summarises potential impacts requiring monitoring:

- Dust generation and settlement;
- Potential noise disturbance to local farming communities located within 1.5 kilometres of the site. 1.5 kilometres is considered to be a conservative figure with respect to the spatial extent of impact; and
- Post closure re-vegetation of the site.

Refer to Section 2.2.4 and Table B.

5.2 Functional requirements for monitoring programmes

The following provides an overview of the proposed approach and methodology for noise, dust and re-vegetation monitoring.

Nuisance dust monitoring – Pre-Closure

Ambient dust monitoring using standard dust bucket monitoring techniques should be conducted at a single monitoring location for a 4-week period prior to commencement of site establishment to provide baseline dust levels. Dust samples will be analysed offsite by an accredited commercial laboratory. Additional dust monitoring should be carried out during the course of works as considered necessary and at the discretion of the RE.

Suggested locations for establishment of dust monitoring stations are the southern and northern perimeters of the site and approximately 50 m south, within the grounds of the nearest identified farmstead. Final location of the baseline monitoring station will depend on prevailing conditions and is at the discretion of the RE. The proposed location of dust monitoring stations is illustrated on Figure 4.

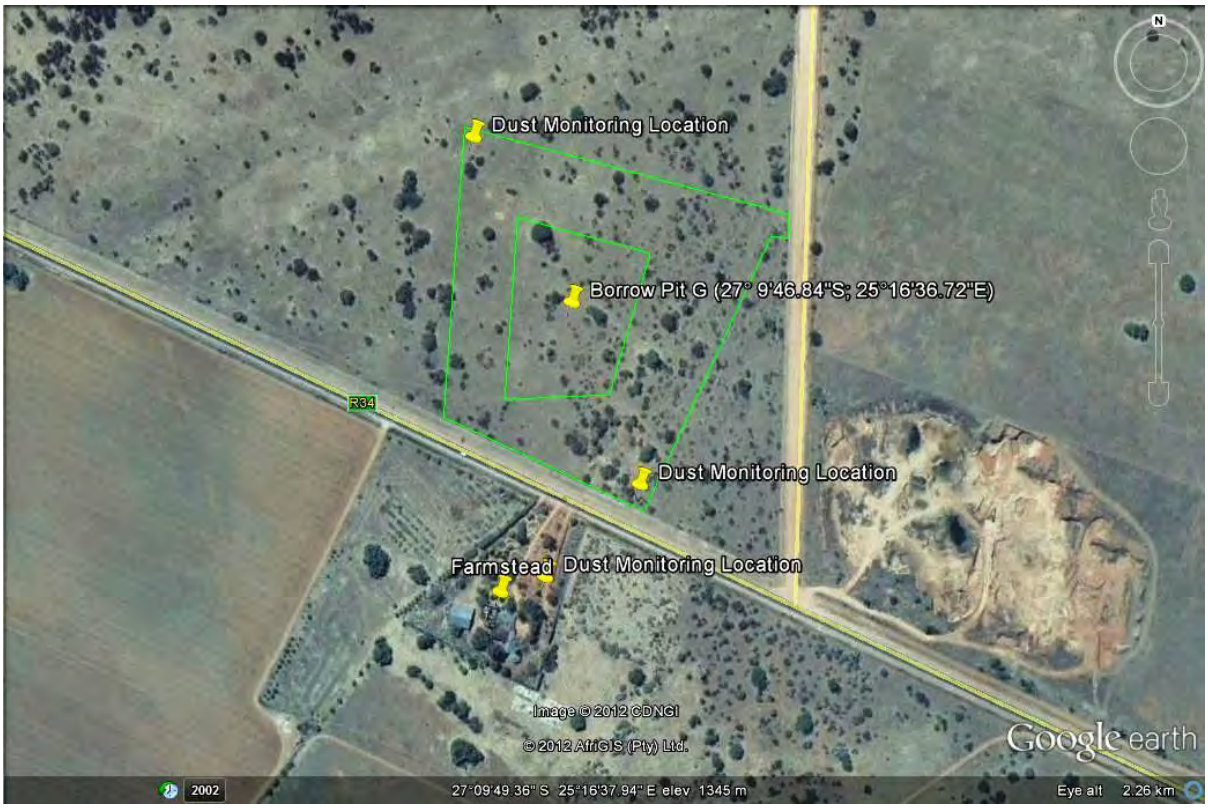

Figure 4 Location of nuisance dust monitoring stations on the northern and southern site perimeter and approximately 0.5 kilometres west of the site, in the direction of the nearest neighbouring property.

Noise monitoring – Pre-closure

Noise monitoring will be carried out as considered necessary and at the discretion of the Resident Engineer.

Re-vegetation monitoring – Post-closure

Post-closure vegetation monitoring will be carried out by a suitably qualified ecologist over the initial 24-month post rehabilitation period to determine the success of site re-vegetation. Monitoring will consist of 4 site visits at approximate 6-monthly intervals.

5.3 Roles and responsibilities for the execution of monitoring programmes

It is the responsibility of the Principal Contractor to ensure that monitoring strategies are implemented in accordance with the requirements of the EMP. The Principal Contractor will provide a suitably qualified and experience Environmental Officer to manage all environmental site issues.

5.4 Committed time frames for monitoring and reporting

Time frames for monitoring are discussed in Section 5.2 and summarised as follows:

- **Dust monitoring** – Ambient dust monitoring will be conducted prior to commencement of works to determine baseline levels. Additional site boundary and / or offsite monitoring will be conducted at the discretion of the RE. Dust samples will be collected and analysed routinely and comparison of results to baseline values will be carried out by the Principal Contractors representative as soon as possible following receipt of results from the laboratory. Results, inferences and recommendations will be reported to the client in an agreed format on a monthly basis.
- **Noise monitoring** – Ambient noise monitoring will be carried out during the works as considered appropriate and at the discretion of the RE. Results, inferences and recommendations will be reported to the client in an agreed format on a monthly basis or as required.
- **Re-vegetation monitoring** – Vegetation monitoring will be carried out over the first 24-month post closure period. Findings will be reported to the client in an agreed format within 4-weeks following each site visit.

6 REGULATION 52 (2) (F): CLOSURE AND ENVIRONMENTAL OBJECTIVES.

6.1 Rehabilitation plan

Refer to Section 4.1, As Built Drawing NWTR 133 07 P12-2 BP3 (Appendix IV).

6.2 Closure objectives and their extent of alignment to the pre-mining environment

Refer to Sections 2.1.3, Rehabilitation and Section 4.2

6.3 Confirmation of consultation

Environmental objectives, in relation to closure and rehabilitation of Borrow Pit G, have been developed in consultation with all interested and affected parties. Section 1.4 provides a detailed description of all stakeholders involved in the consultation process.

7 REGULATION 52 (2) (G): RECORD OF THE PUBLIC PARTICIPATION AND THE RESULTS THEREOF

7.1 Identification of interested and affected parties

7.1.1 Name the community or communities identified, or explain why no such community was identified

A detailed description of all identified stakeholders and communities is presented in Section 1.4.

- The nearest residential community of significance to Borrow Pit G is the town of Schweizer-Reneke, located 4 kilometres to the east. WorleyParsons considers the site to be practically isolated from this community and has therefore not entered into detailed public participation with the community (Section 1.4).
- Three farmsteads have been identified within 1.5 kilometres of the site; the closest of these is located some 50 metres due south (Section 1.4, Figure 3).

7.1.2 Specifically state whether or not the community is also the landowner

The landowner does not represent the community per se; however the landowner has been identified as a member of the affected community since the landowner will retain the site post-rehabilitation.

7.1.3 State whether or not the Department of Rural Development and Land Reform has been identified as an interested party

The Department of Rural Development and Land Reform has been identified as an interested party (Section 1.4).

7.1.4 State specifically whether or not a land claim is involved

A land claim is not involved in this process.

7.1.5 Name the Traditional Authority identified

A Traditional Authority has not been identified as an interested party and does not form part of the stakeholder engagement process.

7.1.6 List the landowners identified by the applicant (Traditional and Title Deed owners)

The Title Deed Owner is:

- Mr H Kotze, PO Box 323, Schweizer Reneke, 2780.

7.1.7 List the lawful occupiers of the land concerned

The land is currently designated as unoccupied agricultural land.

7.1.8 Explain whether or not other persons (including on adjacent and non-adjacent properties) socio-economic conditions will be directly affected by the proposed prospecting or mining operation and if not, explain why not

It is considered that the proposed quarrying operation will not directly affect the socio-economic conditions of any person (other than the current land owner) for the following reasons:

- The size of the operation is relatively small-scale; minimal environmental impacts and environmental receptors have been identified within 1.5 kilometres of the site (Tables A, B & C & Figure 3);
- The duration of the operation is over a relatively short timescale (approximate 12-24 month period).
- Adjacent land use has been identified as agricultural. Farming practices will be able to continue uninterrupted to the site perimeter;
- Land use within 1.5 kilometres of the site has been identified as agricultural;
- Operations will not directly impact on users of the R34 Road;
- Operations will not impact on water resources;
- Operations will have minimal impact on local air quality; and,
- A 24 hour security presence will be onsite for the duration of the works and will ensure security of site plant and equipment, site boundary fences and proximal and adjoining land.

Refer to Section 2.2.4 for further detail.

7.1.9 Name the local Municipality

The local municipality is: Mamusa Local Municipality

7.1.10 Name the relevant government departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project

Relevant government departments, regulatory bodies identified as stakeholders and interested parties have been identified in Section 1.4. These are:

- North West Provincial Government, Department: Public Works; Roads and Transport;
- Department of Mineral Resources (DMR);
- Department of Economic Development, Environment, Conservation & Tourism (DEDECT);
- South African Heritage Resource Agency (SAHRA);
- Department of Agriculture, Forestry & Fisheries (DAFF);
- Mamusa Local Municipality; and,
- Dr Ruth S Mompati District Municipality.

7.1.11 Submit evidence that the landowner or lawful occupier of the land in question, and any other interested and affected parties including all those listed above were notified

All identified interested and affected parties are discussed in Section 1.4. Letters of notification of the proposed works were issued to all identified stakeholders and copies are presented in Appendix III.

7.2 The details of the engagement process

7.2.1 Description of the information provided to the community, landowners, and interested and affected parties

Information provided to the community and interested and affected parties is summarised as follows:

- Written notification to all landowners, local municipalities and government institutions;
- Notice of intent erected on each site location; and,
- Personal visits and communication to landowners and neighbours identified as interested and affected parties.

Copies of all notification are presented in Appendix III and a copy of notice of intent is presented in Appendix II.

7.2.2 List of which parties identified in 7.1 above that were in fact consulted, and which were not consulted

All interested parties listed in Sections 1.4 and 7.1.11 were consulted during the stakeholder engagement process.

7.2.3 List of views raised by consulted parties regarding the existing cultural, socio-economic or biophysical environment

Refer to Appendix VIII (Meeting Minutes) for a list of issues raised during the stakeholder engagement process.

7.2.4 List of views raised by consulted parties on how their existing cultural, socio-economic or biophysical environment potentially will be impacted on by the proposed prospecting or mining operation

Refer to Appendix VIII (Meeting Minutes) for a list of issues raised during the stakeholder engagement process.

7.2.5 Other concerns raised by the aforesaid parties

Refer to Appendix VIII (Meeting Minutes) for a list of issues raised during the stakeholder engagement process.

7.2.6 Confirmation that minutes and records of the consultations are appended

A record of all meetings undertaken with the interested and affected parties (discussed in Sections 1.4 and 7.1.11) are presented in Appendix VIII

7.2.7 Information regarding objections received

No objections to the proposed works have been received to date.

7.3 The manner in which the issues raised were addressed

No objections to the proposed works have been received to date.

8 SECTION 39 (3) (C) OF THE ACT: ENVIRONMENTAL AWARENESS PLAN

8.1 Employee communication process

The following outlines our approach for communicating environmental risk and promoting risk awareness at all levels within the project team. This approach is overarching and applied to both full time and part time staff, contractors and subcontractors and site visitors.

- **Site induction** – All employees and site visitors are required to attend a site induction. The induction process covers both health and environmental risk and ensures that all parties are aware of the project HSE objectives and company and individual responsibilities in achieving these goals.
- **Toolbox talks** – will be provided to all staff on a routine basis to ensure that they remain aware of project goals, are informed of newly identified risk resulting from changes in project scope, methodology or changing environmental conditions. The Toolbox talks will provide individuals with an opportunity to ask questions raise HSE issues and report unsafe actions, behaviour or conditions. The meetings will also provide all parties with an opportunity for recommendations to improve on existing environmental procedures.
- **Formal reporting procedures** – will be implemented for the reporting of environmental incidents, accidents and near misses;
- **Environmental emergency response procedures** – will be developed for the rapid and safe management of environmental risk. It is envisaged that these will focus on nuisance dust management and management of fuel and fuel oil spillage. Emergency response procedures will be available for view on site and will be discussed during site induction;
- **Job Hazard Assessments (JHA), Risk Assessment and Method Statements** – will be developed for all site operations. These will consider the potential impact (and management of impact) on the environment arising from individual job tasks.

8.2 Description of solutions to risks

Environmental risks arising from specified operations, jobs and job tasks will be identified during an initial Job Hazard Assessment and appropriate Risk Assessments and Method Statements will be developed to reduce and appropriately manage the resulting residual risk.

All works will be carried out in accordance with the specified method statement and in accordance with the requirements of the broader EMP. Where a change to job methodology

or working practice is required, re-evaluation of environmental risks will be carried out and risk assessments appropriately revised to capture and reflect the changes. Where these changes or risks are considered significant, they will be communicated to the project team via Toolbox Talks.

All team members will be conversant with emergency response and incident reporting procedures and the implementation thereof in the event of an environmental incident.

The key risks identified within this EMP are dust generation from the quarrying operation, accidental spillage of fuel and fuel oil and fugitive exhaust emissions. Evaluation of risk associated with these hazards and the proposed mitigation options to reduce and effectively manage environmental risk are presented in Section 3.1.2, Table C and Section 3.2.2, Table D.

8.3 Environmental awareness training

In-house and on the job environmental awareness training will be provided to all site personnel as required and at a level that is appropriate to previous experience and position within the project team. This would most likely be accomplished through toolbox talk and routine HSE briefing sessions. It is envisaged that training will include (but may not be limited to):

- General environmental awareness and hazard spotting;
- Emergency response and incident reporting procedures;
- Proper use of emergency response equipment and risk mitigation measures e.g., spill kits, fire extinguishers dust suppression;
- Proper use of spillage containment equipment e.g., drip trays and bunding
- Good housekeeping and safe working practices e.g., appropriate fuel, oil and chemicals storage and appropriate fuelling practices; and,
- The importance of routine plant and equipment inspection, maintenance and repair.

9 SECTION 39 (4) (A) (III) OF THE ACT: CAPACITY TO REHABILITATE AND MANAGE NEGATIVE IMPACTS ON THE ENVIRONMENT

9.1 The annual amount required to manage and rehabilitate the environment

The Principal Contractor appointed by the Provincial Roads Department will be required to (under the project terms of reference) capture the cost of environmental management and rehabilitation within the final project bill of quantities. The principal contractor should consider the following as a minimum environmental management requirement for costing purposes:

- Development of emergency response procedures document;
- Construction of a bunded fuelling and storage area;
- Appropriate waste disposal;
- Safety equipment – fire extinguishers, spill kits, drip trays etc;
- Water bowser or alternative for dust suppression (as required);
- Hire of dust monitoring equipment;
- Noise monitoring (as required);
- Lab analysis on dust samples;
- Evaluation of data and reporting;
- Re-grading and reshaping of site and reestablishment of top soil;
- Re-vegetation planting;
- Initial inspection of completed site by ecologist;
- Visits by ecologist to monitor plant growth progress; and,
- Final ecologists close out report.

9.2 Confirmation that the stated amount correctly reflected in the Prospecting Work Programme as required

In accordance with regulatory requirements; adequate financial provision will be included in the project budget for appropriate environmental management of the site and prescribed operations, and, for post-closure rehabilitation of Borrow Pit G.

10 REGULATION 52 (2) (H): UNDERTAKING TO EXECUTE THE ENVIRONMENTAL MANAGEMENT PLAN

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) in that regard, and the applicant undertakes to execute the Environmental management plan as proposed.

Full Names and Surname	
Identity Number	

-END-

Appendix I

AN ECOLOGICAL EVALUATION OF THE PROPOSED ROAD P12-2 BORROW PITS, SCHWEIZER-RENEKE, NORTH WEST PROVINCE

Prepared for:

WorleyParsons RSA (Pty) Ltd

160 Garstfontein Road
Ashlea Gardens
Pretoria
0081

Compiled by:

Pachnoda Consulting cc

PO Box 72847
Lynwood Ridge
Pretoria
0040

October 2011

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1. INTRODUCTION

The increase in human demand for space and life-supporting resources resulted in a rapid loss of natural open space in South Africa. When open space systems are rezoned for development, indigenous fauna and flora are replaced by exotic species and converted to sterile landscapes with no dynamic propensity or ecological value (Wood *et al.,* 1994). Additionally, mining and urban development have rarely focussed on decisive planning to conserve natural environments, while little thought was given to the consequences on the ecological processes of development in highly sensitive areas.

Transformation and fragmentation are not the only results of unplanned and intended developments, the loss of ecosystem functioning and ultimately the local extinction of species can also result. Therefore, careful planning will not only preserve rare and endemic fauna and flora, but also the ecological integrity of ecosystems on the landscape level, which is imperative for the continuation of natural resources, such as fossil fuels, water and soils with high agricultural potential.

In 1992, the Convention of Biological Diversity, a landmark convention, was signed by more than 90 % of all members of the United Nations. The enactment of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), together with the abovementioned treaty, focuses on the preservation of all biological diversity in its totality, including genetic variability, natural populations, communities, ecosystems up to the scale of landscapes. Hence, the local and global focus changed to the sustainable utilisation of biological diversity.

1.1 Background

Pachnoda Consulting CC was requested by WorleyParsons RSA (Pty) Ltd on behalf of the North West Provincial Government: Department of Public Works, Roads and Transport to provide an ecological evaluation on five borrow pits located north-west of Schweizer-Reneke, North West Province.

1.2 Terms of Reference

The terms of reference for the evaluation are to:

- provide a description of the dominant vegetation and faunal communities on each borrow pit;
- conduct a survey of threatened, "near-threatened" and conservation important species on each proposed borrow pit;
- provide an indication on the relative biodiversity importance and ecological function of each borrow pit (to be incorporated into a sensitivity map); and
- provide recommendations and ecological mitigation measures for the proposed development, if ecologically viable.

2. BACKGROUND INFORMATION

2.1 Location

The five proposed borrow pits are situated north-west of Schweizer-Reneke and are located along the R 34 road (main Vryburg-Schweizer-Reneke road) (Figure 1). The borrow pits are situated between 6 km and 29 km respectively from Schweizer-Reneke.

According to the cadastral information, the borrow pits are located on the remainder of Portion 4 of the Farm Zoet en Smart 31 HO, the remainder of Portion 9 of the Farm Damplaats 38 HO, Portion 4 of the Farm Lot 9 63 HO and on the Farm Moredou 395 HO.

2.2 Land Use and existing infrastructure

The borrow pits correspond to three broad land cover classes which can be described as natural thicket and bushland (BP B & BP C), cultivated land (BP E & BP G) as well as natural grassland (BP F) (Figure 2). Those located on thicket and bushland (BP B & BP C) are represented by unmodified vegetation reminiscent of Schweizer-Reneke Bushveld (see below), while the floristic composition on the remaining pits has been shaped by neighbouring post-anthropogenic activities and grazing regimes. Part of Borrow Pit F and G were previously mined as evidenced by existing areas of excavation.

2.3 Biophysical Description

2.3.1 Climate

The climate is earmarked by summer rainfall with very dry winters. The average annual precipitation varies from 400 to 520 mm. The mean annual temperature is 17.1ºC with frequent occurrence of frost in winter (Mucina and Rutherford, 2006).

2.3.2 Geology

Borrow pits C, B and E is underlain by andesite of the Platberg Group (Randian Erathem), while the underlying geology of BP G and BP F consists of Swazian granite and Bothaville arenite (Platberg Group) respectively.

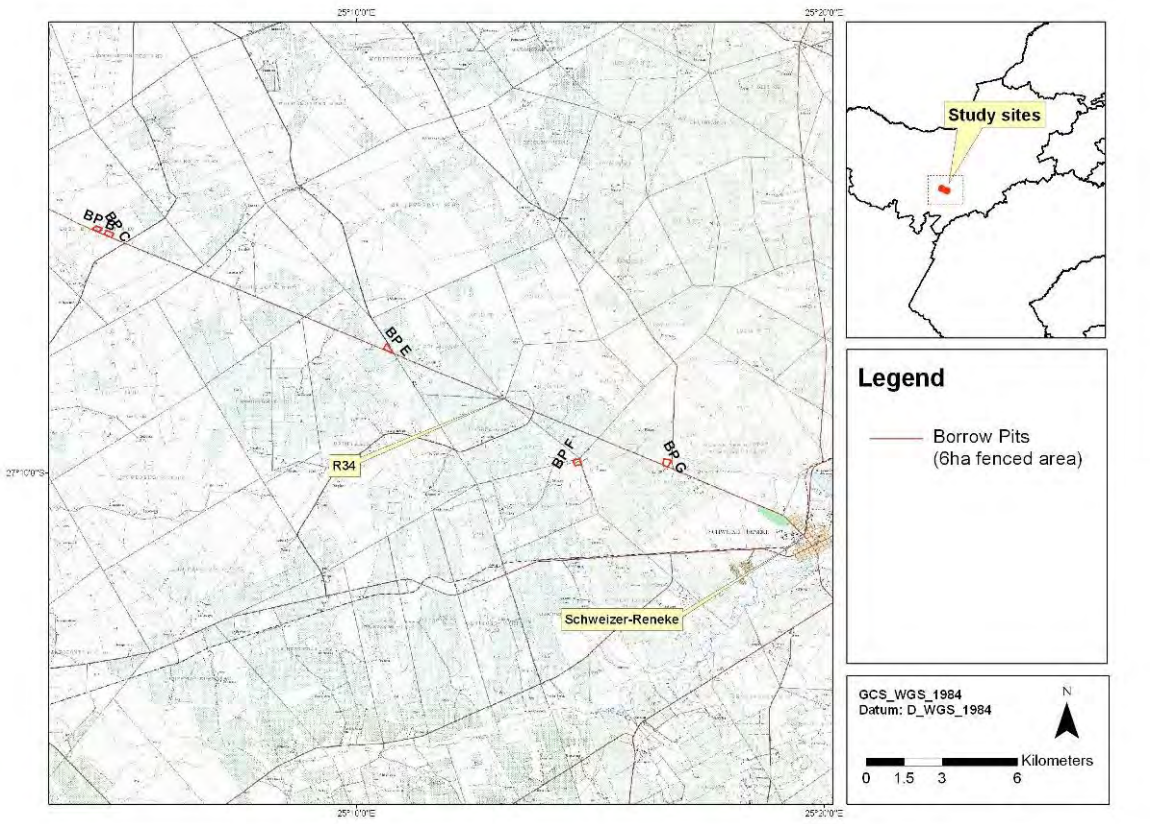


Figure 1: A locality map illustrating the geographic position of the borrow pits.

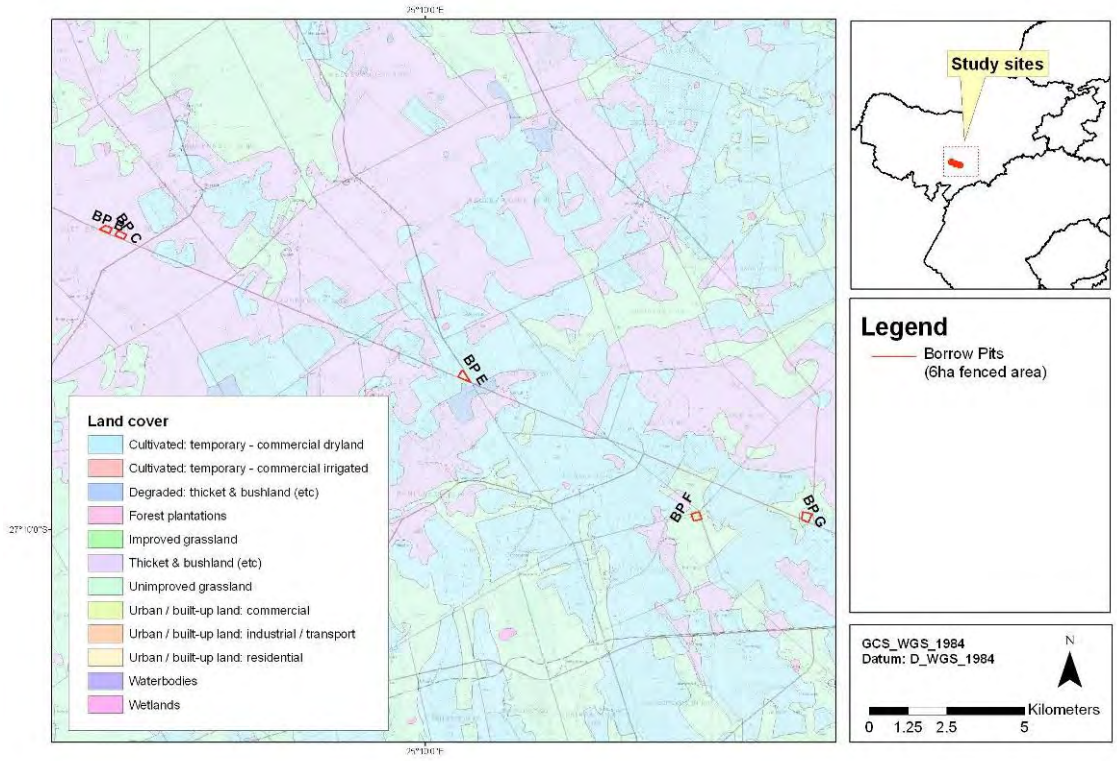


Figure 2: A topographical map of the proposed borrow pits illustrating the land cover categories.

2.3.3 Regional Vegetation Description

The borrow pit positions correspond to the Savanna Biome and more particularly to the Eastern Kalahari Bushveld Bioregion as defined by Mucina & Rutherford (2006). In addition, the natural vegetation on the sites is regionally classified as Schweizer-Reneke Bushveld (Mucina & Rutherford, 2006) (Figure 3).

This bushveld type is endemic to the North West Province and restricted to the Schweizer-Reneke area in the east and towards Amalia in the west. It forms a distinctive open woodland with a fairly dense shrub layer dominated by *Acacia erioloba, A. karroo, Searsia lancea* and low shrubs such as *A. hebeclada, Grewia flava* and *Tarchonanthus camphoratus*.

This bushveld type is “endangered” since none is currently statutory protected or conserved. More than 42 % is already transformed by cultivation.

Table 1 summarises a list of plant species characteristic of the Schweizer-Reneke Bushveld.

Table 1: A list of the characteristic plant species for each stratum (e.g. grass, forb & woody layer) representing Schweizer-Reneke Bushveld (Mucina & Rutherford, 2006).

Schweizer-Reneke Bushveld		
Grassy Layer	**Forb Layer**	**Woody Layer**
Anthephora pubescens, Digitaria eriantha, Heteropogon contortus, Stipagrostis uniplumis, Themeda triandra, Aristida congesta, A. stipitata, Eragrostis biflora, E. rigidior, E. superba, E. trichophora, Sporobolus fimbriatus	***Large herbs**: Chrysocoma ciliata, Gnidia polycephala, Pentzia viridis* ***Herbs:** Barleria macrostegia, Hermannia tomentosa, Indigofera daleoides, Lippia scaberrima, Osteospermum muricatum, Pollichia campestris, Rhynchosia adenodes* ***Geophytic herbs**: Dipcadi papillatum, Nerine laticoma*	***Tall trees:** Acacia erioloba* ***Small trees:** Acacia karroo, A. tortilis subsp. heteracantha, Searsia lancea* ***Tall shrubs**: Asparagus laricinus, Diospyros lycioides subsp. lycioides, Grewia flava, Tarchonanthus camphoratus, D. pallens, Ehretia rigida subsp. rigida, Gymnosporia buxifolia* ***Low shrubs:** Acacia hebeclada* ***Woody climber**: Asparagus africanus*

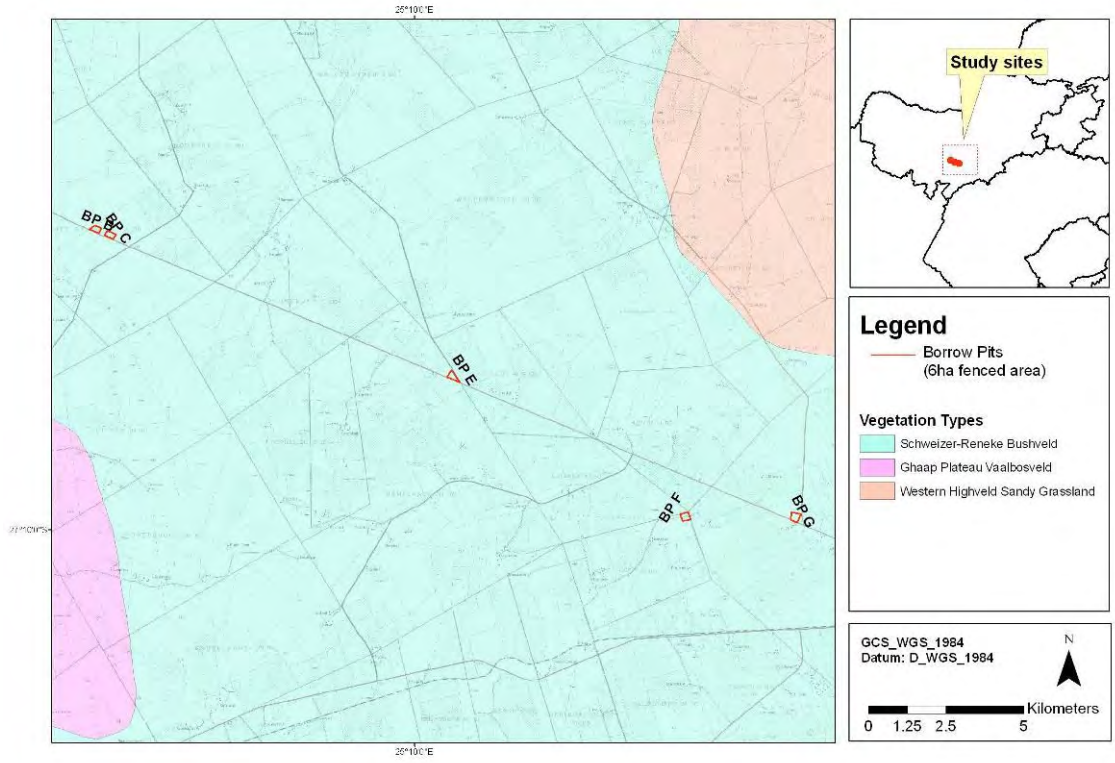


Figure 3: The spatial position of the proposed borrow pits in relation to the regional vegetation types as defined by Mucina & Rutherford (2006).

3. METHODS AND APPROACH

The vegetation and faunal attributes of the proposed borrow pits were investigated during 22 - 23 September 2011 with the objective to evaluate the structure, composition and conservation value of the floristic and faunal assemblages.

3.1 Vegetation Survey

3.1.1 Sampling protocol

- 1: 50 000 topographical maps and GoogleEarth satellite imagery were consulted to subjectively delineate areas of uniform vegetation structure;
- Data collection was primarily plot-based and consisted of three vegetation samples per borrow pit area (referring to an area of 6 ha) (Figure 4: a-e). The plot size was standardised at approximately 100 m^2. The species composition, as well as the mean percentage cover of each species per sampling plot was

measured. Percentage cover was not measured precisely, but was placed in one of seven categories by a visual estimate as described by Braun-Blanquet (in Mueller-Dombois & Ellenberg, 1974; see Table 2).

- Random transect walks were also conducted to ensure sampling of less abundant or localised species, and to assist with the compilation of a species inventory for each borrow pit.

Table 2: Modified Braun-Blanquet cover classes (Mueller-Dombois & Ellenberg, 1974).

Class	Range of cover (%)	Mean
5	75-100	87.5
4	50-75	62.5
3	25-50	37.5
2b	12.5-25	18.75
2a	5-12.5	8.75
1	1-5	2.5
+	<1	0.1
r	<<1	0.01

In addition, the following parameters were also documented to aid the vegetation survey:

- All plant taxa were identified to species level where possible. Scientific names follow Germishuizen *et al*. (2006);
- The growth form of each plant species (a measure of structural diversity) and an indication of its perenniality;
- A survey of threatened taxa, including taxa of conservation concern according to Raimondo *et al*. (2009);
- The identification of plant species protected by provincial and national legislation;
- A survey of plant species with medicinal or cultural value; and
- The identification of declared weeds and invader species as promulgated under the amended regulations (Regulation 15) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

3.1.2 Method of analysis

- A cluster analysis (based on calculated similarity coefficients and group-average linkages; Clarke & Warwick, 1994) of the measured cover estimates for the different plant species were used to classify the vegetation samples and to assist with the naming of the dominant floristic community on each borrow pit. The software package PRIMER for Windows, Ver 5.2.2, was used during the analysis; and
- The percentage contribution (%) of each plant taxon as well as the consistency (calculated as the similarity coefficient/standard deviation) of its contribution on

each borrow pit was calculated according to Clarke & Warwick (1994). Those species with high consistencies and contributions were considered to be typical (or representative) for the given vegetation unit.

3.2 Faunal Survey

3.2.1 Literature review and knowledge base

Mammals

- The occurrence and conservation status of mammal taxa were based on the IUCN (2010) and Friedmann & Daly (2004), while mammalian nomenclature was based on Skinner & Chimimba (2005).

Avifauna

- Hockey *et al*. (2005) was consulted for general information on bird identification and life history attributes;
- Barnes (2000) was consulted for information regarding the IUCN status (Red Data) of bird species;
- Distributional data, especially for species of conservation concern (apart from those obtained during the site visit) was sourced from the South African Bird Atlas Project (SABAP1) and verified against Harrison *et al.* (1997). Therefore, the SABAP1 data represents an indication of the abundance and composition of species recorded within a quarter degree grid cell (QDGC) which was the sampling unit chosen. It should be noted that the atlas data makes use of reporting rates that were calculated from observer cards submitted by lay people as well as citizen scientists. It therefore provides an indication of the thoroughness of which the QDGCs were surveyed between 1987 and 1991; and
- Additional distributional data was also sourced from the SABAP2 database (www.sabap2.adu.org.za). Since bird distributions are dynamic (based on landscape changes such as fragmentation and climate change), SABAP2 was born (and launched in 2007) from SABAP1 with the main difference being that all sampling is done at a finer scale known as pentad grids (5 min lat x 5 min long, equating to 9 pentads within a QDGC). Meaning, the data is more site-specific, recent and more comparable with observations made during the site visit (due to increased standardisation of data collection).

Herpetofauna

- Red Data categories were chosen according to the dated assessment conducted by Branch (1988) and the South African Reptile Conservation Assessment (SARCA; www.saherps.net/sarca/index.php); and
- Red Data categories and listings of amphibian taxa follow Minter *et al*. (2004).

3.2.2 Field Surveys

Mammals

- Mammals were identified by visual sightings through random transect walks. In addition, mammals were also identified by means of spoor, droppings, roosting sites or likely habitat types.

Avifauna

- Birds were identified by means of random transect walks while covering as much of the borrow pit areas. Species, where necessary, were verified using Roberts Birds of Southern Africa, VIIth ed. (Hockey *et al.*, 2005);
- Birds were also identified by means of their calls and other signs such as nests, discarded egg shells (Tarboton, 2001) and feathers. Particular attention was paid to suitable roosting, foraging and nesting habitat for Red list species, in particular the Short-clawed Lark (*Certhilauda chuana*).

Herpetofauna

- Possible burrows, or likely reptile habitat (termitaria, stumps or rocks) were inspected for any inhabitants. Amphibians were also identified by their vocalisations (if any) and through likely habitat types (e.g. water features, drainage lines, etc.). However, the herpetofaunal assessment focussed largely on a desktop review and the occurrence of threatened or range-restricted species.

3.3 Ecological Sensitivity

The ecological sensitivity of any piece of land is based on its inherent ecosystem service (e.g. wetlands) and overall preservation of biodiversity. In addition, the sensitivity of any piece of land is a key consideration when identifying impacts.

3.3.1 Ecological function & connectivity

The extent to which a site is ecologically connected to surrounding areas is an important determinant of its sensitivity. Systems with a high degree of landscape connectivity amongst one another are perceived to be more sensitive and will be those contributing to a better ecosystem service (e.g. wetlands) or overall preservation of biodiversity. Therefore, any environmental management plan must include mitigation measures to ensure that negative environmental impacts do not interfere with the natural ecological process of the area.

3.3.2 Biodiversity significance

Biodiversity significance relates to species diversity, endemism (unique species or unique processes) and the high occurrence of threatened and protected species or ecosystems protected by legislation.

3.3.3 Sensitivity Scale

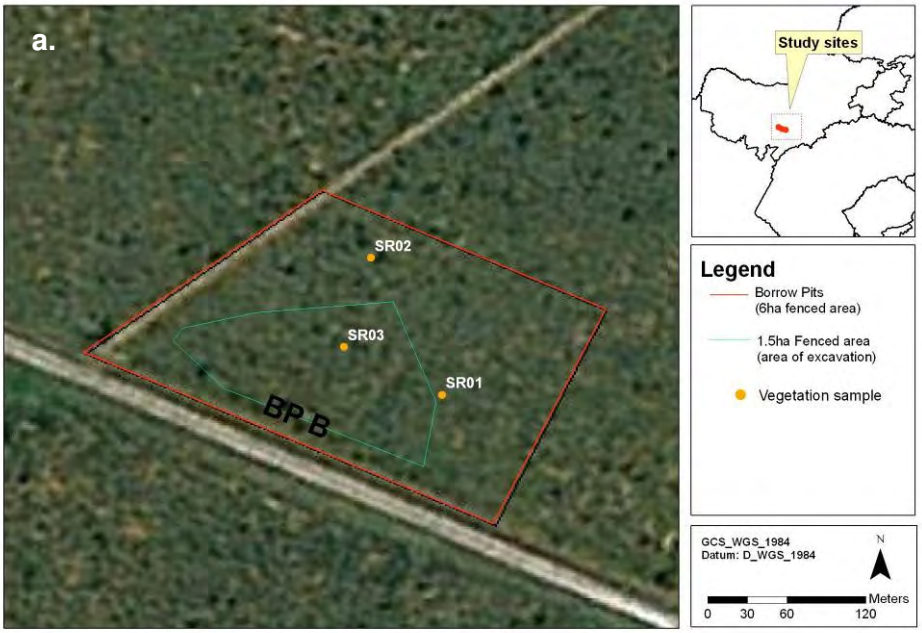
- *High* – Sensitive ecosystems with either low inherent resistance or low resilience towards disturbance factors or highly dynamic systems considered being important for the maintenance of ecosystem integrity. Most of these systems represent ecosystems with high connectivity with other important ecological systems OR with high species diversity and usually provide suitable habitat for a number of threatened or rare species. These areas should be protected;
- *Medium* – These are slightly modified systems which occur along gradients of disturbances of low-medium intensity with some degree of connectivity with other ecological systems OR ecosystems with intermediate levels of species diversity but may include potential ephemeral habitat for threatened species; and
- *Low* – Degraded and highly disturbed/transformed systems with little ecological function and are generally very poor in species diversity (most species are usually exotic or weeds).

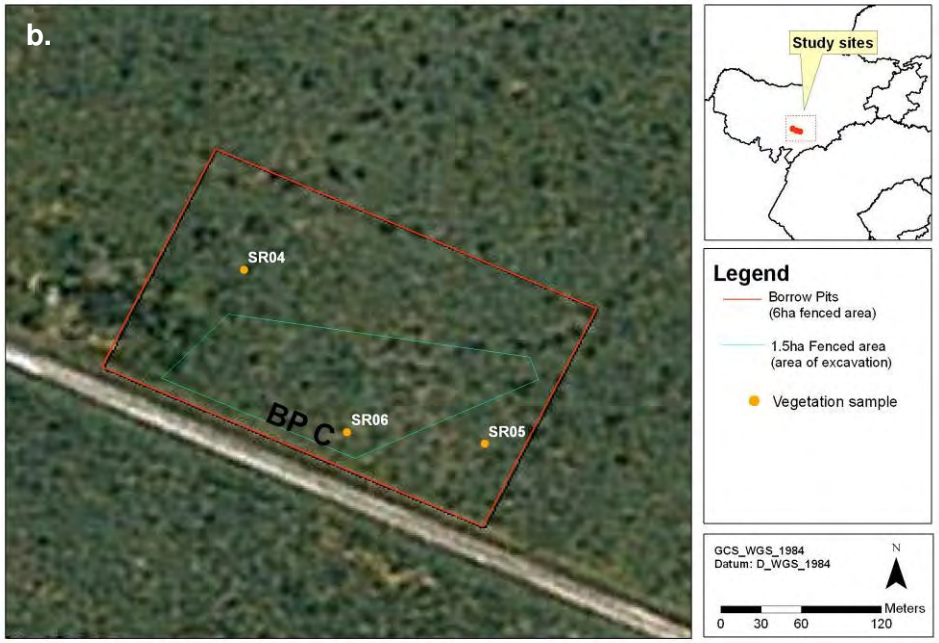
3.4 Limitations

In order to obtain a comprehensive understanding of the dynamics of the floristic and faunal communities on the study sites, as well as the status of endemic, rare or threatened species in any area, ecological assessments should always consider investigations at different time scales (across seasons/years) and through replication.

However, due to budget and time constraints such long-term studies were not feasible. Therefore, physical trapping methods were excluded from the current study.

Since the ecological footprint of each proposed site is small from a landscape perspective, detailed analysis of community descriptors are not possible since it will be severely biased during statistical procedures (due to small sampling sizes). In addition, the compilation of elaborate faunal inventories (lists of species expected to occur) on such small areas is of no use, while emphasis was placed on the observed faunal composition and the expected presence of rare, range-restricted or threatened species.




b.
SR04
BP C
SR06
SR05
Study sites
Legend
Borrow Pits
(6ha fenced area)
1.5ha Fenced area
(area of excavation)
Vegetation sample
GCS_WGS_1984
Datum: D_WGS_1984
N
Meters
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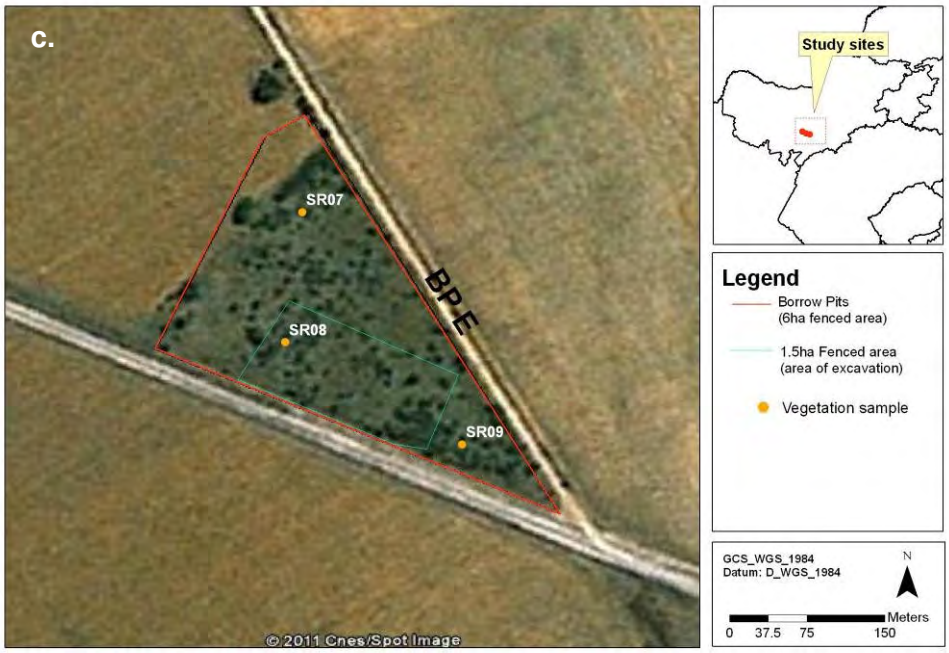
c.
SR07
BP E
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© 2011 Cnes/Spot Image
Study sites
Legend
Borrow Pits
(6ha fenced area)
1.5ha Fenced area
(area of excavation)
Vegetation sample
GCS_WGS_1984
Datum: D_WGS_1984
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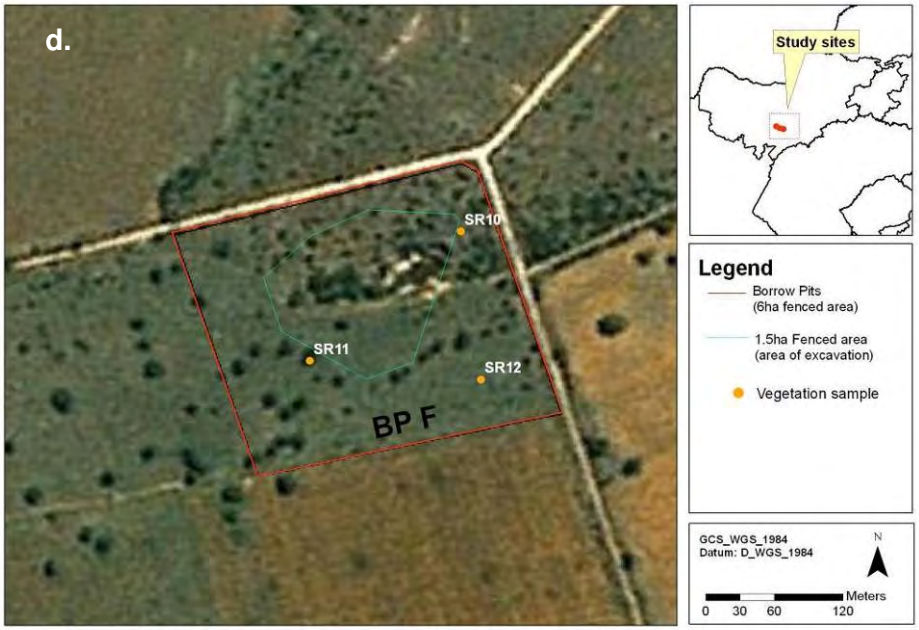
Meters
0 37.5 75 150



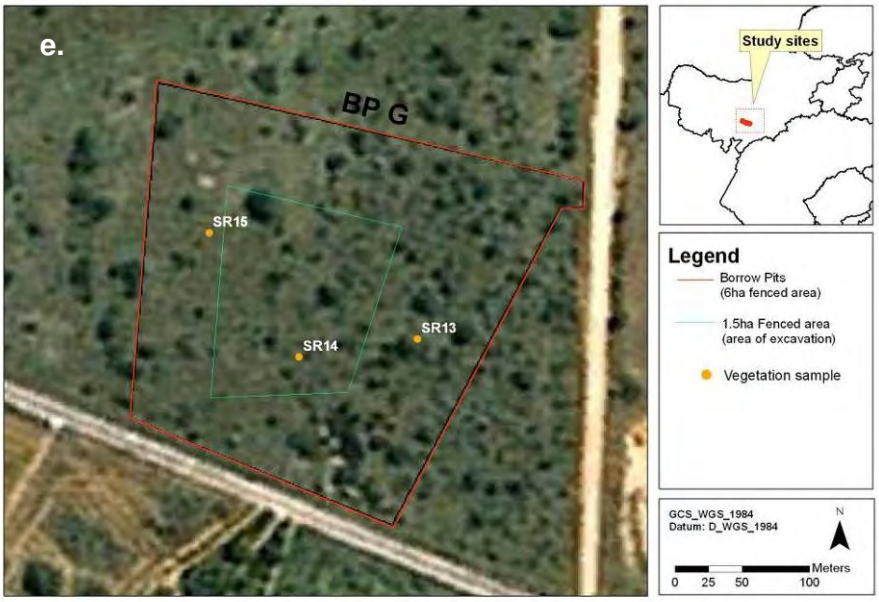


Figure 4: A satellite image of the study sites illustrating the geographic placement of 3 sampling plots on each borrow pit to assist with a vegetation survey (GoogleEarth, 2011). a – BP B, b – BP C, c – BP E, d – BP F and e – BP G.

4. RESULTS AND DISCUSSION

4.1 Borrow Pit B (BP B) & Borrow Pit C (BP C)[1]

4.1.1 Vegetation Component

a. Description

The vegetation composition can be ascribed to a short mixed *Tarchonanthus camphoratus – Eragrostis rigidior* bushveld that is representative of primary Schweizer-Reneke Bushveld (Figure 5 and Appendix 1). The floristic composition is dominated by a short woody layer of approximately four meters consisting of *Tarchonanthus camphoratus, Grewia flava* and *Ehretia rigida* with scattered canopy constituents such as *Acacia robusta* and *A. hereroensis.* The graminoid layer is poorly developed and dominated by various increaser species of the genera *Eragrostis* and *Stipagrostis*. The herbaceous layer is also poorly developed and comprises of many karroid-like herbs such as *Pentzia viridis, Felicia muricata, Lippia scaberrima* as well as the acaulescent succulent *Aloe grandidentata*.

[1] The descriptions for BP B and BP C are concurrently treated since they are spatially autocorrelated. Therefore, both borrow pits share similar habitat characteristics, faunal and flora compositions and floristic structure.

Typical species	Consistency	% Contribution	Average Abundance (mean cover/plot)
Eragrostis rigidior	12.35	62.45	66.07
Tarchonanthus camphoratus	3.08	27.35	35.71
Ehretia rigida	0.59	5.14	15.00

Status:	Primary vegetation
Ecological Importance:	Medium -high biodiversity significance and ecological function.
Plot #:	SR01 – SR06
Species richness:	45 (Shannon-Wiener H'(log base e) = 1.82)
Synonyms:	Schweizer-Reneke Bushveld (Mucina & Rutherford, 2006)

Stratum	Average Cover (%)	Height (m)
Tree	10	4.0
Shrub	40	2.0
Basal		
Grass	30	1.0
Herb	20	0.2

Figure 5: Typical Schweizer-Reneke Bushveld dominated by *Tarchonanthus camphoratus* and *Eragrostis rigidior*.

b. Taxa of conservation concern

No threatened or near-threatened species were observed from the borrow pit areas, nor are any expected to occur on the respective study sites.

However, the geophyte *Ammocharis coranica* (Figure 6) was observed north of BP C (Figure 7) and could occur on the site. Although not threatened, this species is protected under Schedule 11 of the Nature Conservation Ordinance of Transvaal (No 12 of 1983). Please note that this ordinance, although old, is still applicable and a permit is required to remove or disturb a protected plant. Where possible, all protected plant species should be left *in situ*, but if threatened by destruction through activities associated with

the construction or operational phase be removed (with the relevant permits) and temporarily placed within an onsite nursery for re-establishment after operation. *A. coranica* is also often used to treat ailments caused by witchcraft (Pooley, 1998).

Figure 6: An example of the geophyte *Ammocharis coranica* located on bushveld north of BP C.

c. Declared invader and weed taxa

None observed.

4.1.2 Terrestrial Fauna Component

a. General composition

The proposed borrow pit areas are considered pristine, rural and show increased ecological connectivity with habitat types of similar floristic composition and structure adjacent to the sites. The high ecological connectivity and near-absence of anthropogenic activities has made it possible for many mammal taxa to colonise or utilise the area (Appendix 2), including many large-bodied species (e.g. Greater Kudu *Tragelaphus strepsiceros*[2]) and meta-scavengers (e.g. Brown Hyaena *Parahyaena brunnea*) that requires fairly large home ranges. Both sites support higher mammal richness values (based on observed indicators) when compared to the other borrow pit areas (*c.* 16 species representing 80 % of the total observed richness, see Appendix 3) and sustain a high diversity of ungulate taxa.

[2] Recent evaluations of Tragelaphini based on the mtDNA region by Groves & Grubb (2011) has shown that the Greater Kudu form of *T. strepsiceros* is taxonomically different from the genus *Tragelaphus.* It is currently replaced under *Strepciceros* (being *S. zambesiensis* Zambezi Kudu).

Similarly, both sites hold high diversities of bird species that show strong affinities with the central Kalahari basin (Barnes, 1998) and are typified by a community pertaining to the arid western bushveld (e.g. Pririt Batis *Batis pririt*, Ashy Tit *Parus cinerascens* and Dusky Sunbird *Cinnyris fuscus*). These taxa, so-called biome-restricted species, are well represented on both sites by Sociable Weaver (*Philetairus socius*; nesting was not observed from the sites), Kalahari Scrub-robin (*Cerotrichas paena*) and Barred Wren-warbler (*Calamonastes fasciolatus*). In addition, the absence of anthropogenic activities facilitated the colonisation of larger terrestrial species such as the Northern Black Korhaan (*Afrotis afraoides*) and Red-crested Korhaan (*Lophotis ruficrista*) that were ominously absent from most of the other sites.

b. Taxa of conservation concern

Both the globally "near-threatened" Brown Hyaena (*P. brunnea*) (Wiesel *et al*., 2008) and the national "near-threatened" Honey Badger (*Mellivora capensis*) (Friedmann & Daly, 2004) were observed on the two sites.

The Brown Hyaena requires extensive areas (sometimes in excess of 1000 km^2) to maintain a viable population, especially where inter-specific competition for recourses is fierce between other predatory taxa. Such massive home ranges coincide with livestock and agricultural areas where they are often heavily persecuted by farmers since they are commonly assumed to be livestock predators. Therefore, direct persecution and the loss of habitat due to agriculture, are some of the primary threats to the persistence of this species.

Honey Badgers are widespread and generally very catholic in their habitat requirements. They are predominately nocturnal, solitary, and generally very unobtrusive in behaviour (Skinner & Chimimba, 2005). It is tolerant to modified habitat types and anecdotal evidence suggests that they also readily adapt to small areas dominated by agricultural activities (camera trapping, pers. obs.). Its presence emphasises the reality that this species, due to its unobtrusiveness, can occur almost anywhere.

The *Tarchonanthus camphoratus – Eragrostis rigidior* bushveld also provides suitable habitat for the near-endemic and "near-threatened" Short-clawed Lark (*Certhilauda chuana*) (Barnes, 2000). Although not observed during the site survey (based on the playback of its song), it is highly likely to occur in the area.

The above-mentioned species all require fairly large home range sizes (with the exception of *C. chauna*) and are therefore not entirely site-specific or restricted to the proposed sites. These species are probably not immediately threatened by the proposed activities (which are extremely localised) and not likely to be affected in any detrimental way unless they are directly persecuted.

4.1.3 Ecological Sensitivity

Both sites are earmarked by a medium-high ecological sensitivity based on the following arguments (Figure 7):

- The dominant vegetation community represents primary Schweizer-Reneke Bushveld;
- The geographic location of the sites, set amidst a number of privately owned cattle farms, is responsible for high mammal diversities. The area provides a dependable and attractive refuge, and abundant prey base for meso-predators (e.g. jackal, badger, etc.) which are nowadays rare outside game management areas; and
- The intactness of the vegetation cover provides habitat for three "near-threatened" faunal species, namely the Brown Hyaena (*Parahyaena brunnea*), Honey Badger (*Mellivora capensis*) and Short-clawed Lark (*Certhilauda chuana*).

It should be acknowledged that the observed bushveld habitat on the two borrow pit sites is widely distributed in the region and are also well represented on farms adjacent to the sites, irrespective of their ecological importance. The observed species of concern pertaining to this habitat occur widely throughout the study area and is by no means restricted in range to any of the borrow pits (referring to BP B and BP C). However, these species should be considered during the development phase of the project based on their legal or conservation status.

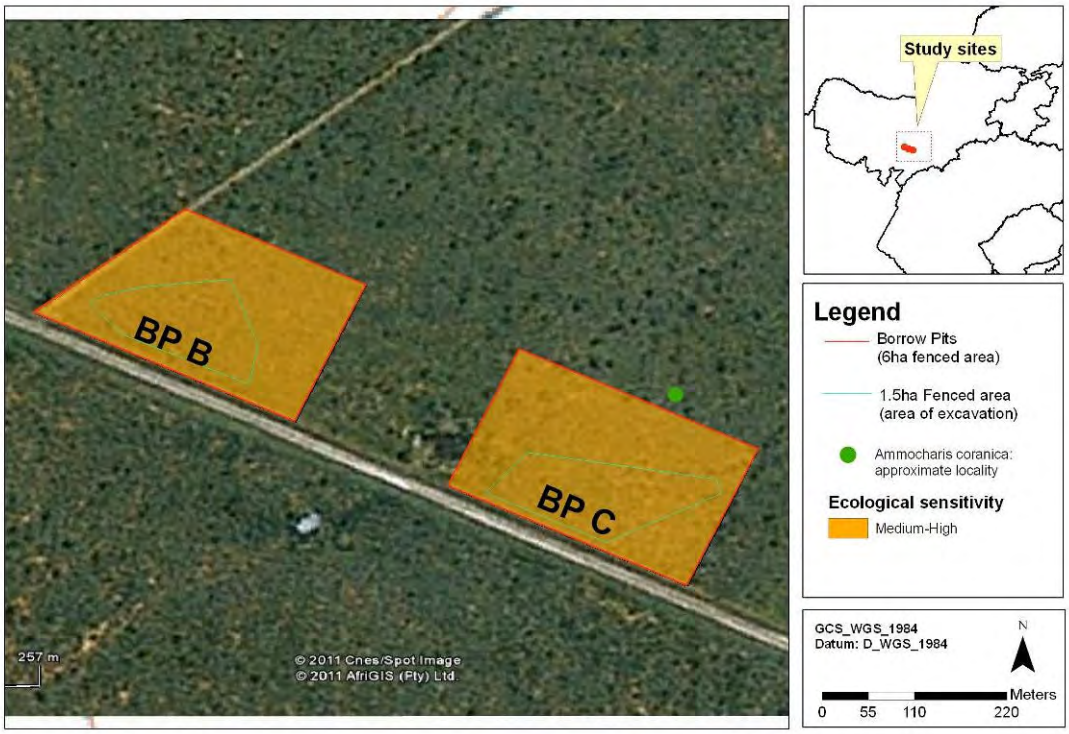


Figure 7: A satellite image illustrating the ecological sensitivity of BP B and BP C (GoogleEarth, 2011).

4.2 Borrow Pit E (BP E)

4.2.1 Vegetation Component

a. Description

The vegetation composition on BP E can be described as an open *Acacia karroo – Eragrostis rigidior* woodland that is essentially a sub-community derived from disturbed *Tarchonanthus camphoratus – Eragrostis rigidior* bushveld (Figure 8 and Appendix 1). Consequently, the observed composition and structure is a result of past agricultural activities and is represented by secondary savannoid grassland. The floristic composition is dominated by a woody layer of *Acacia karroo* and to a lesser extent also *A. erioloba* and *Searsia (=Rhus) lancea.* The herbaceous layer is primarily dominated by graminoid taxa (mainly *Eragrostis rigidior, Themeda triandra* and *E. lehmanniana*) which are responsible for the open "parkland" structure. The herbaceous species richness is low, and consists of either "r"-selected species with annual life histories or encroacher

taxa. Noteworthy species include *Asparagus laricinus, Moraea pallida, Conyza canadensis* and *Senecio inaequidens*.

b. Taxa of conservation concern

No threatened or near-threatened species were observed from BP E. According to Raimondo *et. al*. (2009), *Acacia erioloba* is classified as "declining" due to recent concerns raised over the significant volumes of wood that is removed and sold as commercial firewood. *A. erioloba* was confirmed from BP E with approximately 34 individuals confined to four localities (see Figure 9).

A. erioloba is also listed by the by the National Forests Act of 1998 (No 84 of 1998) as a declared protected tree species. The main reasons for this list are to provide strict protection to certain tree species while others require control over harvesting and utilisation. In terms of the National Forests Act of 1998, a licence should be granted by the Department of Forestry (or a delegated authority) prior to the removal, damage or destruction of any protected tree. Therefore, such activities (as mentioned above) should be directed to the responsible Forestry official in each province or area.

c. Declared invader and weed taxa

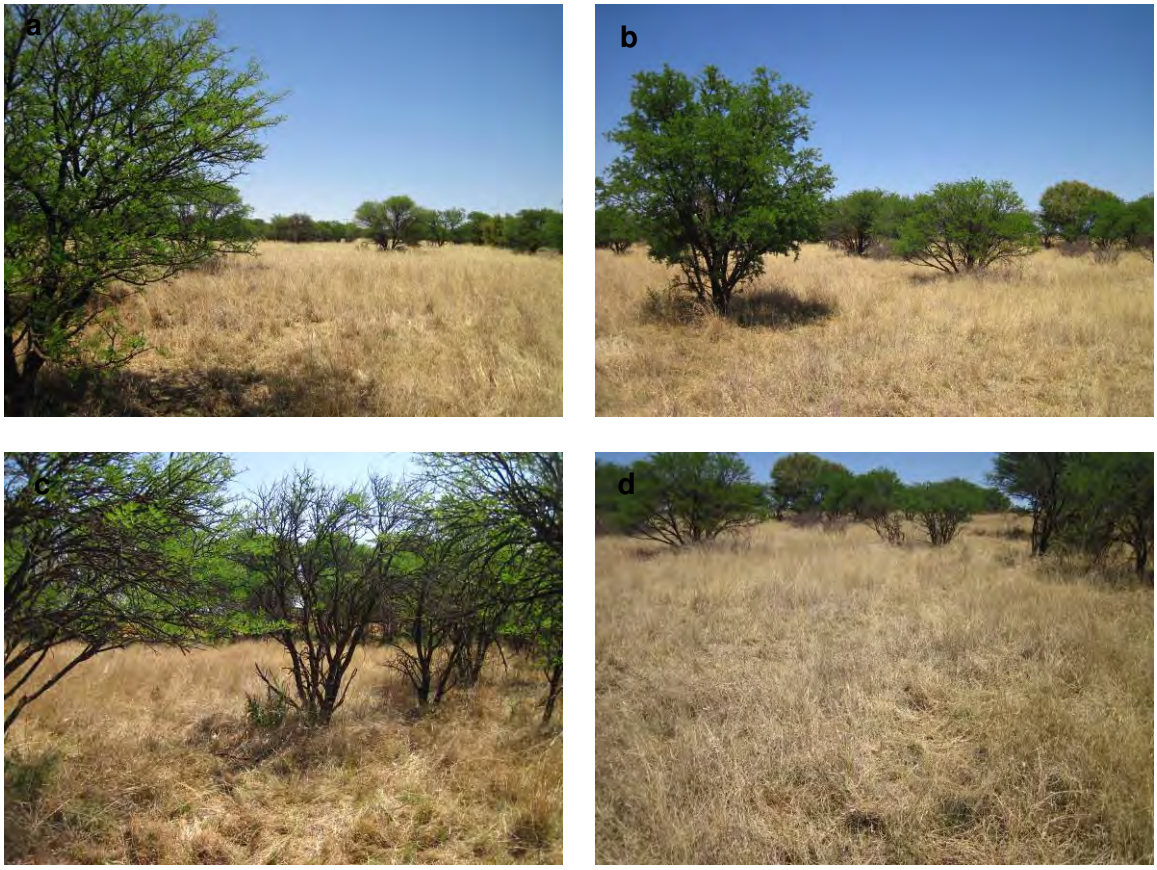
Only ruderal weed species (*Conyza canadensis, Tagetes minuta* and *Bidens pilosa*) were observed from BP E. These species are all annual (they completely die off during the dry season) and are of temporary nature.

4.2.2 Terrestrial Fauna Component

a. General composition

The faunal community is considered secondary and consists of widespread species with opportunistic life-history traits (e.g. Bushveld Gerbil *Tatera leucogaster,* Cape Porcupine *Hystrix africaustralis*, Laughing Dove *Streptopelia senegalensis* and Cape Sparrow *Passer melanurus*).

A Cape Porcupine (*Hystrix africaustralis*) colony occurs on the north-western section of the study site (Figure 9).



Typical species	Consistency	% Contribution	Average Abundance (mean cover/plot)
Eragrostis rigidior	23.74	57.97	62.50
Themeda triandra	2.46	23.03	39.58
Acacia karroo	1.91	11.36	21.67

Status:	Secondary vegetation
Ecological Importance:	Low ecological function (fragmented) & low-medium biodiversity significance (due to protected trees)
Plot #:	SR07 – SR09
Species richness:	31 (Shannon-Wiener H'(log base e) = 1.58)

Stratum	Average Cover (%)	Height (m)
Tree	30	6.0
Shrub	5	1.0
Basal		
Grass	60	1.2
Herb	5	0.2

Figure 8: Typical secondary Schweizer-Reneke Bushveld dominated by *Acacia karroo* and *Eragrostis rigidior*.

b. Taxa of conservation concern

No taxa of conservation concern were observed on BP E.

4.2.3 Ecological Sensitivity

BP E is earmarked by a low-medium ecological sensitivity based on the following arguments (Figure 9):

- The dominant vegetation community represents secondary Schweizer-Reneke Bushveld;
- The area is occupied by taxa with opportunistic life-history traits;
- The study site is isolated (fragmented) and surrounded by agricultural land that will discourage the long-term viability or colonisation of faunal species that occupy or defend large territories;
- Natural dispersal corridors are effectively disrupted and of low concern; and
- The study site is regarded to be of low-medium biodiversity significance due to the occurrence of the protected tree *Acacia erioloba*.

Figure 9: A satellite image illustrating the ecological sensitivity of BP E (GoogleEarth, 2011).

4.3 Borrow Pit F (BP F)

4.3.1 Vegetation Component

a. Description

The vegetation composition on BP F consists of two distinct communities of which one is similar to an *Acacia karroo – Eragrostis rigidior* woodland alliance (similar to the community on BP E) while the other is similar to an *Ehretia rigida – Stipagrostis uniplumis* woodland alliance (Figure 10 and Appendix 1).

The former community (Figure 10: a-b) is confined to the western and southern parts of the study site and represents a secondary composition due to past disturbance events such as cattle grazing. The floristic composition is dominated by a medium-tall open woody canopy of *Acacia karroo, A. erioloba* and *Searsia (=Rhus) lancea.* The herbaceous layer is primarily dominated by graminoid taxa (mainly *Eragrostis rigidior, Aristida congesta* and *Digitaria eriantha*). The herb species richness is low and dominated by *Senecio inaequidens* and *Wahlenbergia undulata*.

The latter community (Figure 10:c-d) is located on the northern section of the study site and is confined to rocky (arenite), shallow soils. This alliance is floristically rich, especially the herbaceous layer which consists of noteworthy species such as *Pentzia viridis, Crotalaria eremicola, Lippia scaberrima* and *Asparagus suaveolens*. The woody layer is unique in the sense that it forms distinct multi-species "bush clumps" comprising of noteworthy species such as *Ehretia rigida, Grewia flava, Acacia karroo* and *Diospyros pallens*. The graminoid layer is equally diverse, albeit sparse, and holds taxa such as *Stipagrostis uniplumis, Aristida stipitata, Eragrostis rigidior* and *Sporobolus ludwigii*.

Typical species	Consistency	% Contribution	Average Abundance (mean cover/plot)
Eragrostis rigidior	0.58	71.16	25.03
Acacia karroo	1.30	1.30	6.67

Status:	Partly primary vegetation (north on rocky soils) and secondary grazed woodland (southern parts)
Ecological Importance:	*Acacia karroo – Eragrostis rigidior* woodland: Low-medium biodiversity significance (due to protected trees)
	Ehretia rigida – Stipagrostis uniplumis woodland: High ecological importance & function (due to increased spatial heterogeneity)
Plot #:	SR10 – SR12
Species richness:	31 (Shannon-Wiener H'(log base e) = 2.35)

Stratum	Average Cover (%)	Height (m)
Tree	15 (25)	8.0 (6.0)
Shrub	1.0 (22.5)	1.5 (2.0)
Basal		
Grass	80 (40)	0.8 (1.0)
Herb	4.0 (22.5)	0.3 (0.4)

Figure 10: The typical floristic dominance and structure of the vegetation communities on BP F. Cover and height values in brackets refer to the *Ehretia rigida – Stipagrostis uniplumis* woodland, while those without brackets refer to the *Acacia karroo – Eragrostis rigidior* woodland.

b. Taxa of conservation concern

No threatened or near-threatened species were observed from BP F, although high densities of *Acacia erioloba* were observed.

A. erioloba is also listed by the National Forests Act of 1998 (No 84 of 1998) as a declared protected tree species. In terms of the National Forests Act of 1998, a licence

should be granted by the Department of Forestry (or a delegated authority) prior to the removal, damage or destruction of any protected tree. Therefore, such activities (as mentioned above) should be directed to the responsible Forestry official in each province or area.

c. Declared invader and weed taxa

Only ruderal weed species (*Conyza canadensis* and *Tagetes minuta*) were observed from BP F. These species are all annual (they completely die off during the dry season), and are of temporary nature.

4.3.2 Terrestrial Fauna Component

a. General composition

The high spatial heterogeneity and niche space produced by the arenite outcrops (the *Ehretia rigida – Stipagrostis uniplumis* woodland) provide habitat for a faunal community that is predicted to be absent from the other habitat types in the area. The arenite outcrops provide shelter and refuge for a variety of taxon groups that also include many rupicolous species (e.g. Eastern Rock Sengi *Elephantulus myurus*, Namaqua Rock Mouse *Micaelamys namaquensis,* Lesser Red Musk Shrew *Crocidura hirta* as well as taxa pertaining to *Trachylepis* skinks and *Pachydactylus* geckos).

b. Taxa of conservation concern

No taxa of conservation concern were observed on BP F during the site survey.

4.3.3 Ecological Sensitivity

The *Ehretia rigida – Stipagrostis uniplumis* woodland unit on BP F is earmarked by a high ecological sensitivity based on the following arguments (Figure 11):

- The vegetation community is unique and spatially restricted. It also supports a high floristic diversity when compared to the other borrow pits (based on the H' diversity index);
- The *Ehretia rigida – Stipagrostis uniplumis* woodland unit is characterised by high spatial heterogeneities (due to the presence of arenite outcrops), thereby contributing to a myriad of microhabitat types and niche space. This high diversity of microhabitat types has the intrinsic potential to support a high faunal richness; and

- In addition, the arenite outcrops has the potential to sustain faunal species not likely to be recorded from the more "homogenous" and secondary *Acacia karroo – Eragrostis rigidior* woodland unit.

On the other hand, the *Acacia karroo – Eragrostis rigidior* woodland unit is earmarked by a low-medium ecological sensitivity due to the following arguments (Figure 11):

- The floral composition of the observed unit is not considered pristine due to the patchy dominance of secondary graminoid taxa (in particular increaser taxa);
- This unit provides habitat for medium-large *Acacia erioloba* specimens (therefore the medium biodiversity significance); and
- The dominant vegetation composition represents secondary Schweizer-Reneke Bushveld and is occupied by faunal taxa with opportunistic life-history traits.

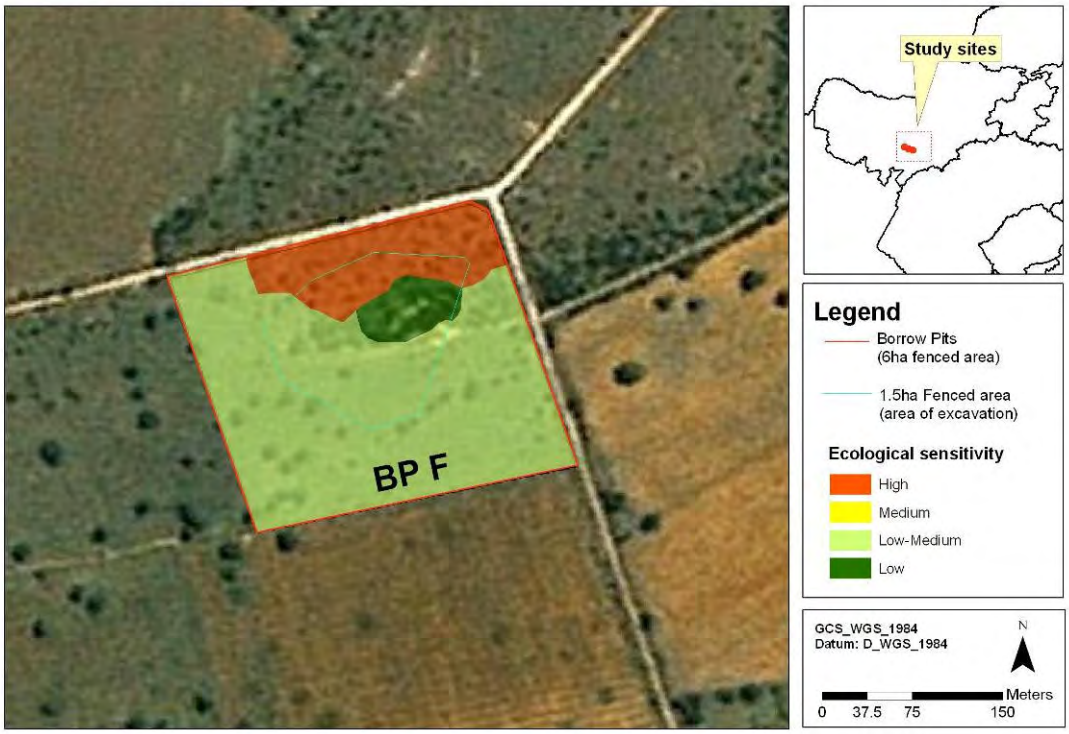


Figure 11: A satellite image illustrating the ecological sensitivity of BP F (GoogleEarth, 2011).

4.4 Borrow Pit G (BP G)

4.4.1 Vegetation Component

a. Description

The vegetation composition on BP G can be described as a tall open *Acacia erioloba – Themeda triandra* woodland on deep sandy soils (Figure 12 and Appendix 1). It differs from the other woodland units by its tall canopy of *A. erioloba* that is represented by mature specimens, and a dense basal cover of the highly palatable grass *Themeda triandra.* Furthermore, it is also structurally distinct from the other units by the patchy occurrence of dense stands of *Acacia hebeclada, Diospyros pallens* and *Grewia flava*. Noteworthy species not shared with the other units include *Rhynchosia adenodes, Indigofera daleoides* and *Ledebouria* cf*. revoluta*.

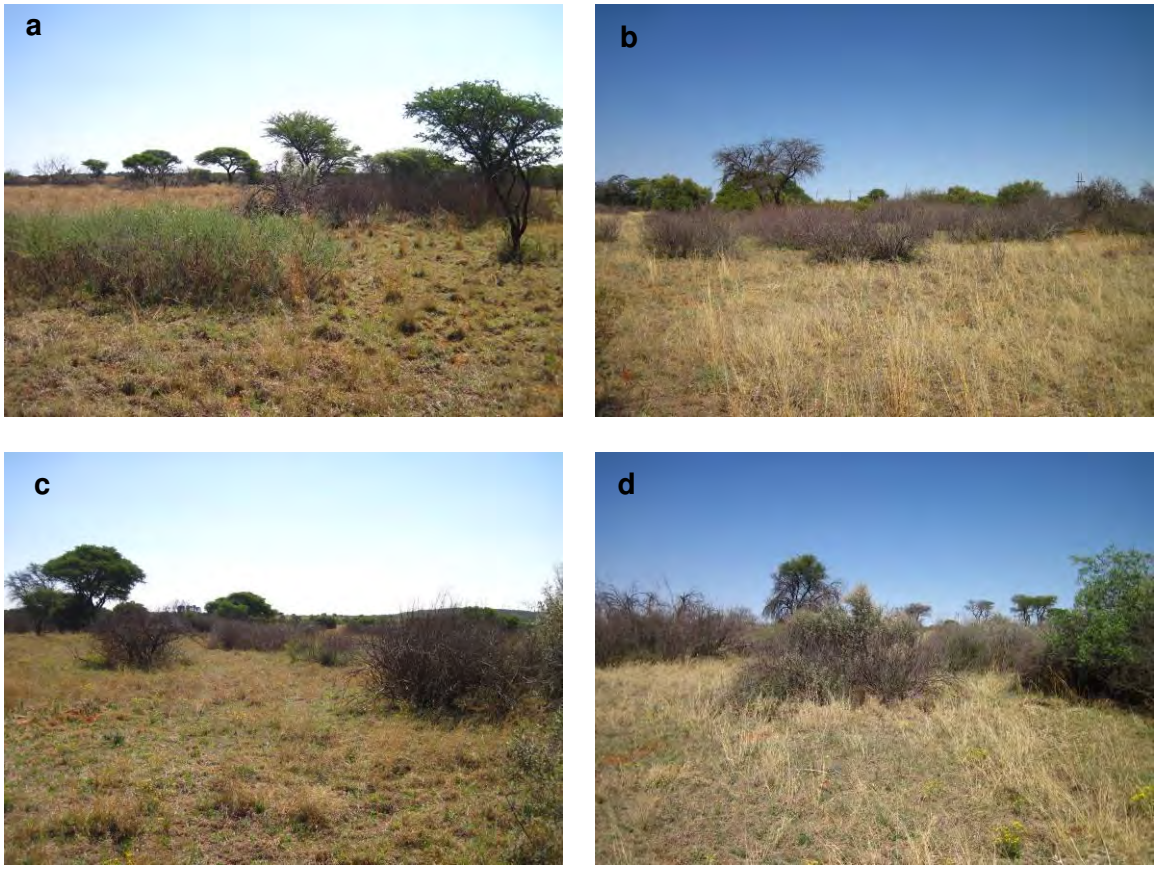
Nevertheless, it also shares part of its composition with BP E and BP F (with reference to the *Acacia karroo – Eragrostis rigidior* woodland unit) as evidenced by the partial dominance of *Eragrostis rigidior, Senecio inaequidens* and *Wahlenbergia undulata* (represented by sample SR13, see Appendix 1).

b. Taxa of conservation concern

No threatened or near-threatened species were observed from BP G, although a high density of tall and mature *Acacia erioloba* were observed (see Figure 13 & 14).

A. erioloba is listed by the National Forests Act of 1998 (No 84 of 1998) as a declared protected tree species. In terms of the National Forests Act of 1998, a licence should be granted by the Department of Forestry (or a delegated authority) prior to the removal, damage or destruction of any protected tree. Therefore, such activities (as mentioned above) should be directed to the responsible Forestry official in each province or area.

Another species worth mentioning is the geophyte *Hypoxis hemerocallidea* which occur as scattered individuals on the open grassy areas of the site. It is declining (Raimondo *et al*., 2009) due to its medicinal properties, and large quantities are exploited and sold nationwide. Although widespread, it should be managed within the footprint areas and should be removed (rescued) during the operational phase if threatened by destruction.



Typical species	Consistency	% Contribution	Average Abundance (mean cover/plot)
Themeda triandra	1.06	94.49	36.25

Status:	Primary vegetation
Ecological Importance:	High ecological function and significance (due to high incidence of mature *A. erioloba*)
Plot #:	SR13 – SR15
Species richness:	34 (Shannon-Wiener H'(log base e) = 2.21)

Stratum	Average Cover (%)	Height (m)
Tree	5.0	9.0
Shrub	10	2.5
Basal		
Grass	60	0.8
Herb	25	0.25

Figure 12: Typical floristic dominance and structure of the vegetation commuity on BP G.

Figure 13: An example of a mature specimen of *Acacia erioloba* on BP G.

c. Declared invader and weed taxa

Only ruderal weed species (*Conyza canadensis* and *Tagetes minuta*) were observed from BP G. These species are all annual (they completely die off during the dry season), and are of temporary nature.

4.4.2 Terrestrial Fauna Component

a. General composition

The sandy substrate on BP G provides the ideal habitat for fossorial taxa and species that prefer to roost in den structures. Three mammal species (Aardvark *Orycteropus afer*, Cape Porcupine *Hystrix africaaustralis* and Yellow Mongoose *Cynictis penicillata*) utilise the site, and extensive burrow systems of all three species were recorded on the study site. The occurrence of Aardvark on the site is worth mentioning since active burrows of this species occur at very high densities (see Figure 14).

b. Taxa of conservation concern

The graminoid layer of the *Acacia erioloba – Themeda triandra* woodland provides suitable roosting, breeding and foraging habitat for the “near-threatened” Melodious Lark (*Mirafra cheniana*). *M. cheniana* is near-endemic to South Africa and generally occurs on fairly short grassland with a low basal cover. It was previously thought to occur almost exclusively in grassland dominated by dry *Themeda triandra* (Harrison *et al*., 1997). However, recent observations (mainly from Gauteng) showed that this species also have a high preference for open grassland on sandy, siliceous soils dominated by sour, wiry

grasses such as *Loudetia simplex, Tristachya rehmannii, Trachypogon spicatus* and *Diheteropogon amplectens*.

This species is easily identified by its distinctive aerial display and prolonged song that includes mimicry. *M. cheniana* was confirmed on the study site (see Figure 14).

The *Acacia erioloba – Themeda triandra* woodland also provides suitable habitat for the near-endemic and "near-threatened" Short-clawed Lark (*Certhilauda chuana*) (Barnes, 2000). Although not observed during the site survey (based on the playback of its song), it is highly likely to occur on the BP G premises.

4.4.3 Ecological Sensitivity

The *Acacia erioloba – Themeda triandra* woodland on BP G is earmarked by a high ecological sensitivity based on the following arguments (Figure 14):

- The vegetation community and composition support a high floristic richness with approximately 60 % of the basal cover represented by late-successional taxa (e.g. *Themeda triandra*);
- The structure and floristic composition provides habitat for two "near-threatened" bird species (e.g. Short-clawed Lark *Certhilauda chuana* and Melodious Lark *Mirafra cheniana*);
- The study site supports exceptional high densities of burrowing/fossorial mammal taxa; and
- The study site sustains prime examples of mature *Acacia erioloba* specimens.

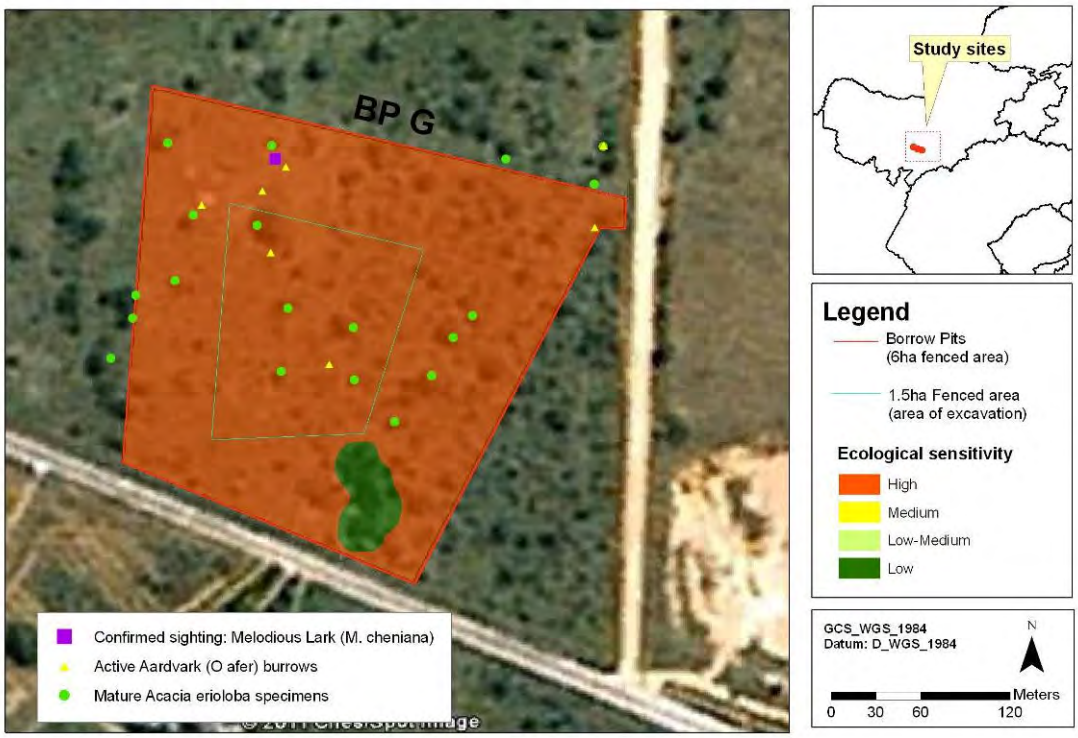


Figure 14: A satellite image illustrating the ecological sensitivity of BP F (GoogleEarth, 2011).

4.5 Species of conservation concern with a high propensity of occurrence on all of the borrow pits.

4.5.1 Giant Bullfrog (Pyxicephalus adspersus)

Conservation Status & Life History Characteristics

The Giant Bullforg is currently categorised as “Near-threatened” in the latest Red Data analysis (Minter *et al*., 2004). It is the largest frog species in South Africa and thus has a long life expectancy.

They spend most of their lives underground in a dormant state (called “aestivation”), and only emerge after heavy bouts of rainfall (Channing, 2001) whereby they immediately start to breed. They are therefore easily overlooked during unfavourable conditions (e.g. dry spells or low rainfall events). After breeding the adults and juveniles will search for suitable “aestivation” sites, and may travel up to 150 m from breeding sites, whereby

they burrow themselves, only to emerge during favourable conditions (Alexander, 2004). It is usually during this long dormancy period that they remain undetected and are thus vulnerable towards development (especially construction works) of changes in runoff. They are also threatened when their breeding habitat becomes degraded (e.g. pollution) or during mass dispersal (e.g. road kills) of juveniles.

Typical Habitat Requirements

In order for Bullfrogs to successfully complete their life cycle, the following habitat requirements should be present (adopted from Alexander, 2004):

- Ephemeral pans or depressions with enough capacity to store water for at least one month to facilitate breeding. These depressions should be shallow enough for breeding to take place;
- The pans and depressions should be easily accessible to Bullfrogs (marginal vegetation surrounding pans or depressions should not restrict accessibility);
- The soils surrounding the depressions and pans should be suitable for "aestivation" of Bullfrogs (normally grey clayey or deep sandy soils); and
- Access to suitable foraging habitat (e.g. open grassland adjacent to breeding sites).

The occurrence of P. adspersus on the borrow pits

According to Minter *et al*. (2004), *P. adspersus* was historically (pre-1996) collected from the quarter-degree grid squares (2725AA and 2725AB) that are also sympatric to the study area. Therefore, it is possible that this species could be present on the borrow pits during favourable conditions. Nevertheless, it is unlikely that *P. adspersus* will breed on any of the borrow pits due to the absence of suitable ephemeral pans or depressions. However, some of the borrow pits (i.e. BP B, PB C and BP F) are located in close proximity (*c*. 420 – 780 m) to potential breeding habitat (being ephemeral pans). It is therefore not unreasonable to argue the possibility for dispersing juveniles or foraging individuals to utilise or aestivate on these borrow pit areas (based on the sandy texture of the soils).

Based on the above, it is possible that "aestivating" individuals could be exposed during the earthwork operations.

4.6. Recommendations & Mitigation

4.6.1 General recommendations pertaining to all borrow pits

The following recommendations should be included in the Environmental Management Plan (EMP) and is applicable for all the proposed borrow pits:

- The sensitivity maps must be used as a decision tool to guide the proposed operations. Earthworks should refrain from areas of high ecological sensitivity;
- The extent of the construction/operational area should be fenced, and no construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the borrow pit operations that are not part of the demarcated area should be considered as "no-go" areas for employees and machinery. The fence system to be used should be perforated to allow for the free movement of faunal taxa;
- The contractor (or applicant) shall appoint an Environmental Control Officer (ECO) with a relevant qualification in botany/ecology during the construction/operational phase;
- The contractor (or applicant) with the assistance of a qualified botanist (or qualified ECO) should familiarise themselves with the "declining" and protected plant species occurring on the borrow pits. In addition, the borrow pit areas should be inspected *prior to* construction activities in order to identify declining or protected individuals/populations that might have been previously missed;
- All "declining" or protected plant species should, where possible, be left *in situ*, but if threatened by destruction through activities associated with the operational phase, be removed (with the relevant permits) and temporarily placed within an onsite nursery for re-establishment after construction. However mature *Acacia erioloba* trees (on BP G) should be preserved *in situ;*
- Bullfrogs exposed during the construction/operational phase should be removed and translocated to the nearest area of suitable breeding habitat. The ECO shall be informed, who shall then with the assistance of a qualified herpetologist issue instructions for its capture, translocation and safe release. Any specimens killed during the earthworks should be preserved as museum "voucher" specimens;
- The study area holds a high diversity of fossorial animals (with the possibility for legless skinks such as *Acontias beviceps* and *A. gracilicauda* to occur). In fact, the natural history of these species are insufficiently known or documented while many display localised or restricted distribution patterns in South Africa. Therefore, if any subterranean/fossorial reptile, scorpion or mammal species is excavated during the construction/operational phase, its identity and location must be noted (accompanied with digital photographs) before being relocated to the nearest area or natural open space with suitable habitat for the particular

species to continue its life history. If accidentally killed, then it should be adequately preserved as a "voucher" specimen (with the assistance and knowledge of the ECO). These specimens may contribute towards a better understanding of biogeography patterns and animal systematics;

- Intentional killing of any faunal species (in particular invertebrates and snakes) should be avoided by means of awareness programmes presented to the labour force. The labour force should be made aware of the conservation issues pertaining to the taxa occurring on the study site. Any person found deliberately harassing any animal in any way should face disciplinary measures, following the possible dismissal from the site; and
- Harvesting of plant material or wood is strictly prohibited;

4.6.2 Specific recommendations pertaining to each borrow pit

a. BP B and BP C

- The northern stockpile and laydown areas on BP C should be screened for the occurrence of *Ammocharis coranica* (Figure 15). If located, all individuals of *A. coranica* should be removed (with the relevant permits) and temporarily placed within an onsite nursery for re-establishment after construction.

b. BP E

- The proposed laydown area should be re-aligned so that it will not coincide with any mammal burrow system or jeopardise the viability of any mammalian colony (see Figure 16); and
- Apply for the necessary permits from DWA should any of the *Acacia erioloba* trees be removed.

c. BP F

- The proposed topsoil stockpile area on the northern part of BP F should be re-aligned so that it will correspond to an area identified with low-medium ecological sensitivity (and not of a high ecological sensitivity) (see Figure 17);
- The area to be excavated should refrain from areas identified with high ecological sensitivities; and
- Apply for the necessary permits from DWA should any of the *Acacia erioloba* trees be removed.

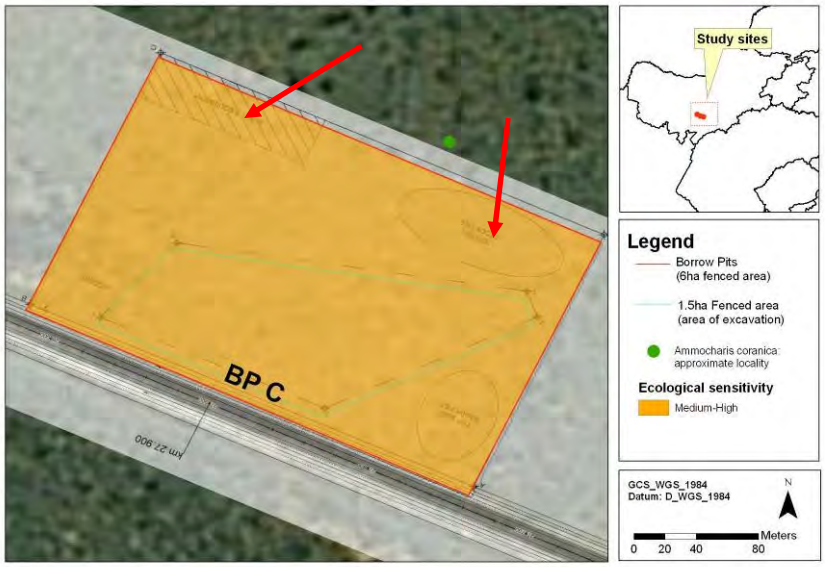


Figure 15: The proposed activities on BP C illustrating the northern stockpile and laydown areas to be searched for protected geophyte specimens (see arrows).

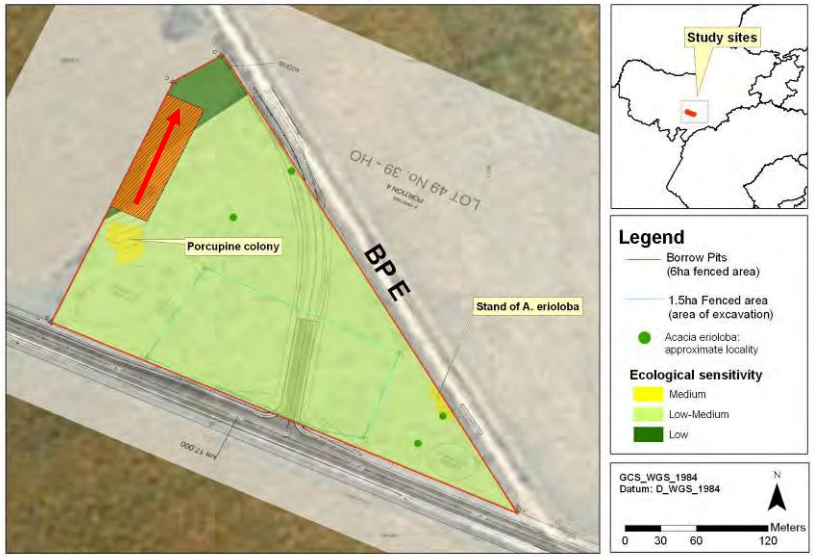


Figure 16: The activities on BP E illustrating the proposed re-alignment of the laydown area in a northerly direction (see arrow).

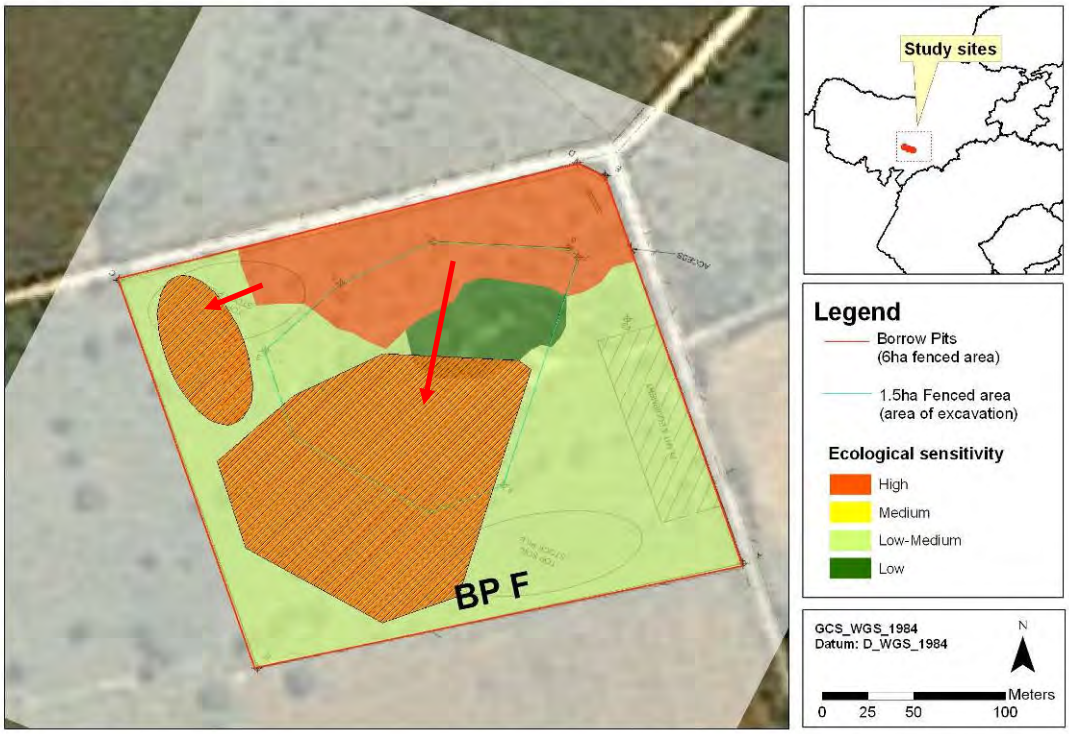


Figure 17: The activities on BP F illustrating the proposed re-alignment of the northern stockpile area and proposed area of excavation (see arrows).

d. BP G

- The proposed stockpile area on the northern part of BP G corresponds to mature *Acacia erioloba* specimens and active Aardvark burrows (see Figure 18);
- The area to be excavated corresponds to an area identified with high ecological sensitivity based on the high density of mature *A. erioloba* trees and active Aardvark burrows; and
- BP G should be considered as a “no-go” area and an alternative area should be sourced elsewhere.

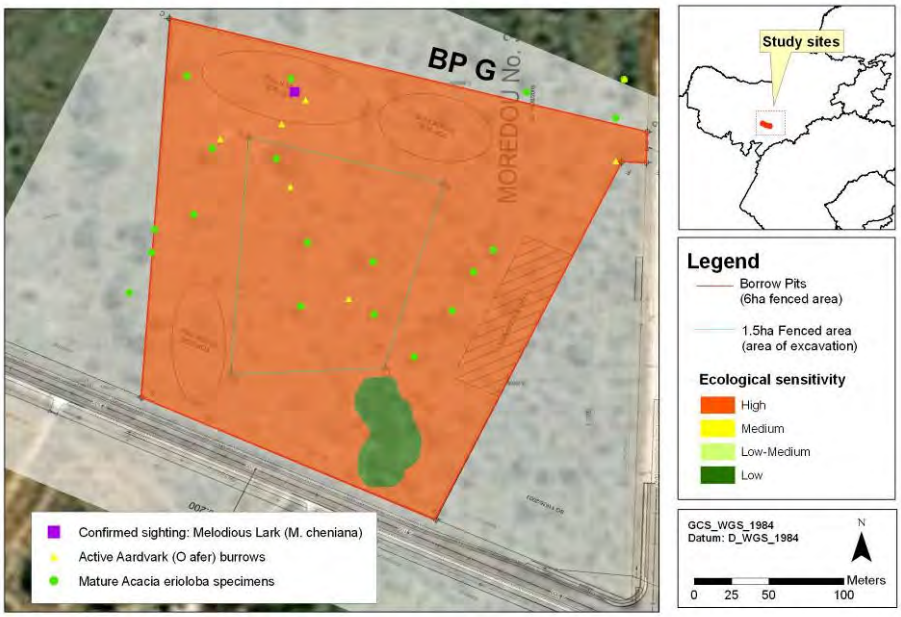


Figure 18: The activities on BP G corresponding to an area of high ecological importance.

5. REFERENCES

Alexander, G.J. 2004. *Specialist Assessment of the Effects of the Proposed Development on Bullfrogs at the Summerset Extension 10 Site (98, 100 – 104 Witpoort 406 JR)*. A report compiled for SEF.

Barnes, K.N. 1998. *The Important Bird Areas of southern Africa*. BirdLife South Africa, Johannesburg.

Barnes, K.N. 2000. *The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland*. BirdLife South Africa, Johannesburg.

Branch, W. R. 1988. *South African Red Data Book – Reptiles and Amphibians*. South African National Scientific Programmes Report No. 151.

Channing, A. 2001. *Amphibians of Central and Southern Africa*. Protea, Pretoria.

Clarke, K.R. & Warwick, R.M. 1994. *Changes in marine communities: An approach to statistical analysis and interpretation*. Natural Environmental Research Council, United Kingdom.

Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

Convention on Biological Diversity. Signed 1993 and ratified 2 November 1995.

Friedmann,Y. & Daly, B. 2004. *Red Data Book of the Mammals of South Africa: A Conservation Assessment*. CBSG South Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust, South Africa.

Germishuizen, G., Meyer, N.L., Steenkamp, Y. & Keith, M. (eds.). 2006. *A checklist of South African Plants*. Southern African Botanical Biodiversity Network Report No. 41, SABONET, Pretoria.

Groves, C. & Grubb, P. 2011 *Ungulate Taxonomy*. Johns Hopkins University Press.

Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. & Brown, C.J. (eds.). 1997. *The Atlas of Southern African Birds. Vol. 1 & 2*. BirdLife South Africa, Johannesburg.

Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G. (eds.) 2005. *Roberts – Birds of Southern Africa*, VIIth ed. The Trustees of the John Voelker Bird Book Fund, Cape Town.

International Union for Conservation of Nature. 2010. http://www.iucnredlist.org/

Minter, L.R., Burger, M., Harrison, J.A., Braack, H.H., Bishop, P.J. & Kloepfer, D. 2004. *Atlas and Red data Book of the Frogs of South Africa, Lesotho and Swaziland*. SI/MAB Series #9. Smithsonian Institution, Washington, D.C.

Mucina, L. & Rutherford, M.C. (eds). 2006. The vegetation map of South Africa, Lesotho and Swaziland. *Strelitzia 19,* South African National Biodiversity Institute.

Mueller-Dombois, D.S. & Ellenberg, H. 1974. *Aims and Methods of Vegetation Ecology*. Wiley, New York.

National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004).

National Forests Act, 1998 (Act No. 84 of 1998).

Nature Conservation Ordinance of Transvaal, 1983 (No 12 of 1983).

Pooley, E. 1998. *A Field Guide to the Wild Flowers of KwaZulu-Natal and the Eastern Region*. Natal Flora Publications Trust, Durban.

Raimondo, D., Von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. & Mayama, P.A. (eds). 2009. Red List of South African plants. *Strelitzia* 25. South African National Biodiversity Institute, Pretoria.

Skinner, J.D. & Chimimba, C.T. (Revisers). 2005. Mammals of the Southern African Subregion. Cambridge University Press, London.

Tarboton, W. 2001. *A guide to the Nests & Eggs of Southern African Birds*. Struik Publishers, Cape Town.

Wiesel, I., Maude, G., Scott, D. & Mills, G. 2008. *Hyaena brunnea*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4. http://www.iucnredlist.org/.

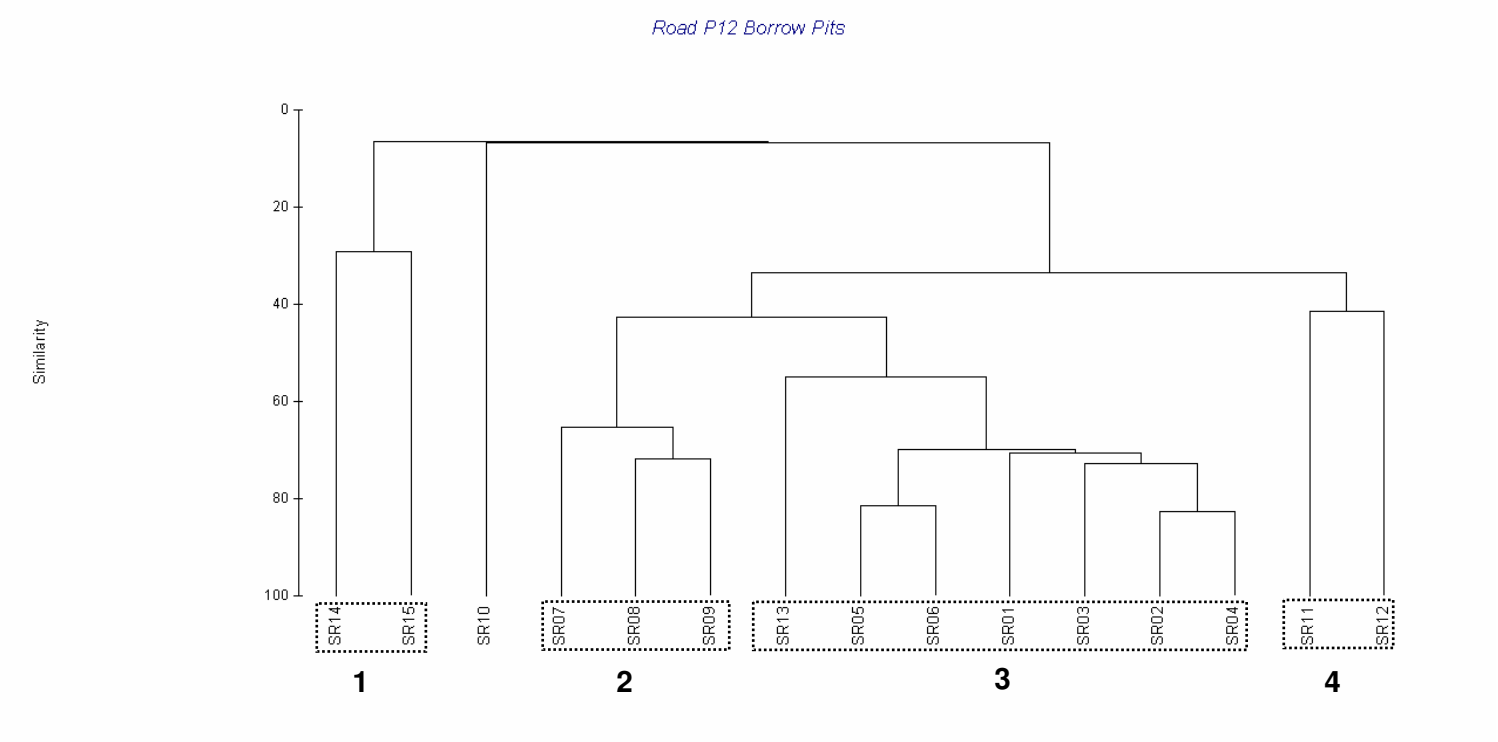
Wood, J., Low, A.B., Donaldson, J.S., & Rebelo, A.G. 1994. *Threats to plant species through urbanisation and habitat fragmentation in the Cape Metropolitan Area, South Africa*. In: Huntley, B.J. (Ed.) Botanical Diversity in Southern Africa. National Botanical Institute, Pretoria.

www.sabap2.adu.org.za

www.saherps.net/sarca/index.php

6. APPENDICES

Appendix 1: A dendrogram based on a cluster analysis of the sampling plots. 1 – *Acacia erioloba – Themeda triandra* woodland, 2 – *Acacia karroo – Eragrostis rigidior* woodland, 3 – *Tarchonanthus camphoratus - Eragrostis rigidior* bushveld and 4- mixed *Acacia karroo – Eragrostis rigidior* woodland.



Appendix 2: A list of plant species observed from the respective borrows pits. *- Exotic species.

Scientific Name	Family	Growth form	PB B & C	PB E	PB F	BP G
Acacia erioloba	Mimosaceae	Tree	0	1	1	1
Acacia hebeclada	Mimosaceae	Shrub	0	1	1	1
Acacia hereroensis	Mimosaceae	Tree	1	0	0	0
Acacia karroo	Mimosaceae	Tree	1	1	1	0
Acacia mellifera	Mimosaceae	Tree	1	1	0	0
Acacia robusta	Mimosaceae	Tree	1	0	1	0
Acacia tortilis	Mimosaceae	Tree	1	0	0	0
Aloe grandidentata	Asphodelaceae	Perennial Succulent Herb	1	0	0	0
Ammocharis coranica	Amaryllidaceae	Geophyte	1	0	0	0
Anthephora pubescens	Poaceae	Perennial Tufted Grass	1	0	0	0
Aptosimum decumbens	Scrophulariaceae	Perennial Herb	1	0	0	0
Aristida congesta barbicollis	Poaceae	Annual Tufted Grass	1	0	0	0
Aristida congesta congesta	Poaceae	Annual Tufted Grass	0	0	1	0
Aristida meridionalis	Poaceae	Perennial Tufted Grass	0	0	1	1
Aristida stipitata	Poaceae	Perennial Tufted Grass	1	0	1	1
Asparagus africanus	Asparagaceae	Perennial Shrub	1	0	0	1
Asparagus laricinus	Asparagaceae	Perennial Shrub	1	1	1	1
Asparagus suaveolens	Asparagaceae	Perennial Shrub	1	1	1	1
*Berkheya rigida**	Asteraceae	Annual Herb	0	1	0	0
*Bidens pilosa**	Asteraceae	Annual Herb	0	1	0	0
Blepharis subvolubilis	Acanthaceae	Perennial Herb	1	0	1	0
Boscia foetida subsp. minima	Capparaceae	Shrub	1	0	0	0
Brachiaria eruciformis	Poaceae	Perennial Tufted Grass	0	1	0	1
Bulbine abyssinica	Asphodelaceae	Geophyte	0	0	1	1
Chrysocoma ciliata	Asteraceae	Perennial Herb	1	0	0	0
*Conyza canadensis**	Asteraceae	Annual Herb	0	1	1	1
Crotalaria eremicola	Fabaceae	Perennial Herb	0	0	1	0
Cymbopogon pospischilii	Poaceae	Perennial Tufted Grass	1	0	0	0
Digitaria eriantha	Poaceae	Perennial Tufted Grass	1	0	1	1
Diospyros lycioides	Ebenaceae	Shrub	0	0	0	1

Scientific Name	Family	Growth form	PB B & C	PB E	PB F	BP G
Diospyros pallens	Ebenaceae	Shrub	1	0	1	1
Ehretia rigida	Boraginaceae	Tree	1	1	1	1
Eragrostis bicolor	Poaceae	Perennial Tufted Grass	1	1	0	0
Eragrostis biflora	Poaceae	Perennial Tufted Grass	1	1	0	0
Eragrostis chloromelas	Poaceae	Perennial Tufted Grass	0	1	0	0
Eragrostis curvula	Poaceae	Perennial Tufted Grass	0	1	0	0
Eragrostis lehmanniana	Poaceae	Perennial Tufted Grass	1	1	1	1
Eragrostis pallens	Poaceae	Perennial Tufted Grass	0	0	0	1
Eragrostis rigidior	Poaceae	Perennial Tufted Grass	1	1	1	1
Eragrostis rigidior	Poaceae	Perennial Tufted Grass	0	1	0	0
Eragrostis superba	Poaceae	Perennial Tufted Grass	1	0	0	0
Eragrostis trichophora	Poaceae	Perennial Tufted Grass	0	0	0	1
Euphorbia inaequilatera	Euphorbiaceae	Perennial Herb	1	0	0	0
Felicia muricata	Asteraceae	Perennial Herb	1	0	0	0
Gazania krebsiana	Asteraceae	Perennial Herb	0	1	0	0
Gomphocarpus fruticosus	Apocynaceae	Perennial Herb	0	1	0	0
Grewia flava	Tiliaceae	Shrub	1	1	1	1
Helichrysum argyrosphaerum	Asteraceae	Perennial Herb	0	1	0	1
Heliotropium ciliatum	Boraginaceae	Perennial Herb	1	0	0	1
Hermannia floribunda	Byttneriaceae	Perennial Herb	1	0	0	0
Hermannia quartiniana	Byttneriaceae	Perennial Herb	1	0	0	0
Hermannia grandistipula	Byttneriaceae	Perennial Herb	0	0	0	1
Heteropogon contortus	Poaceae	Perennial Tufted Grass	1	0	0	0
Hypoxis hemerocallidea	Hypoxidaceae	Geophyte	0	0	0	1
Indigofera daleoides	Fabaceae	Perennial Herb	0	0	0	1
Kleinia longiflora	Asteraceae	Perennial Succulent Herb	1	0	0	0
Laggera decurrens	Asteraceae	Annual Herb	0	0	0	1
Lantana rugosa	Verbenaceae	Perennial Herb	1	0	0	0
Ledebouria revoluta	Hyacinthaceae	Geophyte	0	0	0	1
Lippia scaberrima	Verbenaceae	Perennial Herb	1	0	1	1
Lobelia erinus	Lobeliaceae	Perennial Herb	0	1	1	0
Lycium hirsutum	Solanaceae	Shrub	0	0	1	0

Scientific Name	Family	Growth form	PB B & C	PB E	PB F	BP G
Menodora africana	Oleaceae	Perennial Herb	1	0	0	0
Moraea pallida	Iridaceae	Geophyte	0	1	1	1
Ornithogalum (=Albuca) abyssinicum	Hyacinthaceae	Geophyte	0	0	1	0
Osteospermum muricatum	Asteraceae	Perennial Herb	1	0	0	1
Pavonia burchellii	Malvaceae	Perennial Herb	0	0	0	1
Pentzia viridis	Asteraceae	Perennial Herb	1	0	1	0
Pogonarthria squarrosa	Poaceae	Annual Tufted Grass	0	0	1	1
Pteronia glauca	Asteraceae	Perennial Herb	0	1	1	0
Rhynchosia adenodes	Fabaceae	Perennial Herb	0	0	0	1
Ruschia sp.	Mesembryanthemaceae	Perennial Succulent Herb	0	0	0	1
Searsia lancea	Anacardiaceae	Tree	1	1	1	1
Searsia leptodictya	Anacardiaceae	Tree	1	0	0	0
Searsia pyroides	Anacardiaceae	Tree	0	0	1	1
Senecio inaequidens	Asteraceae	Perennial Herb	1	1	1	1
Solanum elaeagnifolium	Solanaceae	Perennial Herb	0	0	1	0
Solanum panduriforme	Solanaceae	Perennial Herb	0	1	0	0
Sporobolus ludwigii	Poaceae	Perennial Tufted Grass	0	0	1	0
Sporobolus fimbriatus	Poaceae	Perennial Tufted Grass	1	1	1	0
Stipagrostis uniplumis	Poaceae	Perennial Tufted Grass	1	1	1	1
*Tagetes minuta**	Asteraceae	Annual Herb	0	1	1	1
Tarchonanthus camphoratus	Asteraceae	Shrub	1	0	0	1
Themeda triandra	Poaceae	Perennial Tufted Grass	0	1	1	1
Urochloa cf. mossambicensis	Poaceae	Perennial Tufted Grass	0	1	0	0
Vangueria infausta	Rubiaceae	Tree	0	0	1	0
Viscum verrucosum	Viscaceae	Parasitic Herb	1	0	0	0
Wahlenbergia cf. undulata	Campanulaceae	Perennial Herb	0	0	1	1
		Total	**46**	**33**	**38**	**41**

Appendix 3: The *observed* mammal richness on each respective borrow pit during a site survey (22 - 23 September 2011).

Scientific Name	Vernacular Name	Observed Indicator	BP B & C	PB E	PB F	PB G
Antidorcas marsupialis	Cape Springbok	Droppings	1			
Canis mesomelas	Black-backed Jackal	Spoor & droppings	1		1	1
Connochaetus taurinus	Blue Wildebeest	Droppings	1			
Cryptomys hottentotus	Common Mole-rat	Soil heaps		1	1	1
Cynictis penicillata	Yellow Mongoose	Visual sightings	1			1
Hystrix africaeaustralis	Cape Porcupine	Burrows, quills and photographs	1	1	1	1
Lepus capensis/L. saxatilis	Cape Hare/Scrub Hare	Droppings	1	1	1	1
Mellivora capensis	Honey Badger	Spoor	1			
Micaelamys namaquensis	Namaqua Rock Mouse	Communal shelters			1	
Orycteropus afer	Aardvark	Burrows, droppings & spoor	1			1
Oryx gazella	Gemsbok	Spoor, droppings	1			
Parahyaena brunnea	Brown Hyaena	Spoor	1			
Pedetes capensis	Springhare	Burrows, droppings	1	1	1	1

Scientific Name	Vernacular Name	Observed Indicator	BP B & C	PB E	PB F	PB G
Phacochoerus africanus	Common Warthog	Visual sightings	1			
Raphicerus campestris	Steenbok	Spoor	1			1
Strepsiceros zambesiensis	Zambesi Kudu	Droppings, visual sightings	1			
Sylvicapra grimmia	Common Duiker	Spoor	1			
Tatera leucogaster	Bushveld Gerbil	Burrows		1	1	1
Vulpes chama	Cape Fox	Spoor	1			1
Xerus inauris	South African Ground Squirrel	Visual sightings				1
		Total	**16**	**5**	**7**	**11**

PGS
HERITAGE & GRAVE
RELOCATION CONSULTANTS

HERITAGE ASSESSMENT

Proposed Road P12-2 Borrow Pit Project near Schweizer Reneke, Northwest Province

Version **1.0**

DEA Reference:

25 April 2012

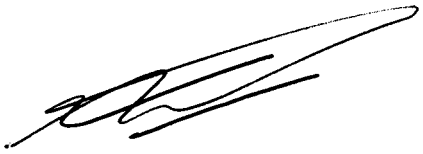
ACKNOWLEDGEMENT OF RECEIPT

CLIENT: Worley Parsons South Africa

CONTACT PERSON: Mr J C Pretorius
Tel: +27 (0) 12 425 6300
Email: jc.pretorius@worleyparsons.com

LEADING CONSULTANT: PGS - Heritage & Grave Relocation Consultants

CONTACT PERSON: Wouter Fourie, Tel: +27 (0)82 851 3575
Email: wouter@gravesolutions.co.za

SIGNATURE: 

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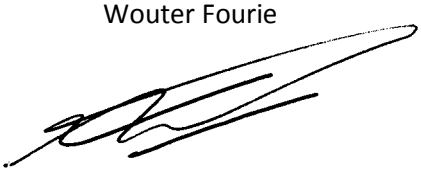
iii. The recommendations delivered to the Client.

Declaration of Independence

The report has been compiled by PGS Heritage & Grave Relocation Consultants an appointed Heritage Specialist for Worley Parsons RSA The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Archaeological Impact Assessment Process.

ARCHAEOLOGICAL CONSULTANT: PGS Heritage & Grave Relocation Consultants

PRINCIPAL INVESTIGATOR: Wouter Fourie

SIGNATURE: 

Executive Summary

PGS Heritage and Grave Relocation Consultants was appointed by WorleyParson RSA, to undertake a Heritage Scoping for the development of borrow pits at 5 locations along the R34 road for the reseal and rehabilitation of road P12-2 Schweizer Reneke to Vryburg, North West Province.

During the survey of the 5 borrow pit sites no sites of heritage significance were found.

It was found that the proposed activities will not have any adverse effect on heritages resources.

General recommendation on archaeological work

If during construction any possible finds are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find.

Contents

APPENDICES

TABLE OF FIGURE

ABREVIATIONS

Acronyms	***Description***
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
AMAFA	
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NID	Notice of Intent to develop
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

TERMS & DEFINITION

Archaeological resources

This includes:

i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;

ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;

iii.

iv. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;

v. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;

ii. carrying out any works on or over or under a place;

iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;

iv. constructing or putting up for display signs or boards;

v. any change to the natural or existing condition or topography of land; and

vi. any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

1. INTRODUCTION

PGS Heritage and Grave Relocation Consultants was appointed by WorleyParson RSA, to undertake a Heritage Scoping for the development of borrow pits at 5 locations along the R34 road for the reseal and rehabilitation of road P12-2 Schweizer Reneke to Vryburg, North West Province.

1.1 Project Background

North West Provincial Government, Department: Public Works; Roads and Transport intends to upgrade Road P12-2 between Schweizer Reneke and Vryburg in the North West Province. With the intended upgrade large volumes of construction material in the form of gravel would be required. This construction material must have the correct geotechnical properties and be of a specific quality to ensure the integrity of the constructed road. The material would need to be sourced from borrow pits in the vicinity of the road.

For this reason geotechnical investigations have been conducted on numerous borrow pit sites with potentially suitable construction material. The investigations were conducted on sites in close proximity to the road in order to reduce hauling costs from the borrow pits to the road during construction. Five potential borrow pit sites have been identified as suitable. The establishment, operation and rehabilitation and closure of the potential borrow pits will however require environmental authorisation prior to the commencement of the activities.

1.2 Site location

The sites are located between kilometers 6.2 and 28.5 on the R34 (P12-2) from Schweizer Reyneke to Vryburg ***Figure 1***.

Figure 1 – Locality Map of the Study Area

1.3 Legislative Framework

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

i. National Environmental Management Act (NEMA) Act 107 of 1998
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
iv. Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

i. National Environmental Management Act (NEMA) Act 107 of 1998 as promulgated in the Regulations.
    a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
    b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
    c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
    d. Environmental Management Plan (EMP) – Section (34)(b)
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
    a. Protection of Heritage resources – Sections 34 to 36; and
    b. Heritage Resources Management – Section 38

i. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
    a. Section 39(3)
ii. Development Facilitation Act (DFA) Act 67 of 1995
    a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…”. The NEMA (No 107 of 1998) states that an integrated environmental management plan should (23:2 (b)) “…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”. In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and Association of Southern African Professional Archaeologists (ASAPA) have also been incorporated to ensure that a comprehensive legally compatible AIA report is compiled. The heritage impact assessment criteria are described in more detail in ***Appendix A***.

1.4 Assumptions and Limitations

Not subtracting 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 in some areas. As such, should any heritage features and/or objects not included in the present inventory be located or observed, an archaeologists 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 as the archaeologist 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.

2. DESCRIPTION OF AFFECTED ENVIRONMENT

The five sites were evaluated during a day's site visit to all five sites and the findings are as follows

Borrow Pits – BP B and BP C

The site is characterised by dense bushveld over most of the study area. A section of the proposed borrow pit BP C was previously utilised as a borrow pit.

Figure 2 – General view of borrow pit BP B (© W Fourie, 2011)

Figure 3 – General view of borrow pit BP C, with previous borrow pit visible (© W Fourie, 2011)

Figure 4 – Tracklogs of survey done by archaeologist (© W Fourie, 2011)

Borrow Pits – BP E

The site is characterised by grass land utilised for grazing inter dispersed with thorny bushveld

Figure 5 – General view of borrow pit BP E (© W Fourie, 2011)

Figure 6 – Tracklogs of survey done by archaeologist (© W Fourie, 2011)

Borrow Pits – BP F

The site is characterised by grass land utilised for grazing inter dispersed with thorny bushveld. A section has previously been utilised as a borrow pit. The western section of the study area is characterised by a rocky outcrop.

Figure 7 – General view of borrow pit BP F, with rocky outcrop to the left (© W Fourie, 2011)

Figure 8 – Tracklogs of survey done by archaeologist (© W Fourie, 2011)

Borrow Pits – BP G

The site is characterised by grass land utilised for grazing inter dispersed with thorny bushveld. A section has previously been utilised as a borrow pit.

Figure 9 – General view of borrow pit BP G, with previous borrow pit visible (© W Fourie, 2011)

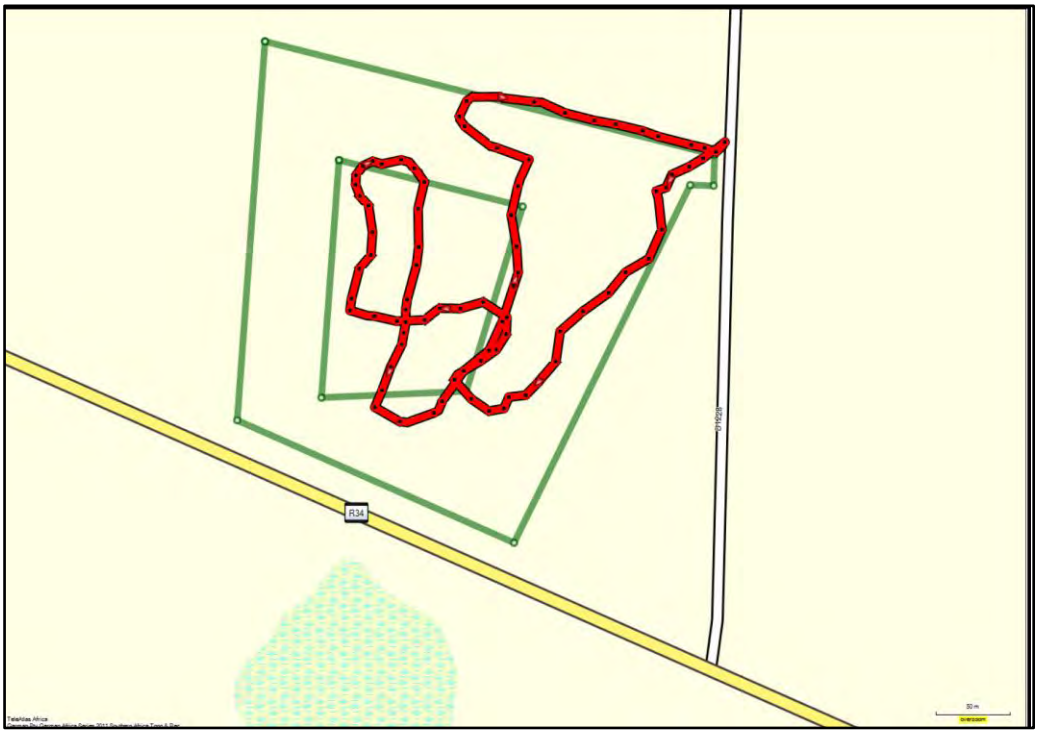


Figure 10 – Tracklogs of survey done by archaeologist (© W Fourie, 2011)

3. ASSESSMEN METHODOLOGY & APPROACH

3.1 General Approach

This chapter describes the evaluation criteria to be used for the sites listed below and to be identified during the ground thruthing.

The significance of archaeological sites was based on four main criteria:

- site integrity (i.e. primary vs. secondary context),
- amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- uniqueness; and
- potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C – Extensive mapping before destruction and preserve section where possible

D - Preserve site, or extensive data collection and mapping of the site; and

E - Preserve site

Impacts on these sites by the development will be evaluated as follows

Impact

The potential environmental impacts that may result from the proposed development activities.

Nature and existing mitigation

Natural conditions and conditions inherent in the project design that alleviate (control, moderate, curb) impacts. All management actions, which are presently implemented, are considered part of the project design and therefore mitigate impacts.

3.2 Evaluation Methods

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

Table 2: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	-	Low Significance	Destruction

Impact Rating

VERY HIGH

These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.

Example: The loss of a species would be viewed by informed society as being of VERY HIGH significance.

Example: The establishment of a large amount of infrastructure in a rural area, which previously had very few services, would be regarded by the affected parties as resulting in benefits with a VERY HIGH significance.

HIGH

These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.

Example: The loss of a diverse vegetation type, which is fairly common elsewhere, would have a significance rating of HIGH over the long term, as the area could be rehabilitated.
Example: The change to soil conditions will impact the natural system, and the impact on affected parties (in this case people growing crops on the soil) would be HIGH.

MODERATE

These impacts will usually result in medium- to long-term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial.
Example: The loss of a sparse, open vegetation type of low diversity may be regarded as MODERATELY significant.
Example: The provision of a clinic in a rural area would result in a benefit of MODERATE significance.

LOW

These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.
Example: The temporary change in the water table of a wetland habitat, as these systems is adapted to fluctuating water levels.
Example: The increased earning potential of people employed as a result of a development would only result in benefits of LOW significance to people who live some distance away.

NO SIGNIFICANCE

There are no primary or secondary effects at all that are important to scientists or the public.
Example: A change to the geology of a particular formation may be regarded as severe from a geological perspective, but is of NO significance in the overall context.

Certainty

DEFINITE: More than 90% sure of a particular fact. Substantial supportive data exists to verify the assessment.
PROBABLE: Over 70% certainty of a particular fact, or of the likelihood of an impact occurring.
POSSIBLE: Only over 40% certainty of a particular fact or of the likelihood of an impact occurring.
UNSURE: Less than 40% certainty of a particular fact or likelihood of an impact occurring.

Duration

SHORT TERM: 0 to 5 years
MEDIUM: 6 to 20 years

LONG TERM: more than 20 years

DEMOLISHED: site will be demolished or is already demolished

Example

Evaluation

Impact	**Impact Significance**	**Heritage Significance**	**Certainty**	**Duration**	**Mitigation**
Negative	Moderate	Grade GP.B	Possible	Short term	B

4. RECOMMENDATIONS

During the survey no sites of heritage significance were found.

It was found that the proposed development will not have any adverse effect on heritages resources.

General recommendation on archaeological work

If during construction any possible finds are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find.

5. LIST OF PREPARES

PGS Heritage and Grave Relocation Consultants have seconded the following specialist to this project:

Team Leader: Wouter Fourie (BA (Hon) Archaeology), Accredited Professional Archaeologist (ASAPA) – CRM Accredited Principal Investigator.

APPENDIX A

LEGISLATIVE PRINCIPLES

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

3.1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the new legislation, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources are integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have interest in the graves: they may be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle will be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:
An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;

- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection, to all historic and pre-historic cultural remains, including graves and human remains.

3.2 Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

Appendix II

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Department of Public Works; Roads and Transport

NOTICE OF MINING PERMIT APPLICATION

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA, Act Number 28 of 2002), of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

Applicant

The Department of Public Works; Roads & Transport

Description of Works

The Department of Public Works; Roads & Transport intend to carry out necessary road improvement works on the P12-2 (R34) Road between the towns of Schweizer Reneke and Vryburg, NW Province. The development of 1 borrow pit has been proposed within this immediate area to provide road construction material for the improvement works.

Borrow Pit Location and Details

Reference:	Borrow Pit G
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9' 46.84" S, 25° 16' 36.72" E
Approximate Site Area:	6.354 Hectares
Approximate Borrow Pit Area:	1.487 Hectares

How does this Affect you as a Resident, Neighbour or an Interested and Affected Party?

An important component of the mining permit application process is the identification of any party who feels that they may be affected by, or, who may wish to make comment on or object to the proposed works. WorleyParsons welcomes your comments and participation in this project and assure you that as an I&AP your input will form an important part of the decision making process.

How to Register as an Interested & Affected Party

Parties or persons wishing to register as an interested and affected party are requested to forward their contact details and comment or concerns to WorleyParsons at the contact details provided below. Please note that all correspondence should be submitted within **30 days** of publication of this notice (21st June 2012). Background information on the proposed project is available from WorleyParsons on request.

Mr JC Pretorius
WorleyParsons Pty
PO Box 93155
Menlopark
0102
☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

Appendix III

WorleyParsons
resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

21st June 2012

H Kotze
PO Box 323
Schweizer Reneke
2780

Dear Mr Kotze

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 (R34) Road Between Schweizer Reneke and Vryburg.

As you are aware, the Department of Public Works; Roads and Transport's (DPWRT) has developed plans to upgrade the R34 Road between Schweizer Reneke and Vryburg, A total of five borrow pits will be required to provide aggregate for the road improvement project. It has been proposed that one of these borrow pits (Borrow Pit G) will be located on MOREDOU No. 395 – HO owned by you.

DPWRT are required by law to obtain a Mining Permit before development of the borrow pits can commence; the mining permit application process is currently on-going. DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf and as part of this process, WorleyParsons has completed a biodiversity study, heritage study and assessment of potential environmental risk and impact for each of the five proposed sites.

As the landowner, you have been registered as a key stakeholder and therefore we will keep you fully informed of progress as the mining permit application proceeds. As a key stakeholder your input to the process is important and we would be obliged if you would please submit any comments queries or suggestions that you may have regarding the proposed works on the attached registration and comment sheet. We would appreciate it if you could also inform us on this sheet if you are aware of any current or proposed land claims against your property. We would like to assure you that any comment or suggestion you make will be addressed and integrated into the Project Environmental Management Plan and will form an important part of the final decision making process.

A satellite image illustrating the location of each borrow pit is attached to this letter. For your information, relevant detail relating to the location and ownership of land for proposed development of the borrow pits is summarised as follows:

Reference:	Borrow Pit B
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.788' S, 25° 4.440' E

Reference:	Borrow Pit C
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901' S, 25° 4.704' E

Reference:	Borrow Pit E
Landowner:	Mr & Mrs W F Coetzee
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373' S, 25° 10.671' E

Reference:	Borrow Pit F
Landowner:	Mr & Mrs S J van der Merwe
Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760' S, 25° 14.713' E

Reference:	Borrow Pit G
Landowner:	Mr H Kotze
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9.781' S, 25° 16.612' E

WorleyParsons would like to thank you in advance for your input to this important process and we look forward to receiving your comments in due course. If you require further information please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA

Mr J.C. Pretorius

WorleyParsons

resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

25th June 2012

H Kotze
PO Box 323
Schweizer Reneke
2780

Dear Mr Kotze

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 (R34) Road between Schweizer Reneke and Vryburg.

I would like to thank you for taking the time to talk to WorleyParsons last week and for providing your input to the mining permit application for the above works.

As agreed I have attached a summary of our discussion and a copy of the mining permit application comment sheet. I would be obliged if you would complete the enclosed form and return it to the above address with any further comments or questions you may have.

Unfortunately we are not in a position to provide clarity on the technical questions you raised during the meeting however we would like to assure you that your questions have been passed on to the engineering project manager and we will forward this information to you as soon as it is made available.

Once again we would again like to thank you for your input and we look forward to receiving your comments in due course. If you require further information or clarification please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA

Mr J.C. Pretorius

WorleyParsons
resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

30th July 2012

Mrs Katie Smuts

South African Heritage Resources Agency

112 Harrington St

Cape Town.

PO Box 4638

8001

Cape Town.

Dear Ms Smuts

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 Road Between Schweizer Reneke and Vryburg.

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA) of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf. As part of this process, WorleyParsons has completed a biodiversity study, heritage study and assessment of potential environmental risk and impact for each of the five proposed sites.

An important component of the mining permit application process is the identification of external stakeholders and interested parties. WorleyParsons has identified and registered you as an interested/affected party and will keep you informed of progress throughout the application process. We would be obliged if you would please submit any comments queries or suggestions that you may have regarding this mining permit application via the attached registration and comment sheet. Alternatively, if you do not consider that you are an interested or affected party and wish to be removed from the project database, please indicate accordingly.

A copy of the Environmental Management Plan for each of the five borrow pits is attached to this letter. For your information, relevant detail relating to location and ownership of land is summarised as follows:

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Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
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Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901' S, 25° 4.704' E

Reference:	Borrow Pit E
Landowner:	Mr & Mrs W F Coetzee
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373' S, 25° 10.671' E

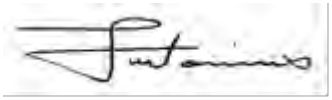
Reference:	Borrow Pit F
Landowner:	Mr & Mrs S J van der Merwe
Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760' S, 25° 14.713' E

Reference:	Borrow Pit G
Landowner:	Mr H Kotze
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9.781' S, 25° 16.612' E

WorleyParsons would like to thank you in advance for your input to this important process and we look forward to receiving your comments in due course. If you require further information please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA



Mr J.C. Pretorius

WorleyParsons

resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

30th July 2012

A Kekesi
Dr Ruth S Mompati District Municipality
PO Box 21
Vryburg
8600

Dear Mr Kekesi

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 Road between Schweizer Reneke and Vryburg.

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA) of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf. As part of this process, WorleyParsons has completed a biodiversity study, heritage study and assessment of potential environmental risk and impact for each of the five proposed sites.

An important component of the mining permit application process is the identification of external stakeholders and interested parties. WorleyParsons has identified and registered you as an interested/affected party and will keep you informed of progress throughout the application process. We would be obliged if you would please submit any comments queries or suggestions that you may have regarding this mining permit application via the attached registration and comment sheet. Alternatively, if you do not consider that you are an interested or affected party and wish to be removed from the project database, please indicate accordingly.

A copy of the Environmental Management Plan for each of the five borrow pits is attached to this letter. For your information, relevant detail relating to location and ownership of land is summarised as follows:

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Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901’ S, 25° 4.704’ E

Reference:	Borrow Pit E
Landowner:	Mr & Mrs W F Coetzee
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373’ S, 25° 10.671’ E

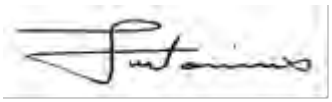
Reference:	Borrow Pit F
Landowner:	Mr & Mrs S J van der Merwe
Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760’ S, 25° 14.713’ E

Reference:	Borrow Pit G
Landowner:	Mr H Kotze
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9.781’ S, 25° 16.612’ E

WorleyParsons would like to thank you in advance for your input to this important process and we look forward to receiving your comments in due course. If you require further information please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA



Mr J.C. Pretorius

WorleyParsons
resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

30th July 2012

Municipal Manager
Naledi Local Municipality
PO Box 35
Vryburg
8600

Dear Mr Segapo

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 Road Between Schweizer Reneke and Vryburg.

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA) of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf. As part of this process, WorleyParsons has completed a biodiversity study, heritage study and assessment of potential environmental risk and impact for each of the five proposed sites.

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Reference:	Borrow Pit C
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901' S, 25° 4.704' E

Reference:	Borrow Pit E
Landowner:	Mr & Mrs W F Coetzee
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373' S, 25° 10.671' E

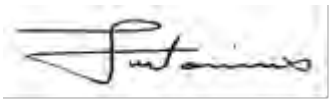
Reference:	Borrow Pit F
Landowner:	Mr & Mrs S J van der Merwe
Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760' S, 25° 14.713' E

Reference:	Borrow Pit G
Landowner:	Mr H Kotze
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9.781' S, 25° 16.612' E

WorleyParsons would like to thank you in advance for your input to this important process and we look forward to receiving your comments in due course. If you require further information please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA



Mr J.C. Pretorius

WorleyParsons

resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

30th July 2012

Municipal Manager
Mamusa Local Municipality
PO Box 5
Schweizer-Reneke
2780

Dear Mr Gincane

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 Road Between Schweizer Reneke and Vryburg.

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA) of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf. As part of this process, WorleyParsons has completed a biodiversity study, heritage study and assessment of potential environmental risk and impact for each of the five proposed sites.

An important component of the mining permit application process is the identification of external stakeholders and interested parties. WorleyParsons has identified and registered you as an interested/affected party and will keep you informed of progress throughout the application process. We would be obliged if you would please submit any comments queries or suggestions that you may have regarding this mining permit application. Alternatively, if you do not consider that you are an interested or affected party and wish to be removed from the project database, please indicate accordingly.

A copy of the Environmental Management Plan for each of the five borrow pits is attached to this letter. For your information, relevant detail relating to location and ownership of land is summarised as follows:

Reference:	Borrow Pit B
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.788' S, 25° 4.440' E

Reference:	Borrow Pit C
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901' S, 25° 4.704' E

Reference:	Borrow Pit E
Landowner:	Mr & Mrs W F Coetzee
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373' S, 25° 10.671' E

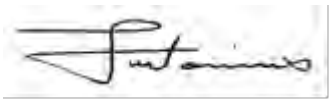
Reference:	Borrow Pit F
Landowner:	Mr & Mrs S J van der Merwe
Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760' S, 25° 14.713' E

Reference:	Borrow Pit G
Landowner:	Mr H Kotze
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9.781' S, 25° 16.612' E

WorleyParsons would like to thank you in advance for your input to this important process and we look forward to receiving your comments in due course. If you require further information please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA



Mr J.C. Pretorius

WorleyParsons

resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

30th July 2012

Mashudu Marubini

Department of Agriculture, Forestry and Fisheries

Delpen Building

Corner of Annie Botha and Union Street

Office 270

Pretoria.

Private Bag X120

0001

Pretoria.

Dear Ms Marubini

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 Road Between Schweizer Reneke and Vryburg.

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA) of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf. As part of this process, WorleyParsons has completed a biodiversity study, heritage study and assessment of potential environmental risk and impact for each of the five proposed sites.

An important component of the mining permit application process is the identification of external stakeholders and interested parties. WorleyParsons has identified and registered you as an interested/affected party and will keep you informed of progress throughout the application process. We would be obliged if you would please submit any comments queries or suggestions that you may have regarding this mining permit application. Alternatively, if you do not consider that you are an interested or affected party and wish to be removed from the project database, please indicate accordingly.

A copy of the Environmental Management Plan for each of the five borrow pits is attached to this letter. For your information, relevant detail relating to location and ownership of land is summarised as follows:

Reference:	Borrow Pit B
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.788' S, 25° 4.440' E

Reference:	Borrow Pit C
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901' S, 25° 4.704' E

Reference:	Borrow Pit E
Landowner:	Mr & Mrs W F Coetzee
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373' S, 25° 10.671' E

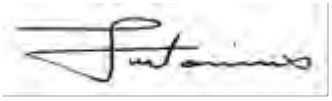
Reference:	Borrow Pit F
Landowner:	Mr & Mrs S J van der Merwe
Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760' S, 25° 14.713' E

Reference:	Borrow Pit G
Landowner:	Mr H Kotze
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9.781' S, 25° 16.612' E

WorleyParsons would like to thank you in advance for your input to this important process and we look forward to receiving your comments in due course. If you require further information please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA



Mr J.C. Pretorius

WorleyParsons
resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 425 6300 / 🖷: 012 460 9978
✉: jc.pretorius@worleyparsons.com

21st June 2012

Dear sir / Madam

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 Road between Schweizer Reneke and Vryburg.

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA) of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf. As part of this process, WorleyParsons has completed a biodiversity study, heritage study and assessment of potential environmental risk and impact for each of the five proposed sites.

An important component of the mining permit application process is the identification of external stakeholders and interested parties. WorleyParsons has identified that you are resident within 1.5 kilometres of one or more of the proposed borrow pits and has therefore registered you as an interested / affected party. As such, we will keep you informed of progress throughout the application process. We would be obliged if you would please submit any comments queries or suggestions that you may have regarding this mining permit application via the attached registration and comment sheet. Alternatively, if you do not consider that you are an interested or affected party and wish to be removed from the project database, please indicate accordingly.

A satellite image illustrating the location of the nearest borrow pit to your residence is attached to this letter. For your information, relevant detail relating to location and ownership of land is summarised as follows:

Reference:	Borrow Pit B
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.788' S, 25° 4.440' E

Reference:	Borrow Pit C
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901' S, 25° 4.704' E

Reference:	Borrow Pit E
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373' S, 25° 10.671' E

Reference:	Borrow Pit F
Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760' S, 25° 14.713' E

Reference:	Borrow Pit G
Site Address:	Moredou No. 395 – HO
GPS Coordinates:	27° 9.781' S, 25° 16.612' E

WorleyParsons would like to thank you in advance for your input to this important process and we look forward to receiving your comments in due course. If you require further information please do not hesitate to contact the undersigned.

Yours sincerely

WorleyParsons RSA

Mr J.C. Pretorius

WorleyParsons

resources & energy

EcoNomics

PO Box 93155
Menlopark
0102

☎: 012 745 2089 / 🖷: 012 745 2001
✉: jc.pretorius@worleyparsons.com

27th June 2012

Chief Director

Department of Rural Development and Land Reform

Restitution Support: Gauteng and North West

Cnr of Provident and University Street

ABSA Building

MMABATHO

2735

Private Bag X08,

MMABATHO

2735

Dear Mr LJ Bogatsu

Mining Permit Application for the Development of Borrow Pits for the Upgrade of the P12-2 Road Between Schweizer Reneke and Vryburg.

Notice is hereby given in terms of the mineral and Petroleum Resources Development Act (MPRDA) of the Department of Public Works; Roads and Transport's (DPWRT) intent to develop five borrow pits along the P12-2 (R34) road between Schweizer Reneke and Vryburg, NW Province. The borrow pits will be developed as part of the planned P12-2 road improvement project.

DPWRT has appointed WorleyParsons RSA as independent environmental consultants to manage the mining permit application process on their behalf. As part of this process, WorleyParsons has completed a Draft Environmental Management Plan and assessment of potential environmental risk and impact for each of the five proposed sites.

An important component of the mining permit application process is the identification of external stakeholders and interested parties. WorleyParsons has identified and registered you as an interested/affected party and will keep you informed of progress throughout the application process. We would be obliged if you would please submit any comments queries or suggestions that you may have regarding this mining permit application. Alternatively, if

you do not consider that you are an interested or affected party and wish to be removed from the project database, please indicate accordingly.

Enclosed please find copies of the five EMPs. For your information, relevant detail relating to location and ownership of land is summarised as follows:

Reference:	Borrow Pit B
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.788' S, 25° 4.440' E

Reference:	Borrow Pit C
Landowner:	Mr P J Jordaan
Site Address:	Remainder of Portion 4, Zoet en Smart No. 31 – HO
GPS Coordinates:	27° 4.901' S, 25° 4.704' E

Reference:	Borrow Pit E
Landowner:	Mr & Mrs W F Coetzee
Site Address:	Remainder of Portion 9, Damplaats No. 38 - HO
GPS Coordinates:	27° 7.373' S, 25° 10.671' E

Reference:	Borrow Pit F
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Site Address:	Portion 4 of Lot 9, No. 63 – HO
GPS Coordinates:	27° 9.760' S, 25° 14.713' E

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Landowner:	Mr H Kotze
Site Address:	Moredou No. 395 – HO
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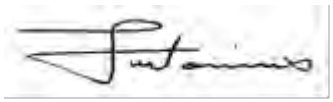
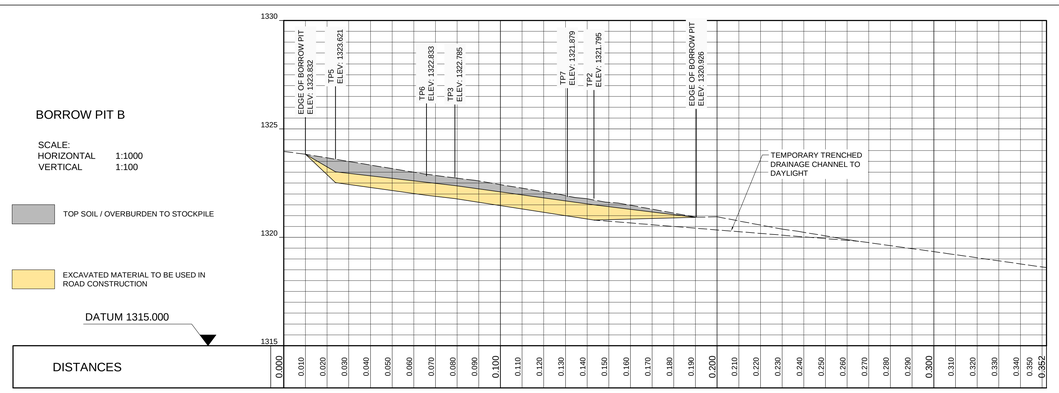
Yours sincerely

WorleyParsons RSA

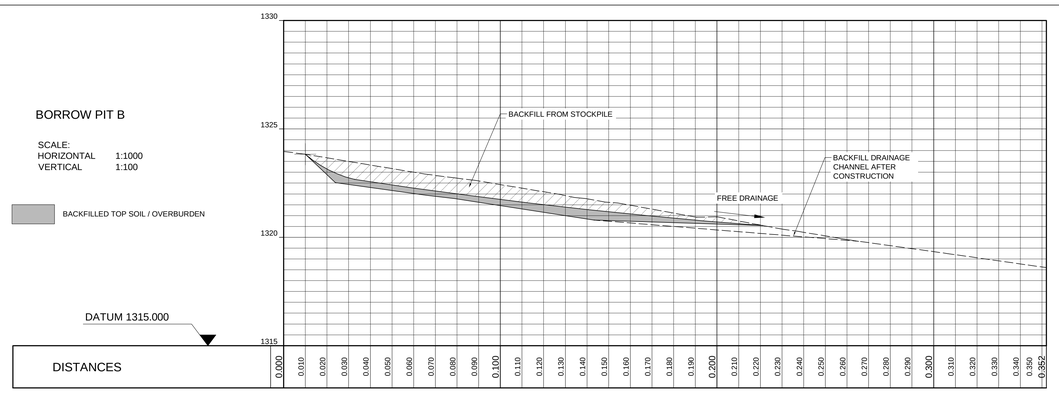


Mr J.C. Pretorius

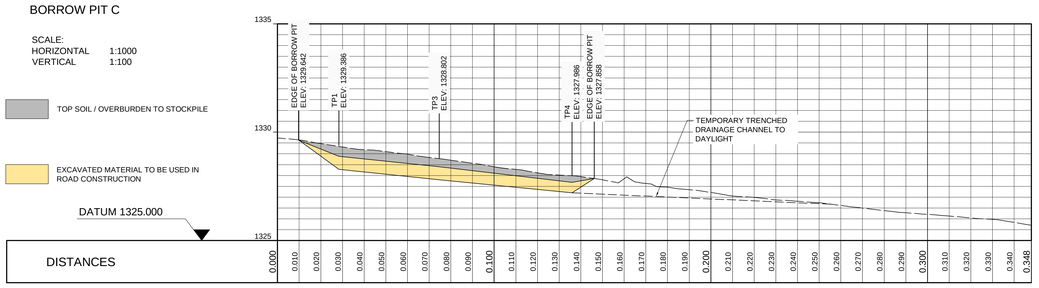
Appendix IV



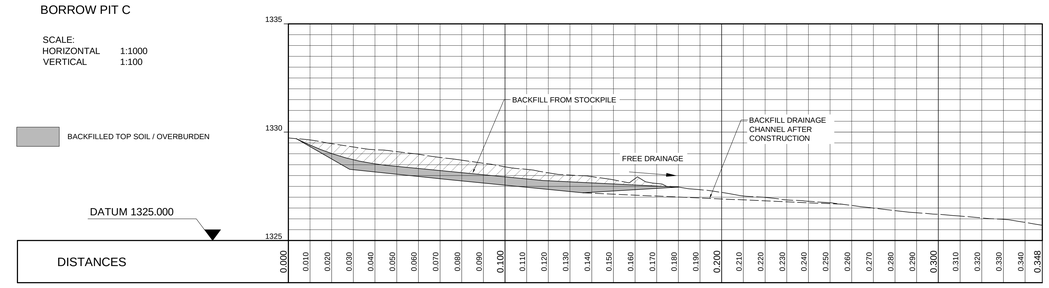
BORROW PIT B - EXCAVATION
CROSS SECTION A-A



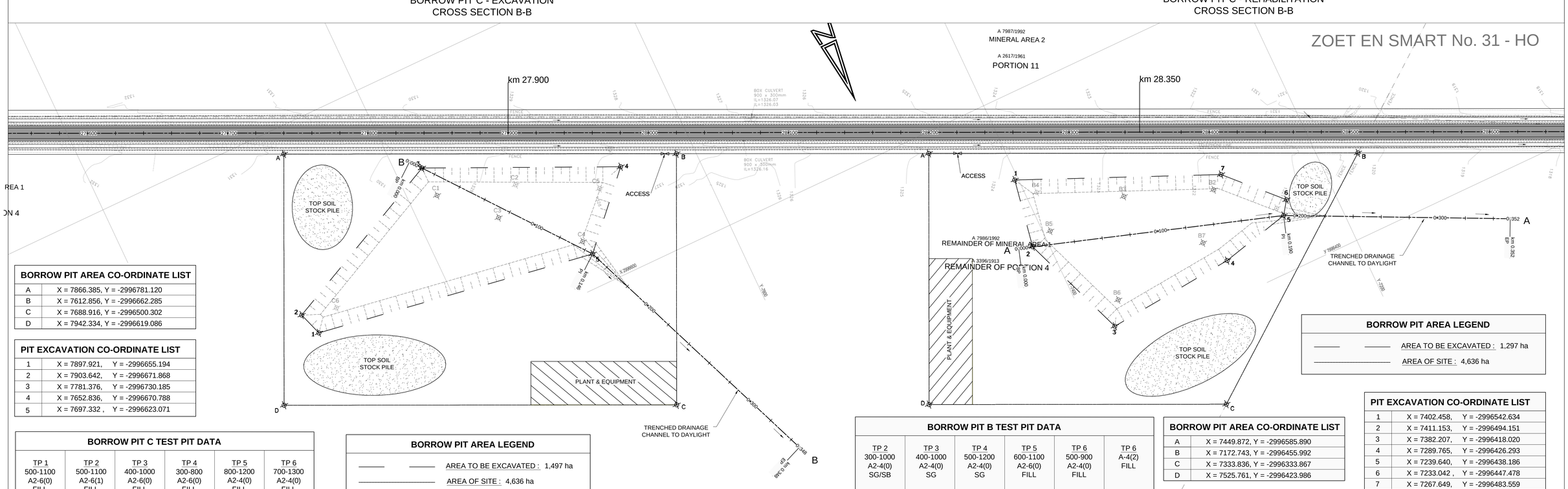
BORROW PIT B - REHABILITATION
CROSS SECTION A-A



BORROW PIT C - EXCAVATION
CROSS SECTION B-B



BORROW PIT C - REHABILITATION
CROSS SECTION B-B



BORROW PIT AREA CO-ORDINATE LIST	
A	X = 7866.385, Y = -2996781.120
B	X = 7612.856, Y = -2996662.285
C	X = 7688.916, Y = -2996500.302
D	X = 7942.334, Y = -2996619.086

PIT EXCAVATION CO-ORDINATE LIST	
1	X = 7897.921, Y = -2996655.194
2	X = 7903.642, Y = -2996671.868
3	X = 7781.376, Y = -2996730.185
4	X = 7652.836, Y = -2996670.788
5	X = 7697.332 , Y = -2996623.071

BORROW PIT C TEST PIT DATA					
TP 1 500-1100 A2-6(0) FILL	TP 2 500-1100 A2-6(1) FILL	TP 3 400-1000 A2-6(0) FILL	TP 4 300-800 A2-6(0) FILL	TP 5 800-1200 A2-4(0) FILL	TP 6 700-1300 A2-4(0) FILL

BORROW PIT AREA LEGEND	
AREA TO BE EXCAVATED :	1,497 ha
AREA OF SITE :	4,636 ha
FINAL SHAPE ILLUSTRATED THUS	

BORROW PIT B TEST PIT DATA					
TP 2 300-1000 A2-4(0) SG/SB	TP 3 400-1000 A2-4(0) SG	TP 4 500-1200 A2-4(0) SG	TP 5 600-1100 A2-6(0) FILL	TP 6 500-900 A2-4(0) FILL	TP 6 A-4(2) FILL

BORROW PIT AREA CO-ORDINATE LIST	
A	X = 7449.872, Y = -2996585.890
B	X = 7172.743, Y = -2996455.992
C	X = 7333.836, Y = -2996333.867
D	X = 7525.761, Y = -2996423.986

BORROW PIT AREA LEGEND	
AREA TO BE EXCAVATED :	1,297 ha
AREA OF SITE :	4,636 ha

PIT EXCAVATION CO-ORDINATE LIST	
1	X = 7402.458, Y = -2996542.634
2	X = 7411.153, Y = -2996494.151
3	X = 7382.207, Y = -2996418.020
4	X = 7289.765, Y = -2996426.293
5	X = 7239.640, Y = -2996438.186
6	X = 7233.042 , Y = -2996447.478
7	X = 7267.649, Y = -2996483.559

SG = SUB GRADE
SB = SUB BASE
B = BASE

ZOET EN SMART No. 31 - HO

AS BUILT DRAWING

for CONSULTANT / for HEAD OF DEPARTMENT
DATE : / DATE :

No	DATE	AMENDMENTS	for N.W.P.	DATE
1	05/2012	SECTION THROUGH BORROW PIT ADDED		

DESIGN APPROVED
for CONSULTANT DATE

APPROVED BY
for DEPUTY DIRECTOR:DESIGN DATE

WSP SA CIVIL AND STRUCTURAL ENGINEERS (PTY) LTD
PO BOX 2330
EDENVALE
1610
TEL: +27 (11) 450-2290
FAX: +27 (11) 450-2294

DESIGNED BY	D.ROBINSON	DRAWN BY	D.ROBINSON
DESIGN CHECKED	M.HUGHES	DRAWING CHECKED	M.HUGHES

North West Province
Department of Transport and Roads

Gabomotho Building
Dr. James Moroka Drive
Mmabatho

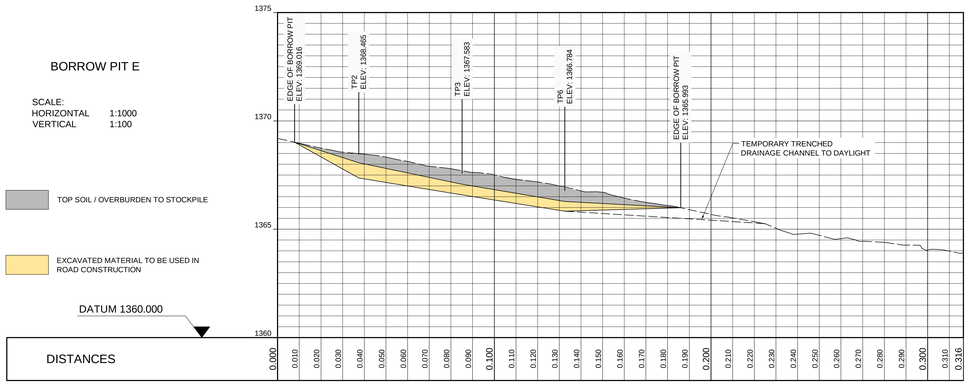
Private Bag x2080
Mmabatho
2735

RESEAL AND REHABILITATION OF ROAD P12-2 SCHWEIZER RENEKE TO VRYBURG

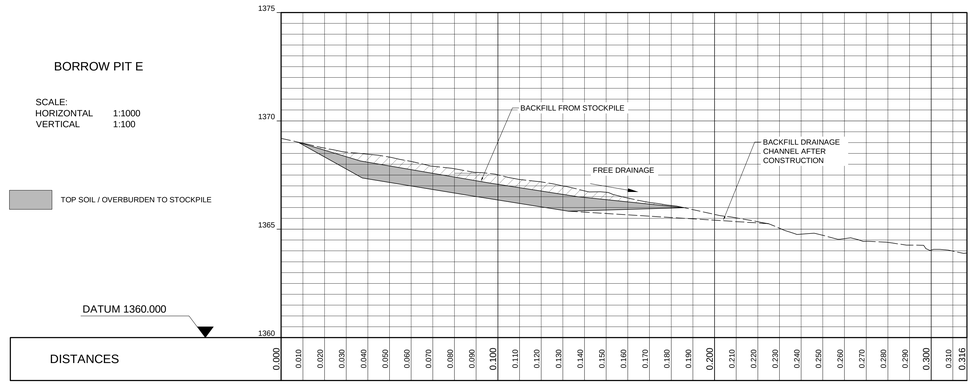
BORROW PIT B AND C
SITE LAYOUT PLAN

FILE No	TYPE OF PLANNING
FROM CLIENT	DETAIL
AGREEMENT No	JOB No
NWTR 133/07 of 2007/12/03	318709
ROAD No	SCALE
P12-2	1:1000
DISTRICT	DWG No
DR. RUTH SEGOMOTSI MOMPATI	NWTR 133 07 P12-2 BP1 1

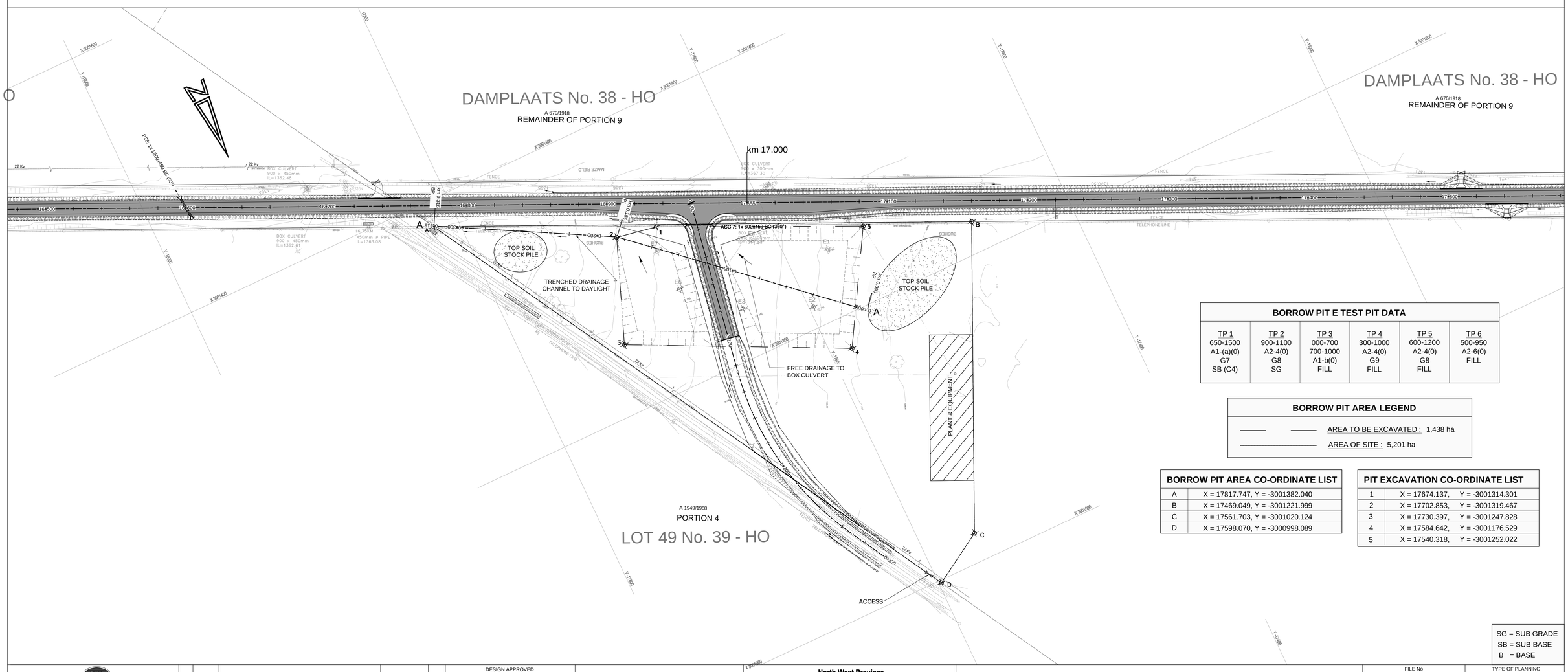
DWG No. NWTR 133 07 P12-2 BP1



BORROW PIT E - EXCAVATION
CROSS SECTION A-A



BORROW PIT E - REHABILITATION
CROSS SECTION A-A



BORROW PIT E TEST PIT DATA

TP 1	TP 2	TP 3	TP 4	TP 5	TP 6
650-1500	900-1100	000-700	300-1000	600-1200	500-950
A1-(a)(0)	A2-4(0)	700-1000	A2-4(0)	A2-4(0)	A2-6(0)
G7	G8	A1-b(0)	G9	G8	FILL
SB (C4)	SG	FILL	FILL	FILL	

BORROW PIT AREA LEGEND

AREA TO BE EXCAVATED : 1,438 ha

AREA OF SITE : 5,201 ha

BORROW PIT AREA CO-ORDINATE LIST

A	X = 17817.747, Y = -3001382.040
B	X = 17469.049, Y = -3001221.999
C	X = 17561.703, Y = -3001020.124
D	X = 17598.070, Y = -3000998.089

PIT EXCAVATION CO-ORDINATE LIST

1	X = 17674.137, Y = -3001314.301
2	X = 17702.853, Y = -3001319.467
3	X = 17730.397, Y = -3001247.828
4	X = 17584.642, Y = -3001176.529
5	X = 17540.318, Y = -3001252.022

SG = SUB GRADE
SB = SUB BASE
B = BASE

AS BUILT DRAWING

for CONSULTANT DATE :

for HEAD OF DEPARTMENT DATE :

No	DATE	AMENDMENTS	for N.W.P.	DATE
1	05/2012	SECTION THROUGH BORROW PIT ADDED		

DESIGN APPROVED

for CONSULTANT DATE

APPROVED BY

for DEPUTY DIRECTOR:DESIGN DATE

WSP SA CIVIL AND STRUCTURAL ENGINEERS (PTY) LTD
PO BOX 2330
EDENVALE
1610
TEL: +27 (11) 450-2290
FAX: +27 (11) 450-2294

DESIGNED BY	D.ROBINSON	DRAWN BY	D.ROBINSON
DESIGN CHECKED	M.HUGHES	DRAWING CHECKED	M.HUGHES

North West Province
Department of Transport and Roads

Gabomotho Building
Dr. James Moroka Drive
Mmabatho

Private Bag x2080
Mmabatho
2735

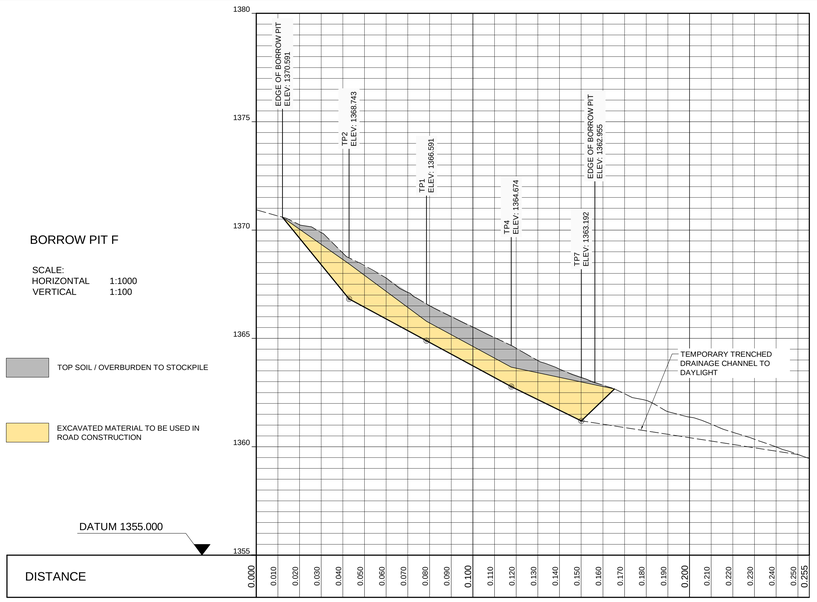
RESEAL AND REHABILITATION OF ROAD P12-2 SCHWEIZER RENEKE TO VRYBURG

BORROW PIT E
SITE LAYOUT PLAN

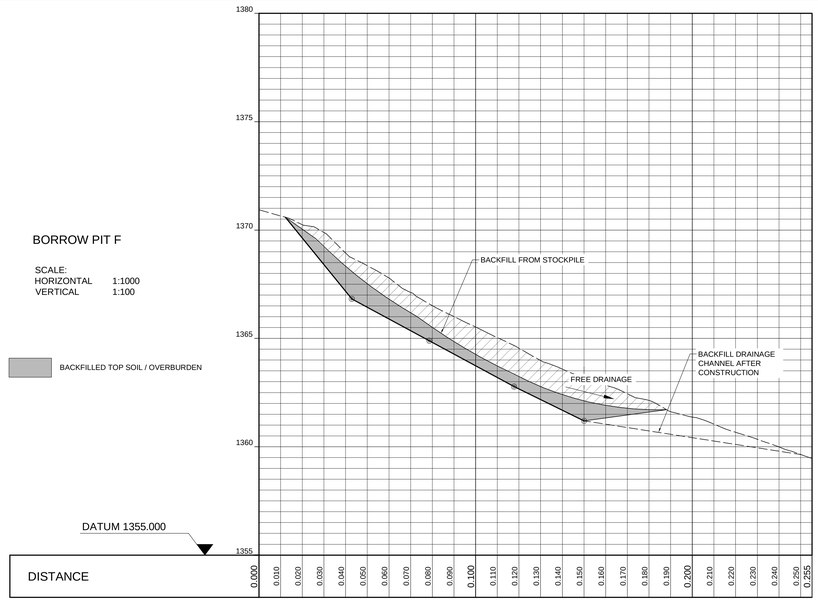
FILE No: FROM CLIENT	TYPE OF PLANNING: DETAIL
AGREEMENT No: NWTR 133/07 of 2007/12/03	JOB No: 318709
ROAD No: P12-2	SCALE: 1:1000
DISTRICT: DR. RUTH SEGOMOTSI MOMPATI	DWG No: NWTR 133 07 P12-2 BP2 1

DWG No. NWTR 133 07 P12-2 BP2

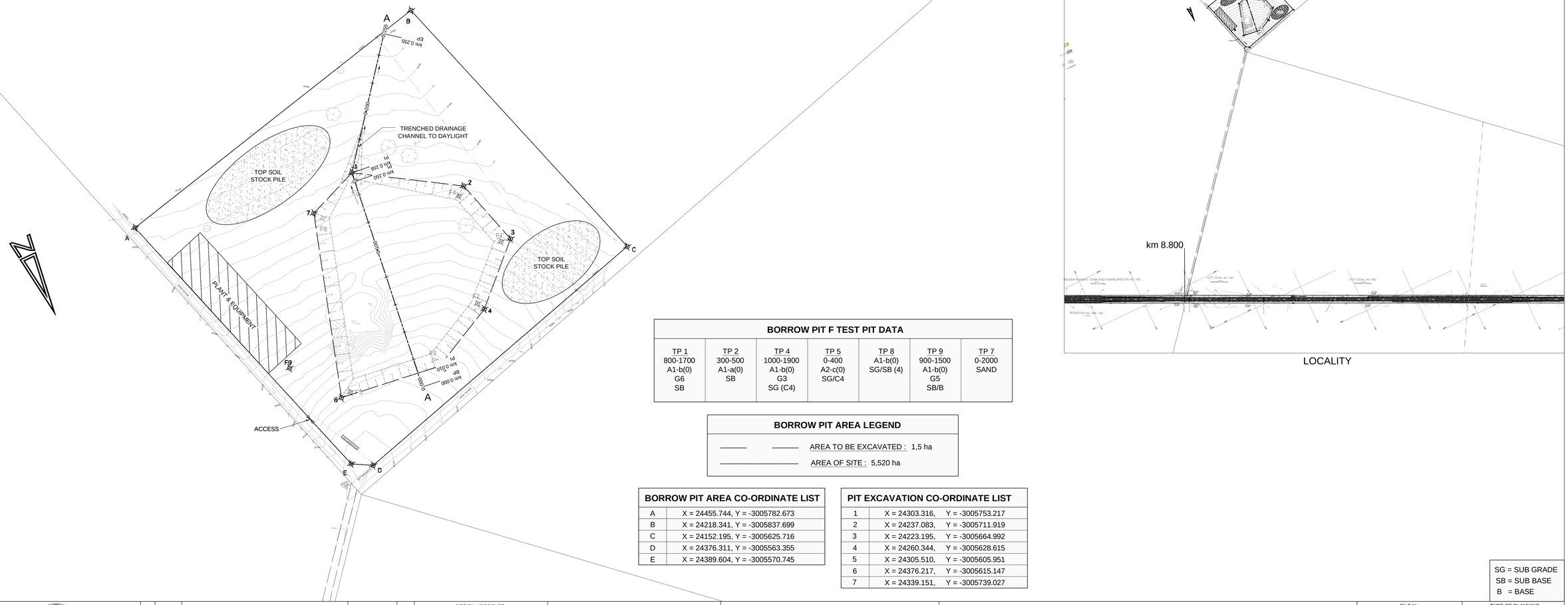
1



BORROW PIT F - EXCAVATION
CROSS SECTION A-A



BORROW PIT F - REHABILITATION
CROSS SECTION A-A



LOCALITY

BORROW PIT F TEST PIT DATA						
TP 1 800-1700 A1-b(0) G6 SB	TP 2 300-500 A1-a(0) SB	TP 4 1000-1900 A1-b(0) G3 SG (C4)	TP 5 0-400 A2-c(0) SG/C4	TP 8 A1-b(0) SG/SB (4)	TP 9 900-1500 A1-b(0) G5 SB/B	TP 7 0-2000 SAND

BORROW PIT AREA LEGEND	
AREA TO BE EXCAVATED :	1,5 ha
AREA OF SITE :	5,520 ha

BORROW PIT AREA CO-ORDINATE LIST	
A	X = 24455.744, Y = -3005782.673
B	X = 24218.341, Y = -3005837.699
C	X = 24152.195, Y = -3005625.716
D	X = 24376.311, Y = -3005563.355
E	X = 24389.604, Y = -3005570.745

PIT EXCAVATION CO-ORDINATE LIST	
1	X = 24303.316, Y = -3005753.217
2	X = 24237.083, Y = -3005711.919
3	X = 24223.195, Y = -3005664.992
4	X = 24260.344, Y = -3005628.615
5	X = 24305.510, Y = -3005605.951
6	X = 24376.217, Y = -3005615.147
7	X = 24339.151, Y = -3005739.027

SG = SUB GRADE
SB = SUB BASE
B = BASE

AS BUILT DRAWING

for CONSULTANT DATE:
for HEAD OF DEPARTMENT DATE:

No	DATE	AMENDMENTS	for N.W.P.	DATE
1	05/2012	SECTION THROUGH BORROW PIT ADDED		

DESIGN APPROVED
for CONSULTANT DATE
APPROVED BY
for DEPUTY DIRECTOR:DESIGN DATE

WSP SA CIVIL AND STRUCTURAL ENGINEERS (PTY) LTD
PO BOX 2330
EDENVALE
1610
TEL: +27 (11) 450-2290
FAX: +27 (11) 450-2294

DESIGNED BY	D.ROBINSON	DRAWN BY	D.ROBINSON
DESIGN CHECKED	M.HUGHES	DRAWING CHECKED	M.HUGHES

North West Province
Department of Transport and Roads

Gabomotho Building
Dr. James Moroka Drive
Mmabatho

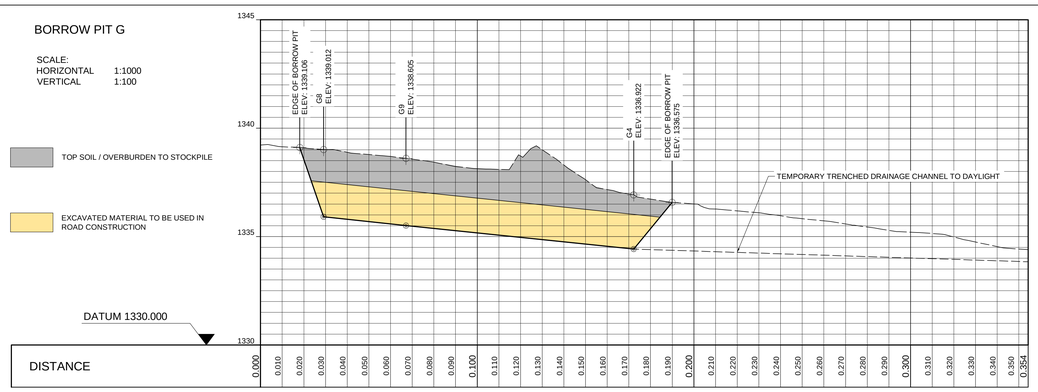
Private Bag x2080
Mmabatho
2735

RESEAL AND REHABILITATION OF ROAD P12-2 SCHWEIZER RENEKE TO VRYBURG

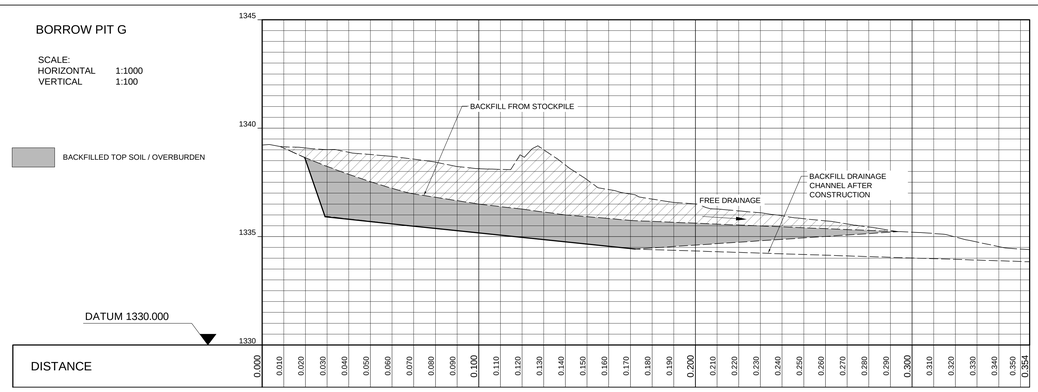
BORROW PIT F
SITE LAYOUT PLAN

FILE No: FROM CLIENT	TYPE OF PLANNING: DETAIL
AGREEMENT No: NWTR 133/07 of 2007/12/03	JOB No: 318709
ROAD No: P12-2	SCALE: 1:1000
DISTRICT: DR. RUTH SEGOMOTSI MOMPATI	DWG No: NWTR 133 07 P12-2 BP3 1

DWG No. NWTR 133 07 P12-2 BP3



BORROW PIT G - EXCAVATION
CROSS SECTION A-A



BORROW PIT G - REHABILITATION
CROSS SECTION A-A

2 - HO

A 2812/1944
AINDER OF PORTION 26

SG 2914/2004
PORTION 129

SCHWEIZER-RENEKE TOWN AND TOWNLANDS No. 62 - HO

A 2812/1944
REMAINDER OF PORTION 26

km 6.200

SG 11636/2003

MOREDOU No. 395 - HO

TOP SOIL STOCK PILE

TRENCHED DRAINAGE CHANNEL TO DAYLIGHT

PLANT & EQUIPMENT

TOP SOIL STOCK PILE

TOP SOIL STOCK PILE

ACCESS

SCHWEIZER-RENEKE TOWN AND TOW

REMAINDER OF PORTION 1
A 892/1947

SG 11636/2003

MOREDOU No. 395 - HO

P11: 24 600 PC (270°)

P12: 24 600 PC (270°)

BOX CULVERT
920 x 440mm
IL=1336.01
IL=1335.97

BOX CULVERT
920 x 440mm
IL=1336.07
IL=1336.02

BORROW PIT G TEST PIT DATA

TP 2	TP 3	TP 4	TP 7	TP 8	TP 9
A1-b(0) SG	2000-2900 A2-4(0) G6 SB (C4)	1500-2500 A1-16(0) SB (C3) 1000-1500 FORMATION	1600-2000 A1-b(0) G3 FILL (CHECK CBR <15)	2500-3100 A2-4(0) SG 1500-2500 FORMATION	2300-3100 A1-b(0) SB (C4) 1200-2300 FORMATION

BORROW PIT AREA LEGEND

AREA TO BE EXCAVATED : 1,487 ha
AREA OF SITE : 6,354 ha

BORROW PIT AREA CO-ORDINATE LIST

A	X = 27506.917, Y = -3005892.617
B	X = 27332.459, Y = -3005810.699
C	X = 27350.647, Y = -3005558.517
D	X = 27634.047, Y = -3005634.765
E	X = 27633.311, Y = -3005655.279
F	X = 27618.608, Y = -3005654.751

PIT EXCAVATION CO-ORDINATE LIST

1	X = 27477.028, Y = -3005791.709
2	X = 27385.699, Y = -3005795.804
3	X = 27397.103, Y = -3005637.678
4	X = 27512.883, Y = -3005668.828

SG = SUB GRADE
SB = SUB BASE
B = BASE

AS BUILT DRAWING

for CONSULTANT DATE :
for HEAD OF DEPARTMENT DATE :

No	DATE	AMENDMENTS	for N.W.P.	DATE
1	05/2012	SECTION THROUGH BORROW PIT ADDED		

DESIGN APPROVED
for CONSULTANT DATE

APPROVED BY
for DEPUTY DIRECTOR:DESIGN DATE

WSP SA CIVIL AND STRUCTURAL ENGINEERS (PTY) LTD
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EDENVALE
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TEL: +27 (11) 450-2290
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Private Bag x2080
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2735

RESEAL AND REHABILITATION OF ROAD P12-2 SCHWEIZER RENEKE TO VRYBURG

BORROW PIT G
SITE LAYOUT PLAN

FILE No FROM CLIENT	TYPE OF PLANNING DETAIL
AGREEMENT No NWTR 133/07 of 2007/12/03	JOB No 318709
ROAD No P12-2	SCALE 1:1000
DISTRICT DR. RUTH SEGOMOTSI MOMPATI	DWG No NWTR 133 07 P12-2 BP4 1

DWG No. NWTR 133 07 P12-2 BP4

Appendix V

Generic Methodology for the Determination of Environmental Impact

The following outlines our approach for the determination of environmental impact arising from site operations. The approach represents an initial assessment with the intent of determining whether the level of impact is sufficiently low for works to proceed without the need for impact mitigation measures or, whether mitigation measures will be required to reduce the perceived environmental risk to an acceptable level.

1. **Status of impacts** – determines whether the potential impact is positive (positive gain to the environment), negative (negative impact on the environment), or, neutral (i.e. no perceived cost or benefit to the environment);
2. **Spatial scale of impacts** – determines the extent of the impact on a scale of localised to global effect. Potential impact is expressed numerically on a scale of 1 to 5;
3. **Temporal scale of impacts** – determines the extent of the impact in terms of timescale and longevity. Potential impact is expressed numerically on a scale of 1 to 5;
4. **Probability of impacts** – quantifies the impact in terms of the likelihood of the impact occurring on a percentage scale of <5% to >95%;
5. **Severity of impacts** – quantifies the impact in terms of the magnitude of effect on environment (receptor) and is derived by consideration of points 1, 2 and 3 above. For this particular study, a conservative approach is adopted for severity (e.g. where spatial impact was considered to be 2 and temporal impact was considered to be 3, a value of 3 would be adopted as a conservative estimate for severity of impact); and,
6. **Calculated significance of impact** – determines the overall impact on (or risk to) a specified receptor and is calculated as: the product of the probability (P) of the impact occurring and the severity (S) of the impact if it were to occur (Impact = P × S). This is a widely accepted methodology for calculating risk and results in an overall impact rating of Low (L), Low/Medium (LM), Medium (M), Medium/High (MH) or High (H).

Table 1: Status of impacts

Rating	Description	Quantitative Rating
Positive	A benefit to the receiving environment (positive impact)	+
Neutral	No determined cost or benefit to the receiving environment	N
Negative	At cost to the receiving environment (negative impact)	-

Table 2: Spatial scale of impacts

Rating	Description	Quantitative Rating
Very Low	**Negligible** – zero or very low impact determined	1

Low	Site Specific – impacts confined within the project site boundary	2
Medium	**Local** – impacts extend beyond the site boundary and affect the immediate surrounding environment - i.e. up to 5 km from project site boundary	3
High	**Regional** – impacts extend beyond the site boundary and have a widespread effect - i.e. > 5 km from project site boundary	4
Very High	**Global** – impacts extend beyond the site boundary and have a national or global effect	5

Table 3: Temporal scale of impacts

Rating	Description	Quantitative Rating
Very Low	**Negligible** – zero or very low impact determined	1
Low	**Short term** – impacts expected on a duration timescale of <2 years	2
Medium	**Medium term** – impacts expected on a duration timescale of 2-5 years	3
High	**Long term** – impacts expected on a duration timescale of 5-15 years	4
Very High	**Permanent** – impacts expected on a duration timescale exceeding 15 years	5

Table 4: Probability of impacts

Rating	Description	Quantitative Rating
Highly Improbable	Likelihood of the impact arising is estimated to be negligible; <5%.	1
Improbable	Likelihood of the impact arising is estimated to be 5-35%.	2
Possible	Likelihood of the impact arising is estimated to be 35-65%	3
Probable	Likelihood of the impact arising is estimated to be 65-95%.	4
Highly Probable	Likelihood of the impact arising is estimated to be > 95%.	5

Tabl 5: Severity of impacts

Rating	Description	Quantitative Rating
Very Low	**Negligible** – zero or very low impact	1
Low	Site specific and short term impacts	2
Medium	Local scale and / or short term impacts	3
High	Regional and / or long term impacts	4
Very High	Global scale and / or permanent environmental change	5

Table 6: Significance of impact

Rating	Description	Quantitative Rating
Low	P × S = 1-3 (low impact significance)	L
Low/Medium	P × S = 4-5 (low/medium impact significance)	LM
Medium	P × S = 6-9 (medium impact significance)	M
Medium/High	P × S = 10-12 (medium/high impact significance)	MH
High	P × S = 13-25 (High impact significance)	H

Table 7: Perceived significance of Impact

Probability (P)	Severity (S)				
	1	**2**	**3**	**4**	**5**
1	**L**	**L**	**L**	**LM**	**LM**
2	**L**	**LM**	**M**	**M**	**MH**
3	**L**	**M**	**M**	**MH**	**H**
4	**LM**	**M**	**MH**	**H**	**H**
5	**LM**	**MH**	**H**	**H**	**H**

Assessment of Pre-Mitigation Impact for Borrow Pit G

	Spatial Scale	Temporal Scale	Probability	Severity	Significance
Removal of Acacia erioloba	2	4	5	4	20 - H
Removal of habitats frequented by burrowing mammals	2	2	5	2	10-MH
Destruction of Hypoxis hemerocallidea	2	4	5	4	20 - H
The destruction of habitats for two near-threatened bird species	2	4	5	4	20 - H
Dust	3	2	4	3	12 - MH
Noise	3	2	3	3	9 - M
Hydrocarbon Contamination	3	2	3	3	9 - M
Exhaust emissions	3	2	4	3	12 - MH

Assessment of Post-Mitigation Residual Impact for Borrow Pit G

	Spatial Scale	Temporal Scale	Probability	Severity	Significance
Removal of Acacia erioloba	2	3	3	3	9 - M
Removal of habitats frequented by burrowing mammals	2	2	4	2	8-M
Destruction of Hypoxis hemerocallidea	2	3	3	3	9 - M
The destruction of habitats for two near-threatened bird species	2	3	4	3	12 -MH
Dust	3	2	3	3	9 - M
Noise	3	2	2	3	6 – M
Hydrocarbon Contamination	3	2	1	3	3 - L
Exhaust emissions	3	2	3	3	9 - M

Appendix VI

Appendix VII

dpwrt

Department:
Public Works; Roads and Transport
North West Provincial Government
Republic of South Africa

Modiri Molema Road
Old Parliament Complex
Provincial Head Office
Mmabatho, 2735
Private Bag X 2080, Mmabatho, 2735
Tel.: +27 (18) 388 1395/2045
Fax: +27 (18) 387 1395
Website: www.nwpg.gov.za/public works

CHIEF DIRECTORATE: ROADS MANAGEMENT

17 March 2011

Bagale Consulting (Pty) LTD
PO Box 1719
Mafikeng
2745

Capex Programme Manager
Att: Mr T. Richardson

NWTR 133/07: REHABILITATION AND WIDENING OF ROAD P12/2 FROM SCHWEIZER RENEKE TO VRYBURG IN THE WESTERN REGION (APPROVAL OF OPTION 1 OF PRELIMINARY DESIGN)

The preliminary design report and your cover letter submitted to this office has reference.

We hereby approve that the project Engineer WSP Civil and Structural Engineers continue with the detail design of the works based on Option 1 (with at 10.6m surfaced road way) for this project, as recommended by the District Engineer.

Please convey the above information to the Project Engineer without delay.

Yours faithfully,

MR. A. MAFUNE
The Director – Planning and Design
Department of Public Works, Roads and Transport

Our Ref. 318709/5/

WSP SA Civil and Structural Engineers

CIB One
Riley Road Office Park
15E Riley Road, Bedfordview
Republic of South Africa
P O Box 2330, Edenvale, 1610
Tel: +27(0)11 450 2290
Fax: +27(0)11 450 2294
E-mail: mike.hughes@wspgroup.co.za
http://www.wspgroup.com

WSP SA Civil and Structural Engineers (Pty) Ltd
Registered Number: 1973/09683/07

A member of WSP Group Africa

9 July 2012

WORLEYPARSONS
(incorporating KV3 ENGINEERS)
P.O. Box 36155
Menlo Park
0102

For Attention: Mr. Jc Pretorius

Dear Sir,

NWTR 133/07: REHABILITATION AND WIDENING OF ROAD P12/2 FROM SCHWEIZER RENEKE TO VRYBURG IN THE WESTERN REGION: REHABILITATION AND REMEDIATION OF BORROWPITS – FINANCIAL PROVISION

The Detail Design of the P12/2 project as referred to in the attached correspondence from the North West Provincial Government, Department Public Works; Roads and Transport ('dpwrt'), has been completed.

We are pleased to be able to confirm that the following financial provisions have been made in the project Bill of Quantities (all as per COLTO as submitted to 'dpwrt'), to enable the rehabilitation and remediation of the borrowpits along the P12/2 route to take place.

• 58.03 (f)	Stockpiling of topsoil	R 277 800-00
• 31.03 (b) and (c)	Final shaping of borrow area	R 180 000-00
• 58.03 (d)	Topsoiling of borrowpit area	R 432 000-00
• 58.03 (e)	Application of fertiliser and planting/ hydroseeding	R 50 200-00
	Total (excluding VAT)	R 940 000-00

Yours faithfully

M.R. HUGHES *Pr Eng*: TECHNICAL DIRECTOR
WSP SA CIVIL AND STRUCTURAL ENGINEERS (PTY) LTD

W:\318000\318709 P12-2 Reseal and Rehab\1 - Design Phase Correspondence\1.2 Sent (E-mails, Letters and Faxes)\Letters and Faxes\Other\WSP Worley Parsons letter to financial provision_2012 07 09.docx

Appendix VIII

Public Participation Process, Interested and Affected Parties Meeting Minutes Summary Sheet

Nearest Borrow Pit To Residency:	**Acknowledgement of Receipt of Notification Letter:**		**Sheet** 1 **of** 1
Landowner, Pit G	Original signed		
Name:	**Date:**	**Interviewer:**	**Property GPS Coordinates:**
Mr Kotze	22nd June 2012	J Hine	S 27 09 03.94 E 25 16 02.43
Property Postal Address: . PO Box 323, Schweizer Reneke, 2780.			

Meeting Notes:

Mr Kotze raised the following points and comments:

1. What is the expected time period before the ground is reinstated and is suitable for grazing.
2. Will compensation be available for loss of earnings.
3. Will payment be made for gravels removed from the borrow pit.

NB: A copy of these notes should be typed and forwarded to the above postal address for comment

Appendix IX

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

NAME OF APPLICANT: North West Provincial Government Dept: Public Works; Road & Transport

REFERENCE NUMBER:

REPORT ON THE RESULTS OF CONSULTATION

WITH COMMUNITIES AND

INTERESTED AND AFFECTED PARTIES

AS REQUIRED IN TERMS OF SECTIONS, 16(4)(b) or 27 (5) (b) OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 of 2002), AND IN ACCORDANCE WITH THE STANDARD DIRECTIVE FOR THE COMPILATION THEREOF AS PUBLISHED ON THE OFFICIAL WEBSITE OF THE DEPARTMENT OF MINERAL RESOURCES.

A. Definitions

„consultation" means a two way communication process between the applicant and the community or interested and affected party wherein the former is seeking, listening to, and considering the latter's response, which allows openness in the decision making process.

„community" means a group of historically disadvantaged persons with interest or rights in a particular area of land on which the members have or exercise communal rights in terms of an agreement, custom or law: Provided that, where as a consequence of the provisions of the Act negotiations or consultations with the community are required, the community shall include the members or part of the community, directly affected by prospecting or mining, on land occupied by such members or part of the community.

„Interested and affected" parties include, but are not limited to; –

(i) Host Communities
(ii) Landowners (Traditional and Title Deed owners)
(iii) Traditional Authority
(iv) Land Claimants
(v) Lawful land occupier
(vi) The Department of Land Affairs,
(vii) Any other person (including on adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the proposed prospecting or mining operation
(viii) The Local Municipality,
(ix) The relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

B. Report on the results of consultation

1. Methodology applied to consultation.

1.1. Name the community or communities identified, or explain why no such community was identified.

WorleyParsons has identified the following community within the participation process:

a) Site landowner: Mr HP Kotze;

b) Farmsteads located within 1.5 kilometres of the proposed site;

The nearest residential community area of significance to Borrow Pit G is the town of Schweizer-Reneke, located 4 kilometres to the southeast. WorleyParsons considers the site to be practically isolated from this community and has therefore not entered into detailed public participation with the community.

The closest farmstead is located some 50 metres due south. Notice of intent to develop a borrow pit at the proposed location has been erected on the site.

1.2. Specifically state whether or not the Community is also the landowner.

Mr HP Kotze is the landowner of the farm on which the proposed borrow pit is located.

1.3. State whether or not the Department of Land Affairs been identified as an interested and affected party.

The Department of Rural Development and Land Reform (DRDLR)was a consulted stakeholder and a copy of the Draft EMP was sent to the DRDLR for comment on 30 July 2012.

1.4. State specifically whether or not a land claim is involved.

The landowner indicated that he is not aware of any land claim on the proposed property.

1.5. Name the Traditional Authority identified

No traditional authority is involved.

1.6. List the landowners identified by the applicant. (Traditional and Title Deed owners)

Mr HP Kotze is the landowner of the farm MOREDOU No. 395 – HO

1.7. List the lawful occupiers of the land concerned.

Mr HP Kotze

1.8. Explain whether or not other persons' (including on adjacent and non-adjacent properties) socio-economic conditions will be directly affected by the proposed prospecting or mining operation and if not, explain why not.

The borrow pit activities will not negatively affect any of the neighbouring residents or land owners.

1.9. Name the Local Municipality identified by the applicant

a) Mamusa Local Municipality; and,

b) Dr Ruth S Mompati District Municipality.

1.10. Name the relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

a) North West Provincial Government, Department: Public Works; Roads and Transport;
b) Department of Mineral Resources (DMR);
c) Department of Economic Development, Environment, Conservation & Tourism (DEDECT);
d) South African Heritage Resource Agency (SAHRA);
e) Department of Agriculture, Forestry & Fisheries (DAFF);
f) Department of Rural Development and Land Reform

1.11. Submit evidence that the landowner or lawful occupier of the land in question, and any other interested and affected parties including all those listed above, were notified.

Application for Environmental Authorisation was submitted to DEDECT on the 27th February 2012. (Ref: NWP/EIA/162/2011). Confirmation of receipt of the application was received by WorleyParsons on the 5th March 2012. DEDECT confirm that Authorisations will be processed through DMR however, DEDECT remain an interested party.

A copy of the draft EMP report has been forwarded to all interested parties listed above.

A copy of letters of notification and confirmation of receipt is provided in Appendix III of the EMP.

2. Description of the existing status of the cultural, socio-economic or biophysical environment, as the case may be, prior to the proposed prospecting or mining operation.

2.1.1. Confirm that the identified and consulted interested and affected parties agree on the description of the existing status of the environment.

The contents of the Draft EMP was discussed with the land owner during a site visit conducted on 21 June 2012. No issues relating to the existing status of the environment were raised.

2.1.2. Describe the existing status of the cultural environment that may be affected

A Heritage assessment was conducted by PGS and the report is contained in Appendix I of the EMP. Heritage Assessment describes the affected environment as follow: The site is characterised by dense bushveld over most of the study area. During the survey no sites of cultural or heritage significance were found. It was found that the proposed development will not have any adverse effect on heritage resources. General recommendation on archaeological work entailed that if during construction any possible finds are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find.

2.1.3. Describe the existing status of any heritage environment that may be affected

See 2.1.2 above.

2.1.4. Describe the existing status of any current land uses and the socio-economic environment that may be directly affected

The site is located on a cattle farm and the construction area could not be utilised for grazing for a minimum period of 24 months until the rehabilitated vegetation is fully established.

2.1.5. Describe the existing status of any infrastructure that may be affected.

No Infrastructure will be affected by the constructiopn other than the removal of fences, which will be reinstated after construction.

2.1.6. Describe the existing status of the biophysical environment that will be affected, including the main aspects such as water resources, flora, fauna, air, soil, topography etc.

A ecological evaluation of the proposed site was conducted by Dr. Lukas Niemand from Pachnoda Consulting and the report is contained in Appendix I of the EMP. The ecological survey descrbes the site as follow: The land class can be described as natural thicket and bushland and represented by unmodified vegetation reminiscent of Schweizer-Reneke Bushveld.

The borrow pit positions correspond to the Savanna Biome and more particularly to the Eastern Kalahari Bushveld Bioregion as defined by Mucina & Rutherford (2006). In addition, the natural vegetation on the sites is regionally classified as Schweizer-Reneke Bushveld (Mucina & Rutherford, 2006). This bushveld type is endemic to the North West Province and restricted to the Schweizer-Reneke area in the east and towards Amalia in the west. It forms a distinctive open woodland with a fairly dense shrub layer dominated by Acacia erioloba, A. karroo, Searsia lancea and low shrubs such as A. hebeclada, Grewia flava and Tarchonanthus camphoratus.

This bushveld type is "endangered" since none is currently statutory protected or conserved. More than 42 % is already transformed by cultivation.

The vegetation composition on BP G can be described as a tall open Acacia erioloba – Themeda triandra woodland on deep sandy soils. It differs from the other woodland units by its tall canopy of A. erioloba that is represented by mature specimens, and a dense basal cover of the highly palatable grass Themeda triandra. Furthermore, it is also structurally distinct from the other units by the patchy occurrence of dense stands of Acacia hebeclada, Diospyros pallens and Grewia flava. Noteworthy species not shared with the other units include Rhynchosia adenodes, Indigofera daleoides and Ledebouria cf. revoluta.

Nevertheless, it also shares part of its composition with BP E and BP F (with reference to the Acacia karroo – Eragrostis rigidior woodland unit) as evidenced by the partial dominance of Eragrostis rigidior, Senecio inaequidens and Wahlenbergia undulata.

Taxa of conservation concern

No threatened or near-threatened species were observed from BP G, although a high density of tall and mature Acacia erioloba were observed. A. erioloba is listed by the National Forests Act of 1998 (No 84 of 1998) as a declared protected tree species. In terms of the National Forests Act of 1998, a licence should be granted by the Department of Forestry (or a delegated authority) prior to the removal, damage or destruction of any protected tree. Therefore, such activities (as mentioned above) should be directed to the responsible Forestry official in each province or area.

Another species worth mentioning is the geophyte Hypoxis hemerocallidea which occur as scattered individuals on the open grassy areas of the site. It is declining (Raimondo et al., 2009) due to its medicinal properties, and large quantities are exploited and sold nationwide. Although widespread, it should be managed within the footprint areas and should be removed (rescued) during the operational phase if threatened by destruction.

Declared invader and weed taxa

Only ruderal weed species (Conyza canadensis and Tagetes minuta) were observed from BP G. These species are all annual (they completely die off during the dry season), and are of temporary nature.

The sandy substrate on BP G provides the ideal habitat for fossorial taxa and species that prefer to roost in den structures. Three mammal species (Aardvark Orycteropus afer, Cape Porcupine Hystrix africaaustralis and Yellow Mongoose Cynictis penicillata) utilise the site, and extensive burrow systems of all three species were recorded on the study site. The occurrence of Aardvark on the site is worth mentioning since active burrows of this species occur at very high densities.

Taxa of conservation concern

The graminoid layer of the Acacia erioloba – Themeda triandra woodland provides suitable roosting, breeding and foraging habitat for the "near-threatened" Melodious Lark (Mirafra cheniana). M. cheniana is near-endemic to South Africa and generally occurs on fairly short grassland with a low basal cover. It was previously thought to occur almost exclusively in grassland dominated by dry Themeda triandra (Harrison et al., 1997).

However, recent observations (mainly from Gauteng) showed that this species also have a high preference for open grassland on sandy, siliceous soils dominated by sour, wiry grasses such as Loudetia simplex, Tristachya rehmannii,

Trachypogon spicatus and Diheteropogon amplectens. This species is easily identified by its distinctive aerial display and prolonged song that includes mimicry. M. cheniana was confirmed on the study site.
The Acacia erioloba – Themeda triandra woodland also provides suitable habitat for the near-endemic and "near-threatened" Short-clawed Lark (Certhilauda chuana) (Barnes, 2000). Although not observed during the site survey (based on the playback of its song), it is highly likely to occur on the BP G premises.

2.1.7. Provide any relevant additional information.

The Acacia erioloba – Themeda triandra woodland on BP G is earmarked by a high ecological sensitivity based on the following arguments:

1. The vegetation community and composition support a high floristic richness with approximately 60 % of the basal cover represented by late-successional taxa (e.g. Themeda triandra);

2. The structure and floristic composition provides habitat for two "near-threatened" bird species (e.g. Short-clawed Lark Certhilauda chuana and Melodious Lark Mirafra cheniana);

3. The study site supports exceptional high densities of burrowing/fossorial mammal taxa; and

4. The study site sustains prime examples of mature Acacia erioloba specimens.

3. The anticipated environmental, social or cultural impacts identified.

3.1. Confirm that the community and identified interested and affected parties have been consulted and that they agree that the potential impacts identified include those identified by them.

3.1.1. Provide a list and description of potential impacts identified on the cultural environment.

During the survey no sites of cultural significance were found. It was found that the proposed development will not have any adverse effect on cultural resources.

3.1.2. Provide a list and description of potential impacts identified on the heritage environment, if applicable.

During the survey no sites of heritage significance were found. It was found that the proposed development will not have any adverse effect on heritage resources.

3.1.3. Provide a list and description of potential impacts identified on the socio-economic conditions of any person on the property and on any adjacent or non adjacent property who may be affected by the proposed prospecting or mining operation.

The sole impact on socio-economic conditions resulting from the borrow pit is anticipated to be the temporary loss of grazing land during construction and rehabilitatiopn of the proposed site. This will impact on the land owner's ability to utilise the affected portion of land for a period until the rehabilitation of the site is successful.

3.1.4. Provide a list and description of potential impacts (positive & negative) identified on: employment opportunities, community health, community proximity.

The proposed activity will not create any new employment oportunities. An experienced contractor will be employed to conduct the construction and rehabilitation and the contractor will utilise his own trained staff. on the project.

Community health will not be affected by the proposed borrow pit development due to the distance between the site and the nearest community or receptors and because no employees will reside on the site.

There is no community within close proximity to the site which will be negatively affected by the proposed activity.

3.1.5. Provide a list and description of potential impacts identified on the biophysical environment including but not be limited to impacts on: flora, fauna, water resources, air, noise, soil etc.

The potential environmental impacts arising from all four phases of the operation have been identified in the EMP as:

1. **Dust generation and settlement arising from the quarrying operation and movement of plant and vehicles;**
2. **Noise disturbance arising from the use of heavy plant and machinery;**
3. **Potential hydrocarbon contamination of soils arising from refuelling operations, fuel and oil storage and leakage from plant and machinery;**
4. **Destruction of habitats, chiefly arising from vegetation strip; and,**
5. **Vehicle and plant exhaust emissions.**

3.1.6. Provide a description of potential cumulative impacts that the proposed operation may contribute to considering other identified land uses which may have potential environmental linkages to the land concerned.

No cumulative impacts have been identified relating to any of the four phases of the proposed quarrying operation.

Dust arising from the quarrying operation will have some minor cumulative effect with respect to dust generated during upgrade of the P12-2 (R34) Road. However, proposed dust mitigation measures (Section 3.2 of the EMP) will reduce dust concentrations from the quarrying operation to acceptable levels and residual dust concentrations will be insignificant in the context of the broader road upgrade project. Cumulative dust impact is therefore not considered significant.

4. Land use or development alternatives, alternative means of carrying out the proposed operation, and the consequences of not proceeding with the proposed operation.

4.1. Provide a list of and describe any alternative land uses that exist on the property or on adjacent or non-adjacent properties that may be affected by the proposed mining operation.

The proposed site and adjacent land is characterised by its agricultural use and no alternative uses for the land is being considered by the landowner and therefore it is proposed to return the site to a state where it could be utilised again for its intended purpose. The utilisation of the pit is essential for the upgrade of the P12-2 road between Sweizer Reneke and Vryburg.

4.2. Provide a list of and describe any land developments identified by the community or interested and affected parties that are in progress and which may be affected by the proposed mining operation.

No developments were indicated by any of the IAPs as being planned or which may be affected by the proposed development.

4.3. Provide a list of and describe any proposals made in the consultation process to adjust the operational plans of the mine to accommodate the needs of the community, landowners and interested and affected parties.

No adjustments to the operational plans were required as a result of the relatively low residual impact signifficance of the impacts assessed.

4.4. Provide information in relation to the consequences of not proceeding with proposed operation

The supply of gravel for the roads upgrade project is a vital component and the positive contribution of the upgrade of the road locally and regionally is immense.

5. Description of the process of engagement referred to in 3.2.1 and 3.2.2 above with identified communities, landowners and interested and affected parties.

5.1. Provide a description of the information provided to the community, landowners, and interested and affected parties to inform them in sufficient detail of what the prospecting or mining operation will entail on the land, in order for them to assess what impact the prospecting will have on them or on the use of their land;

WorleyParsons has identified the following as interested and affected parties within the participation process:

a) Site landowner: Mr HP Kotze;

b) Farmsteads located within 1.5 kilometres of the proposed site;

c) North West Provincial Government, Department: Public Works; Roads and Transport;

d) Department of Mineral Resources (DMR);

e) Department of Economic Development, Environment, Conservation & Tourism (DEDECT);

f) South African Heritage Resource Agency (SAHRA);

g) Department of Agriculture, Forestry & Fisheries (DAFF);

h) Mamusa Local Municipality;

i) Dr Ruth S Mompati District Municipality; and

j) Department of Rural Development and Land Reform.

The nearest residential community area of significance to Borrow Pit G is the town of Schweizer-Reneke, located 4 kilometres to the east. WorleyParsons considers the site to be practically isolated from this community and has therefore not entered into detailed public participation with the community.

The closest farmstead is located some 50 metres due south. Notice of intent to develop a borrow pit at the proposed location has been erected on the site. A copy of the notice is provided in Appendix II of the EMP.

Application for Environmental Authorisation was submitted to DEDECT on the 27th February 2012. (Ref: NWP/EIA/162/2011). Confirmation of receipt of the application was received by WorleyParsons on the 5th March 2012. DEDECT confirm that Authorisations will be processed through DMR however, DEDECT remain an interested party.

A copy of this draft report has been forwarded to all interested parties listed e to j above.

A copy of letters of notification and confirmation of receipt is provided in Appendix III of the EMP.

5.2. Provide a list of which of the identified communities, landowners, lawful occupiers, and other interested and affected parties were in fact consulted.

Refer to 5.1 above.

5.3. Provide a list of their views raised in regard to the existing cultural, socio-economic or biophysical environment, as the case may be.

During the public consultation no views regarding the existing socio-economic environment were raised by the landowner, Mr HP Kotze.

5.4. Provide a list of their views raised on how their existing cultural, socio-economic or biophysical environment potentially will be impacted on by the proposed prospecting or mining operation.

During the public consultation the following issues were raised by the landowner, Mr HP Kotze:

1. **What is the expected time period before the ground is reinstated and is suitable for grazing.**
2. **Will compensation be available for loss of earnings.**
3. **Will payment be made for gravels removed from the borrow pit.**

5.5. Provide list of any other concerns raised by the aforesaid parties.
No other concerns were raised.

5.6. Provide the applicable minutes and records of the consultations as appendices.

The minutes of consultations, responses and correspondence are contained in Appendices II, III and VIII of the EMP.

5.7. Provide information with regard to any objections received.

No objection was received but clarity was requested by the landowner relating to the issues listed in 5.4 above.

6. Describe the most appropriate means to carry out the proposed operation with due accommodation of the issues raised in the consultation process.

The most appropriate means to carry out the proposed operation is described in the EMP.

C. IDENTIFICATIONOF THE REPORT

The report on the results of consultation must, at the end of the report include a certificate of identification as follows;

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises the results of consultation as contemplated in Section 16 (4) (b) or 27 (5) (b) of the Act, as the case may be.	
Full Names and Surname	**Johannes Cornelius Pretorius**
Identity Number	**7803265031088**

- END -