

Appendix 1



Prime Resources (Pty) Ltd
The Workshop 70–7th Avenue Parktown North 2193
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Gené Main – Principal Environmental Consultant, Pr. Sci. Nat.

Present Appointment	Principal Environmental Consultant
Professional Registration	South African Council for Natural Scientific Professions (SACNASP) registration 400370/13 (Environmental Science) Registered Environmental Assessment Practitioner (EAP), EAPASA registration 2019/1257 IAIAsa member (5932)
Nationality	South African
Qualifications	BSc (Botany and Environmental Science), Rhodes University, 2002 BSc Hons (Environmental Science), Rhodes University, 2003 MSc (Botany), University of the Western Cape, 2006
Languages	English, Afrikaans
Synopsis	Gené has 13 years of experience working on environmental and social aspects of development projects related to mining, waste management and water management, including EIAs, EMPs, closure and rehabilitation plans, monitoring and auditing. She has also been project lead in several environmental due diligence and technical review projects, most of these in terms of the Equator Principles, IFC Performance Standards, and World Bank EHS Guidelines.

Project History

International

Assessments and reporting in terms of Equator Principles (EPII) / IFC / World Bank

- Environmental and Social Impact Assessment for a gold mine, Tajikistan
- Order of Magnitude Study for Zanaga Iron Ore Mine, Republic of Congo
- Prospecting Environmental Management Plan for Cabinda Phosphate Project, Angola
- Environmental and social baseline report (pre-feasibility) for the Cabinda Phosphate Project, Angola
- Environmental and social baseline report (pre-feasibility) for the Horizonte Minerals, Araguaia Nickel Project, Brazil
- Environmental and social process, Pre-Feasibility, Ferrex Iron Ore, Malelane, South Africa
- Peer review and report compilation of Environmental and Social chapters of BFS, Ganajur Gold Mine, India

Due Diligence and compilation of Environmental and Social Action Plans (ESAPs) in terms of Equator Principles (EPII) / IFC / World Bank

- Review of Kipoi Central RDFS's operations, Democratic Republic of Congo
- Review of Anvil's Kinsevere Copper Mine, Democratic Republic of Congo

- Review of Koidu Kimberlite Project's expansion project on behalf of Standard Chartered Bank, Sierra Leone
- Review of Kipoi Stage 2 Phase 1 project, Independent Technical Review, Democratic Republic of Congo
- Review of Maamba Colliery's existing and proposed expansion project, Zambia (ongoing operational monitoring – to present)
- Review of Ghaghoo Diamond Mine, Botswana
- Review of Lihobong Diamond Mine, Lesotho (ongoing operational monitoring – to present)
- Review of Beacon Hill Resources, Moatize Coal, Mozambique
- Review of North River Resources, Lead and Zinc project, Namibia
- Review of Konongo Gold Project, Ghana
- Review of Triton's Ancuabe and Balama Graphite projects, Mozambique
- Review of Khoemacau Copper Mine, Botswana
- Review of Segilola Gold Mine, Nigeria

National

Pre-Feasibility Studies (PFS)

- Environmental PFS report for Lonmin Hossy Shaft upgrade, South Africa
- Environmental PFS report for Jubilee Platinum's Tjate mine, South Africa

EIAs and EMPs, including closure planning

- Siyanda Coal, Koornfontein Mine, South Africa
- Anglo Platinum proposed chromite recovery plants, South Africa
- T-Project Colliery, South Africa
- Vlakvarkfontein Colliery, South Africa
- Prospecting EMP (gold) for De Beers Namaqualand Mines, South Africa
- Gold One International, Modder East Operations, South Africa (for various infrastructure)
- KaNgwane South Anthracite Mine, South Africa
- Holfontein Gold Mine, South Africa
- Ventersburg Gold Mine, South Africa
- Cons Modder Gold Mine, South Africa
- Middelvlei Gold Mine, South Africa

Water Use Licence Applications

- T-Project Colliery, South Africa
- Vlakvarkfontein Colliery, South Africa
- New Kleinfontein Goldmine, South Africa
- Holfontein Project Gold Mine, South Africa
- Ventersburg Gold Mine, South Africa
- Cons Modder Gold Mine, South Africa
- General Authorisation process for Far East Gold SPV, South Africa

Environmental audits

- Regulation 55 (MPRDA) Performance Assessment - Rustenburg Platinum Mines, Union Section, South Africa
- Regulation 55 Performance Assessment – Klipspringer Diamond Mine, South Africa
- Regulation 55 Performance Assessment – Ferrex Iron Ore, South Africa
- Regulation 55 Performance Assessment – Vlakfontein Colliery, South Africa
- Quarterly environmental compliance audits for landfill waste sites, Ekurhuleni Metropolitan Municipality, South Africa
- Environmental compliance audit for Interwaste Hazardous Waste Transfer Facility, Germiston, South Africa

- Environmental compliance audit for Interwaste Waste Transfer and Materials Recovery Facility, Western Cape, South Africa

Due Diligence and compilation of Environmental and Social Action Plans (ESAPs) in terms of Equator Principles (EPII) / IFC / World Bank

- Gold One International's Modder East Operations, South Africa
- Review of Kalagadi Manganese Mine on behalf of Standard Bank, South Africa (ongoing operational monitoring – to present)
- Review of Western Bushveld Joint Venture Project 1 on behalf of Standard Bank, South Africa
- Review of Tharisa Platinum Mine on behalf of HSBC, South Africa (ongoing operational monitoring – to present)
- Review of Pilanesberg Platinum Mine as part of an Independent Technical Review, South Africa
- Review of Kudumane Manganese Mine on behalf of Standard Chartered Bank, South Africa
- Review of the Steenkampskraal project, Preliminary Economic Assessment, South Africa
- Review of Vele Colliery, South Africa

Due Diligence (compliance with national requirements)

- Review of Scoping Report for proposed Eskom power line, Mpumalanga, South Africa
- Gap analysis of Waterberg Coal Project for Sekoko Resources, South Africa
- Environmental review of Harmony tailings storage facilities, South Africa
- Environmental review of Bafokeng Rasimone Platinum Mine (BRPM), South Africa
- Environmental review of Blyvooruitzicht Gold Mining Company, on behalf of Village Main Reef Ltd, South Africa
- Review of Rand Uranium West Rand Operations for Gold One International, South Africa
- Review of Ruighoek and Tuschenkomst Properties of Platmin Limited, South Africa
- Review of Transhex Iron Ore, South Africa
- Review of Evander coal operations, South Africa



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Stephen Tarlton – Senior Environmental Scientist Pr. Sci. Nat.

Present Appointment	Senior Environmental Consultant
Professional Registration	South African Council for Natural Scientific Professions (SACNASP) registration No. 115011 (Environmental Science)
Nationality	South African
Education	BSc (Ecology and Plant Science) University of the Witwatersrand, 2006 BSc Hons (Plant Science) University of the Witwatersrand, 2007 MSc (Ecology and Plant Science) University of the Witwatersrand 2012
Languages	English

Synopsis	Stephen is a Professional Natural Scientist with a background in ecology. He has undertaken environmental management assignments on various mining, waste, water and linier infrastructure projects in Africa. Projects include environmental authorisations, impact assessments, management plans, environmental monitoring, audits, and due diligence reporting. Additionally, he gained hands-on experience aligning site environmental performance to the IFC Standard, during his time on the Neckartal Dam construction site.
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Project History

International

Environmental assessments and management plans

- Environmental and Social Impact Assessment Update, Neckartal Dam, Ministry of Agriculture Water and Forestry, //Karas Region, Namibia
- Environmental and Social Impact Assessment Update, Kinsevere Copper Mine, MMG, DRC
- Environmental and Social Impact Assessment for the Oniipa Sewage Treatment Plant near Onethindi, Oshikoto Region, Namibia
- Environmental and Social Impact Assessment, Farim phosphate project, GB Minerals LTD., Guinea-Bissau
- Environmental Impact Statement, Combination Plant and Fresh Rock Project, Siguiri Gold Mine, Société AngloGold Ashanti de Guinée, State of Guinea
- Environmental management system to the ISO: 14001 Standard, Mongbwalu Gold Project, Ashanti Gold Kilo, DRC
- Environmental management plan for the Komsberg Farm Redevelopment, Fine Fare Food Market LLC, Namibia.

Construction supervision and auditing

- Contractor supervision and monitoring for the construction of the Neckartal Dam Project, Ministry of Agriculture Water and Forestry, //Karas Region, Namibia
- Drafting and supervision of the implementation of Sustainable Rehabilitation Plan, Kinsevere Copper Mine, MMG, DRC
- Environmental Control Officer Audit, Oshoopala Bridge and Bridge in Extension 16 over the Okatana river, Oshakati, Namibia
- Environmental Control Officer Auditing for the Komsberg Farm Redevelopment, Fine Fare Food Market LLC, Namibia.

Reporting in terms of Equator Principles (EPII) / IFC / World Bank

- Reporting of IFC compliance progress to the Development Bank of Namibia, Neckartal Dam Project, Ministry of Agriculture Water and Forestry, //Karas Region, Namibia
- Independent operational monitoring of environmental and social management, Liqhobong Mining Development Company, Lesotho
- Independent operational monitoring of environmental and social management, Maamba Collieries Limited, Zambia
- Review of Lindi Jumbo Graphite Project, Tanzania
- Review of Bon Ami Bauxite Project, Republic of Guinea.

Environmental Monitoring

- Water quality monitoring, Kinsevere Copper Mine, MMG, DRC
- Air quality monitoring, Kinsevere Copper Mine, MMG, DRC
- Meteorological monitoring / lightning warning system, Kinsevere Copper Mine, MMG, DRC
- Stream flow monitoring for proposed hydropower stations (Magembe and Ulindi), Banro, South Kivu, DRC
- Stream flow monitoring for proposed hydropower stations and the Kalungwishi river, Olympic milling, Zambia
- Stream flow monitoring / underwater survey for the 11 MW Azambi Hydroelectric Project, Kibali Goldmines S.A. (Barrick, AngloGold Ashanti, and Société Minière de Kilo-Moto), Haut-Uele, DRC.

National

Environmental assessment and environmental management plans

- Basic Assessment Process for rezoning of erf 23205 Milnerton, City of Cape Town, Western Cape Province, South Africa
- Environmental Management Plan amendments for various borrow pits and quarries for National route 17 upgrade (Davel to Ermelo), SANRAL, Mpumalanga, South Africa.
- Ecological Assessment of Johannesburg impoundments, City of Johannesburg, Gauteng, South Africa.
- Environmental and Social Impact Assessment for ERPM Ext 1 Mining Right, ERPM, Gauteng, South Africa
- Environmental and Social Impact Assessment for Buffelsdoorn Mining Right Application, Bacarac, North-West Province, South Africa
- Basic Assessment Report for a Prospecting Right Application, Gauteng Province, South Africa
- Scoping for the Klinkerstene Waste Management Licence Application, Mpumalanga, South Africa.

Environmental auditing

- Environmental Control Officer Auditing for Gauteng Freeway Improvement Project (packages F, C K & I), SANRAL, Gauteng, South Africa
- Environmental Control Officer Auditing for National route 17 upgrade (Davel to Ermelo), SANRAL, Mpumalanga, South Africa

- Environmental Control Officer Auditing for the construction and rehabilitation of Provincial Roads D2690 and D636 between Provincial road P17/6, Yaverland and Plaston, Palabora Copper (Pty) Limited, Mpumalanga, South Africa.
- Section 20 Audit, Middleburg Ferrochrome, Samancor Chrome Limited, South Africa
- Environmental Auditor for various waste storage, treatment and recovery facilities, Interwaste / Séché Environmental, South Africa.

Reporting in terms of Equator Principles (EPII) / IFC / World Bank

- Independent operational monitoring of environmental and social management, Tharisa Minerals, North-West Province, South Africa.

Environmental Monitoring

- Water quality monitoring, Sedibelo Platinum Project, I.B.M.R., South Africa
- Water quality monitoring for Leeuwkop Platinum Project, Afplats, South Africa
- Water quality monitoring for various sewage treatment works in Johannesburg, Johannesburg water, Gauteng, South Africa
- Water quality monitoring for the Klinkerstene and FG Landfill, Interwaste / Séché Environmental, South Africa.



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Itumeleng Morosele – Environmental Scientist | GIS Technician

Present Appointment	Environmental Scientist, Prime Resources (Pty) Ltd
Period	March 2018 - Present
Nationality	South African
Education	MSc in Environmental Management, University of Johannesburg BSc (Hons.) Geography <i>with distinction</i> , University of Johannesburg BSc in Life and Environmental Sciences, University of Johannesburg

Synopsis

Itumeleng is an environmental scientist with over two years' experience in environmental consulting. She has experience in environmental monitoring and compliance auditing, environmental authorizations (including Basic Assessments and Scoping & Environmental Impact Assessments/Environmental Management Programmes), Water Use Licence applications, Mining Right applications, rehabilitation plans, and Geographic Information Systems (GIS).

Current Projects and Project History

Environmental Monitoring and Compliance Auditing

- Water quality monitoring and environmental compliance auditing, F.G. Landfill Site, Gauteng, South Africa
- Water quality monitoring and environmental compliance auditing, Klinkerstene Landfill Site, Mpumalanga, South Africa
- Environmental Compliance Monitoring, Samancor Chrome Ferrometals, Mpumalanga, South Africa

Environmental Authorization and Public Participation

- Environmental Authorization (including Scoping and EIAR / EMPr phases) for the proposed chrome recovery plant expansion and railway track extension at the Siyanda Bakgatla Platinum Mine, North West & Limpopo, South Africa
- Environmental Authorization (Scoping phase) for the proposed Buffelsdoorn Mine, North West, South Africa

- Basic Assessment, Prospecting Right Application for Portion 48 of the farm Middelvlei 255 IQ, Gauteng, South Africa
- Basic Assessment, Prospecting Right, Tawana Investment Holdings (Pty) Ltd, Northern Cape, South Africa
- Environmental Authorization (including Scoping and EIAR / EMPr phases) for ERPM Extension 2 Mine, Gauteng, South Africa
- Environmental Authorization (including Scoping and EIAR / EMPr phases) for Middelvlei Mine, Gauteng, South Africa
- Environmental Authorization (including Scoping and EIAR / EMPr phases) for Gold One Modder East Operations, Gauteng, South Africa
- Terms of Reference and Scoping Report for Lubambe Copper Mine, Copperbelt, Zambia

Water Use Licence applications

- Water Use Licence application for the KaNgwane Anthracite Mine, Mpumalanga, South Africa
- General Authorization application for the proposed FEG Project, Gauteng, South Africa
- Water Use Licence application for the proposed Holfontein Project, Gauteng, South Africa
- Water Use Licence Application and Integrated Waste and Water Management Plan for the proposed Cons Modder Gold Mine, Gauteng Province, South Africa
- Water Use Licence Application and Integrated Waste and Water Management Plan for the proposed Ventersburg Gold Mine, Free State, South Africa

Mining Right applications

- Mining Right application for the proposed Buffelsdoorn Mine, North West, South Africa

Mine Closure Planning and Liability and Performance Assessments

- Annual Rehabilitation Plan for the Middelvlei Mine, Randfontein, Gauteng, South Africa
- Rehabilitation Plan for the proposed Cons Modder Gold Mine, Gauteng, South Africa
- Performance Assessment and Financial provision for Mbila and Msebe Mine, KwaZulu-Natal, South Africa
- Closure Plans and Annual assessment of the Quantum for Closure-Related Financial Provision for the Modikwa Platinum Mine, Limpopo, South Africa
- Assessment of the Quantum for Closure-Related Financial Provision for the Sebilo Manganese Mine, Northern Cape, South Africa

GIS (Proficiency with Esri ArcGIS software 10.1 – 10.5 and QGIS Desktop 3.2.3)

- Conversion of CAD files into GIS readable formats for various projects
- Performing different spatial analyses available in the ArcGIS package for the mapping of natural and man-made features including mine layouts, underground mine plans, farm portions and environmental information for projects listed above
- Experience with the SANBI BGIS database

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COMPANY PROFILE

Prime Resources (Pty) Ltd is a medium-sized group of consulting environmental engineers and scientists serving clients across a wide range of industries, although the majority of our project work is based around natural resources, waste and mining.

The company was established in Johannesburg in 2003. Our head offices are located in Parktown North, Johannesburg, South Africa.

Prime Resources employs a talented and innovative group of professional people. We also have an extensive network of specialist sub-contractors who, together with our team, provide specialist environmental and civil design services. We provide consulting services and solutions to clients in a wide range of fields including:

- Project Management and implementation of environmental solutions
- Environmental Social Impact Assessments (ESIA) and Environmental Management Programmes (EMPr)
- Public consultation and engagement with Interested and Affected Parties (IAPs)
- Water Use Licence Applications (WULA)
- Waste management strategies and licensing
- Mining Right Applications
- Mine closure and rehabilitation planning
- Social and Labour Plans (SLP)
- Environmental and social compliance auditing and performance assessments
- Geographic Information Systems (GIS) services
- Environmental / civil / geotechnical engineering solutions
- Geotechnical and tailings dam assessments
- Feasibility studies
- Environmental advisors on purchase and sale transactions – Independent Technical Advisors
- Environmental and social due diligence and risk assessments both in terms of national legislation and international best practice
- Advising on compliance with international best practice, most importantly the Equator Principles, IFC Performance Standards, and World Bank EHS Guidelines

KEY STAFF AND QUALIFICATIONS

PROFESSIONAL STAFF	ROLE	QUALIFICATIONS
Peter Theron	Company Director Environmental Engineer Project Manager	Professional Engineer (Pr. 950329) BSc Eng. (Civil) GDE Environmental Engineering, Tailings & Geotechnical
Jonathan van de Wouw	Project Manager Principal Environmental Scientist	BSc (Hons) Microbiology and Biotechnology
Gené Main	Project Manager Principal Environmental Scientist	Pr. Sci. Nat. (Environmental Science) MSc Botany BSc (Hons) Environmental Science
Louise Jones	Senior Environmental Scientist GIS Specialist	MSc Environmental Sciences BSc (Hons) Applied Chemistry
Stephan Geyer	Senior Civil Engineer	BSc Eng. (Civil)
Itumeleng Morosele	Environmental Scientist	BSc (Life and Environmental Sciences) BSc (Hons) Geography
Stephen Tarlton	Senior Environmental Scientist	MSc Plant conservation ecology BSc Plant Sciences and Ecology
Dr Bronwyn Grover	Environmental Scientist Geochemistry	PhD Environmental Analytical Chemistry BSc Geology and Chemistry
Ivanna Katz	Environmental Scientist	BSc (Hons) Geography MPhil Environmental Management
Fernanda Smook	Office Manager	Business Management courses

ASSOCIATES:

PROFESSIONAL STAFF	ROLE	QUALIFICATIONS
Niel Scheepers	Civil Engineering Technician	B Tech (Civil)

PROJECT EXPERIENCE

Prime Resources has considerable in-house experience in the technical and civil design of mine and waste residue storage facilities, including geotechnical engineering, geochemical evaluation, barrier selection and design, hydrogeology and wastewater containment.

Our in-house technical project team includes Peter Theron, Director of Prime Resources and a Professional Engineer (Civil) with over 33 years' experience and specialising in Environmental Engineering, Tailings, Waste Management and Geotechnical Design. Stephan Geyer (Senior Geotechnical and Tailings Engineer), Claire Kennedy (Civil and Environmental Engineer) and Dr Bronwyn Grover (Geochemist and Analytical Chemist) as well as a number of environmental scientists covering a range of Permitting and Licensing fields.

We have further associated ourselves with a number of specialist service providers whom we work together with to provide a complete range of design solutions, including civil engineering technicians and draughtsmen, hydrogeologists and hydrologists.

INTERNATIONAL PROJECTS

- **Al Amar Tailings Storage Facility Design, Saudi Arabia**
 - Tailings and Waste disposal aspects of Al Amar Tailings Retreatment Project
 - Detailed design of the liner system and contract documentation
- **Minas Moatize due diligence, Mozambique**
 - Review of environmental, social and legislative aspects
 - Review of the waste disposal discard disposal aspects
- **Lemur Resources Coal Project, Madagascar**
 - High level review of the coal discard, environmental and social work undertaken during PFS
- **Avesoro New Liberty Access Road Review, Liberia**
 - Review of geotechnical, road design aspects
- **Tri-K due diligence, Guinea**
 - Review of environmental, social and legislative aspects
 - Review of the waste disposal discard disposal
 - Compilation of a Stage 2 Due Diligence report
- **Segilola Gold due diligence, Nigeria**
 - Review of environmental, social, geochemical and tailings aspects
 - Compilation of a Stage 2 Due Diligence report
- **Nouvelle Gabon Manganese, Gabon**
 - Review of environmental, social, geochemical and tailings aspects
 - Compilation of a Stage 1 high level report
- **Itasca Africa Lubambe Extension Project, Zambia**
 - Review of environmental, social and legislative aspects for Pre-Feasibility Study
 - Compilation of an integrated environmental and social report
- **Araguaia Nickel Project, Brazil**
 - Detailed design of slag disposal facility for Feasibility Study

- Site geotechnical investigations
- Detailed design of cooling water dam and river abstraction pipeline
- **Lindi Jumbo Graphite Project, Tanzania**
 - Surface geotechnical study
 - Site selection for tailings storage facility
 - Pre-Feasibility Study design for tailings storage facility
 - Definitive Feasibility Study design for tailings storage facility
 - Terracing design for plant infrastructure
- **Cacata Phosphate Project, Angola**
 - Environmental licensing according to Angolan legislative requirements
 - Environmental and Social Impact Assessment process according to international best practice
- **Ganajur Gold Project, India**
 - Review of environmental aspects for Feasibility Study
 - Surface geotechnical study
 - Site selection for tailings storage facility
 - Feasibility Study design for tailings storage facility
- **Salamanca Uranium Project, Spain**
 - Feasibility Study design for lined surface waste disposal facilities
 - Feasibility Study design and detailing for an in-pit waste disposal liner system
- **Mpokoto Gold Project, Democratic Republic of Congo**
 - Surface geotechnical study
 - Site selection for tailings storage facility
 - Pre-Feasibility Study design for tailings storage facility
 - Bankable Feasibility Study design for tailings storage facility
 - Terracing design for plant infrastructure
- **Unki Platinum Slag Storage Facility, Zimbabwe**
 - Geotechnical investigation for the slag stockpile area and borrow material;
 - Detailed design for construction of a slag stockpile and water management infrastructure.
- **Olovo Terrace Design, Bosnia**
 - Geotechnical design of a terrace for a run-of-mine ore pad and access ramp.
- **Caula Graphite Project, Mozambique**
 - Site selection and sizing of a graphite tailings storage facility
 - Scoping level design aspects including seepage management, surface water management
- **Cinovec Project, Czech Republic**
 - Pre-feasibility Study (PFS) for the waste rock disposal facility
 - Pre-feasibility Study (PFS) for the terracing and earthworks
- **Lucunga Phosphate Project, Angola**
 - Environmental licensing according to Angolan legislative requirements
- **Veduga Gold Project, Russia**
 - Technical review of environmental and mine waste disposal aspects
- **Ghaghoo Diamond Project, Botswana**

- Independent technical review of the environmental, social and permitting documentation according to the Equator Principles, IFC Performance Standards, and World Bank EHS Guidelines
- Preparation of an Equator Principles environmental and social action plan
- **Debswana Diamond Projects, Botswana**
 - Peer review of environmental and mine waste aspects for Pre-Feasibility Studies
- **Liqhobong Diamond Mine, Lesotho**
 - Independent technical review of the environmental and social aspects, permitting, water management and residue management - according to the Equator Principles, IFC Performance Standards, and World Bank EHS Guidelines
- **Koidu Diamond Project, Sierra Leone**
 - Review of environmental, social, groundwater and tailings documentation for compliance with Equator Principles, IFC Performance Standards and EHS Guidelines
- **Araguaia Nickel Project, Brazil**
 - Environmental and social baseline report Pre-Feasibility Study
 - Preliminary design of slag disposal facility for Pre-Feasibility Study
- **Maminskoye Gold Project, Central Urals, Russia**
 - Environmental and social audit of the Pre-Feasibility Study
- **Cabinda Phosphate Project, Angola**
 - Social impact plan and Environmental Management Plan for prospecting
 - Environmental and social baseline report towards the Definitive Feasibility Study stage
- **Owere Gold Project, Ghana**
 - Independent technical review of the environmental, social and permitting documentation
- **Kinsevere Copper Project, Democratic Republic of Congo**
 - Review of tailings dam risks and opportunities for compliance with Equator Principles
- **Kipoi Copper Mine, Democratic Republic of Congo**
 - Review of environmental, social, heap leach and tailings of the Kipoi Central RDFS operations, Tiger Resources
 - Independent technical review of the environmental, social and permitting documentation according to the Equator Principles, IFC Performance Standards, and World Bank EHS Guidelines
- **Zanaga Iron Ore Project, Democratic Republic of Congo**
 - Environmental and social section of the order of magnitude study
- **Pakrut Gold Mine, Tajikistan**
 - Social and Environmental Impact Assessment process, baseline evaluations according to international best practice requirements
- **Lece Gold Mine, Serbia**
 - Tailings technical review and concept design work for a tailings retreatment project
- **Langer Heinrich Uranium Mine, Namibia**
 - Independent technical review of the tailings storage facility and storage strategy
- **Maamba Coal Mine, Zambia**
 - Independent technical review of the environmental, social, permitting, discard and water management according to the Equator Principles, IFC Performance Standards, and World Bank EHS Guidelines
- **North River Resources Lead Zinc, Namibia**

- High level review of the environmental and social documentation according to Namibian legislative requirements
- **Minas Moatize Coal Expansion Project, Mozambique**
 - Independent technical review and due diligence of mine residue facilities (slurry and discard), water management, environmental and social aspects
- **Aquarius Shipping International, Warehouse and Container Depot, Beira, Mozambique**
 - Geotechnical investigation
- **Passendro Gold Project, Democratic Republic of Congo**
 - Independent peer review for tailings storage facility
- **Banro Twangiza Project, Democratic Republic of Congo**
 - Independent technical review of the environmental, social, tailings and water management aspects according to the Equator Principles

NATIONAL PROJECTS

Projects are all conducted in terms of relevant National legislation, including the National Environmental Management Act, No. 107 of 1998 (NEMA); the Mineral and Petroleum Resources Development Act, No. 28 of 2002 (MPRDA); the National Environmental Management: Waste Act, No. 59 of 2008; the National Water Act, No. 36 of 1998 etc.

- **Sebilo Resources – Perth Mine, Northern Cape**
 - Assessment of the quantum for rehabilitation-related financial provision
- **Samancor^{Cr} – TC Smelters, North West**
 - Closure, Decommissioning and Rehabilitation Plan
 - Assessment of the quantum for rehabilitation-related financial provision
- **Samancor^{Cr} – Ferrometals, Mpumalanga**
 - EMP performance assessment for decommissioning of the IC3 facility
 - Slag dump waste management licence compliance audit
 - Water use license compliance audit
- **Tawana Investment Holdings – Prospecting Right, Northern Cape**
 - Prospecting Right Application
 - Environmental Authorisation process incl. BAR, EMP and closure plan
- **Pan African Mineral Development Company – Prospecting Right, Northern Cape**
 - Prospecting Right Application
 - Environmental Authorisation process incl. BAR, EMP and closure plan
- **Newshef – Cons Modder Project, Gauteng**
 - Social and Labour Plan
 - Environmental Impact Assessment and Environmental Management Programme
 - Water Use Licence Application
- **Imperial Cargo Solutions – Flammable Goods Store, Gauteng**
 - Environmental Impact Assessment and Environmental Management Programme
- **Gold One Africa – Ventersburg Project, Free State**
 - Social and Labour Plan
 - Environmental Impact Assessment and Environmental Management Programme

- Waste Management Licence
- Water Use Licence Application
- Atmospheric Emission Licence
- **WRE – EJV Gold Project, Free State**
 - Site selection for tailings storage facility
 - Pre-Feasibility Study design for tailings storage facility
- **Rietvlei Mine, Mpumalanga**
 - Technical input on discard dump and pollution control dam design
- **Gold One Africa – Holfontein Gold Project, Gauteng**
 - Environmental Impact Assessment and Environmental Management Programme
 - Water Use Licence Application and water dam designs
- **New Kleinfontein Goldmine – Modder East Operations, Gauteng**
 - Environmental Impact Assessment and Environmental Management Programme and amendments thereto
 - Basic Assessment for a return water dam and Environmental Management Programme amendment
 - Water Use Licence Application and amendments thereto
 - Atmospheric Emission Licence application
 - Rehabilitation Strategy and Implementation Programme
 - Social and Labour Plan revision
 - Equator Principles and IFC compliance review
 - Alien invasive vegetation eradication plan
 - Emergency preparedness and response plan
 - Stormwater management plan
- **Interwaste – Various sites in Gauteng, Mpumalanga and Western Cape**
 - Environmental compliance auditing at various landfill sites and depots
 - Water quality monitoring and reporting
 - External environmental control officer for the Klinkerstene Landfill Site, Environmental Authorisation and construction Environmental Management Programme compliance auditing
- **Ekurhuleni Metropolitan Municipality – Various landfill sites in Gauteng**
 - Environmental compliance auditing at various landfill sites and transfer stations
 - Permit amendment application
 - Water quality monitoring and reporting
- **Royal Bafokeng Platinum, North West**
 - Annual assessment of the quantum for rehabilitation-related financial provision for Prospecting Rights
- **Samancor^{Cr} – Various sites in Limpopo**
 - Performance assessments and assessment of the quantum for rehabilitation-related financial provision for various Prospecting Rights
- **Modikwa Platinum Mine, Mpumalanga**
 - Water Use Licence compliance audit and action plan
 - Annual assessment of the quantum for rehabilitation-related financial provision

- Annual Rehabilitation Plan
- Final Rehabilitation Decommissioning and Closure Plan
- Environmental Risk Assessment
- Waste Management Licence Amendment
- **Coal of Africa – Vele Colliery, Limpopo**
 - Independent technical review of the environmental, social, tailings and water management aspects according to the Equator Principles and IFC Performance Standards
- **Canyon Springs Coal Mine, Mpumalanga**
 - Environmental Impact Assessment and Environmental Management Programme
 - Water Use Licence Application
 - Waste Management Licence application
 - High level bulk water supply assessment
 - External environmental control officer, construction Environmental Management Programme compliance auditing
 - Water Use Licence execution
- **Elsmore Pafuri Camp, Limpopo**
 - Environmental Authorisation amendment
- **Elsmore Luvuvhu Camp, Limpopo**
 - External environmental control officer, Environmental Authorisation and construction Environmental Management Programme compliance auditing
- **Bio-2-Watt – Biogas Plant, Gauteng**
 - External environmental control officer, construction Environmental Management Programme compliance auditing
 - Technical advice
- **Samancor^{Cr} – Scheiding Chrome Mine, Limpopo**
 - Environmental Impact Assessment and Environmental Management Programme
 - Water Use Licence Application
- **African Exploration Mining Finance Corporation – T-Project Colliery, Mpumalanga**
 - Environmental Impact Assessment and Environmental Management Programme
 - Water Use Licence Application
 - Closure and rehabilitation plan
 - Bulk water supply assessment
 - Equator Principles compliance review and gap analysis
 - Stakeholder engagement plan and grievance mechanism
 - Emergency preparedness and response plan
 - Alien invasive vegetation eradication plan
 - Water Use Licence execution
- **Mbila Anthracite Mine, KwaZulu-Natal**
 - Basic Assessment and Environmental Management Programme
 - Water Use Licence amendment
- **Msebe Opencast Anthracite Mine, KwaZulu-Natal**
 - Environmental Impact Assessment and Environmental Management Programme

- **Tjate Platinum Mine, Limpopo**
 - Environmental and social baseline report
 - Baseline environmental assessments and project management of the environmental inputs into the Pre-Feasibility Study
 - Social and Labour Plan update
 - Site selection and preliminary design for a tailings storage facility
- **Tharisa Platinum Mine, North West**
 - Due diligence for independent technical engineers report (ITE), review of the environmental, social and tailings documentation and reporting and annual updates thereto
- **Anglo American Platinum Limited – Rustenburg Platinum Mines, Limpopo**
 - The consolidation of existing approved Environmental Management Programmes and the alignment thereof with the requirements of the MPRDA
- **Kalagadi Manganese Mine, Northern Cape**
 - Review of environmental documentation to determine compliance with Equator Principles and international best practice, on behalf of Standard Bank
- **African Exploration Mining Finance Corporation – Vlakvarkfontein Colliery, Mpumalanga**
 - Water Use Licence Application
 - Closure and rehabilitation plan
 - The technical design, 3D modelling and detailing of the conceptual backfill plan for an opencast pit
 - Compilation of an alien invasive vegetation eradication plan
 - Social and Labour Plan amendment
 - Basic Assessment and Environmental Management Programme for a haul/ access road and above ground diesel storage area
- **Western Bushveld Joint Venture – Project 1, North West**
 - Review of environmental, hydrology and tailings dam documentation for compliance with Equator Principles, IFC Performance Standards and EHS Guidelines, on behalf of Standard Bank
- **Anglo American Platinum Limited – Amandelbult Chrome Recovery Plant, Limpopo**
 - Basic Assessment and Environmental Management Programme for a chrome recovery plant
 - Addendum to the existing Environmental Impact Assessment and Environmental Management Programme in terms of the MPRDA
- **Steenkampskraal Project, Western Cape**
 - Review of environmental, hydrology and tailings dam documentation for compliance for PEA Canadian NI 43-101 filing
- **Malelane Iron Ore Project, Mpumalanga**
 - Preliminary environmental and social baseline studies
- **Rand Uranium – Reclamation of Lindum Tailings Storage Facility, Gauteng**
 - Environmental Impact Assessment and Environmental Management Programme addendum
- **Hlabisa Coal, KwaZulu-Natal**
 - High-level, desktop environmental evaluation (sensitivity analysis)
- **Anglo American Platinum Limited – Kilken Tailings, Limpopo**

- Independent technical review of the environmental and social aspects permitting and water management according to the Equator Principles, IFC Performance Standards, and World Bank EHS Guidelines
- **Mooiplaats Platinum Mine, Limpopo**
 - Social and Labour Plan
- **Rietkuil Coal Project, Mpumalanga**
 - Independent technical review and due diligence of environmental documentation
- **Evander Gold Mine, Mpumalanga**
 - Review of environmental, social and tailings dam documentation for compliance with South African Environmental and Social Standards
- **Holgoun Energy – Springbok Flats Coal Fields, Limpopo**
 - Competent Persons Report
 - High level bulk water supply assessment
 - High level environmental review for the Western Complex Project
- **Kudumane Manganese Mine, Northern Cape**
 - Independent technical review of the environmental and social aspects
- **ZYL Limited – KaNgwane Anthracite Mine, Mpumalanga**
 - Environmental Impact Assessment and Environmental Management Programme
 - Water Use Licence Application
 - Closure and rehabilitation plan
- **ZYL Limited – Southern Anthracite Project, Mpumalanga**
 - Environmental Impact Assessment and Environmental Management Programme
- **DRDGold – Blyvooruitzicht Mining Operation, Gauteng**
 - High level environmental review
- **Lonmin – Akanani Platinum Project, Limpopo**
 - Pre-Feasibility Study, review of the environmental and social documentation and reporting of high level risks and opportunities
- **Anglo American Platinum Limited – Dishaba Mine, Limpopo**
 - Environmental Impact Assessment and Environmental Management Programme
 - Water Use Licence amendment
- **Majuba Colliery, Mpumalanga**
 - Closure and rehabilitation plan
- **Rietfontein Prospect, Limpopo**
 - Geotechnical investigation
 - Environmental Management Programme amendment
- **Namaqualand Mines, Northern Cape**
 - Independent technical review of the environmental, social and tailings aspects according to the Equator Principles and IFC Performance Standards
- **Leeuwfontein and Blinkpan project areas, Mpumalanga**
 - Geotechnical investigation
- **Bafokeng Rasimone Platinum Mine, North West**
 - Preliminary closure and rehabilitation plan

- **Umtu (Manganese) Mine Project, Northern Cape**
 - Independent technical review of the environmental and social aspects according to the Equator Principles and IFC Performance Standards
- **Koornfontein Mines, Mpumalanga**
 - Environmental Impact Assessments and Environmental Management Programmes for the separate sections of the mining operations
 - Environmental Impact Assessments and Environmental Management Programmes amendment for the Leeuwfontein Block
 - Water Use Licence Applications for the separate sections of the mining operations
 - Identification of a suitable host area and conditions for resettlement and the compilation of the Resettlement Action Plan and agreement on timeframes and responsibilities
- **Bafokeng Rasimone Platinum Mine, North West**
 - Due diligence on environmental and tailings dam documentation for listing purposes on the JSE stock exchange
 - Competent Persons Report including environmental, social, hydrological and tailings aspects
- **Simmer & Jack Limited – Elandsdrift Heap Leach Pad, Mpumalanga**
 - Geotechnical and slope stability investigation
 - As built drawings for the Elandsdrift heap leach pad
- **Simmer & Jack Mines Limited Transvaal Gold Mining Estates, Mpumalanga**
 - Design, quality control/assurance manual, site support and part time project management for the design and construction of a heap leach dam extension
- **Afrikander Leases Gold Mine, North West**
 - Environmental Impact Assessment and Environmental Management Programme amendment
- **Grass Valley Platinum Project, Limpopo**
 - Update the environmental aspects in the Pre-Feasibility Study report
- **Lonmin PLC Western Platinum Mine, North West**
 - Basic Assessment and Environmental Management Programme for a hazardous waste storage facility
 - Waste Management Licence application

Appendix 3

NOTIFICATION OF PUBLIC PARTICIPATION PROCESS

Siyanda Bakgatla Platinum Mine is proposing the expansion of its current chrome beneficiation operation by installing two Fine Chrome Recovery Plants (FCRPs) as well as an extension to the existing railway line. The proposed expansion project is located on the border of the North West and Limpopo Provinces, near the town of Swartklip. The FCRPs will extract further chrome from the tailings. The location of these facilities is based on the location of the existing railway line and other related processing infrastructure. All components of this expansion project will be within the boundaries of the existing Siyanda Bakgatla Platinum Mine.

SBPM is applying for Environmental Authorisation for activities listed in terms of the National Environmental Management Act, 1998 (NEMA) EIA Regulations (2014 as amended): Listed activities 27, 31 and 64 of Listing Notice 1 (GNR983 of 2014) and activity 6 of Listing Notice 2 (GNR984 of 2014). A Scoping and EIA process will be undertaken.

Prime Resources (Pty) Ltd has been appointed as the Environmental Assessment Practitioner to facilitate the above process.

REGISTER AS AN INTERESTED OR AFFECTED PARTY (IAP)

Individuals and organisations are invited to register as Interested and Affected Parties or request additional information by submitting contact details to Prime Resources. To register, SMS or WhatsApp "**Siyanda**" followed by your name and contact number to **076 403 3386** or email prime@resources.co.za.

PUBLIC COMMENT INVITED

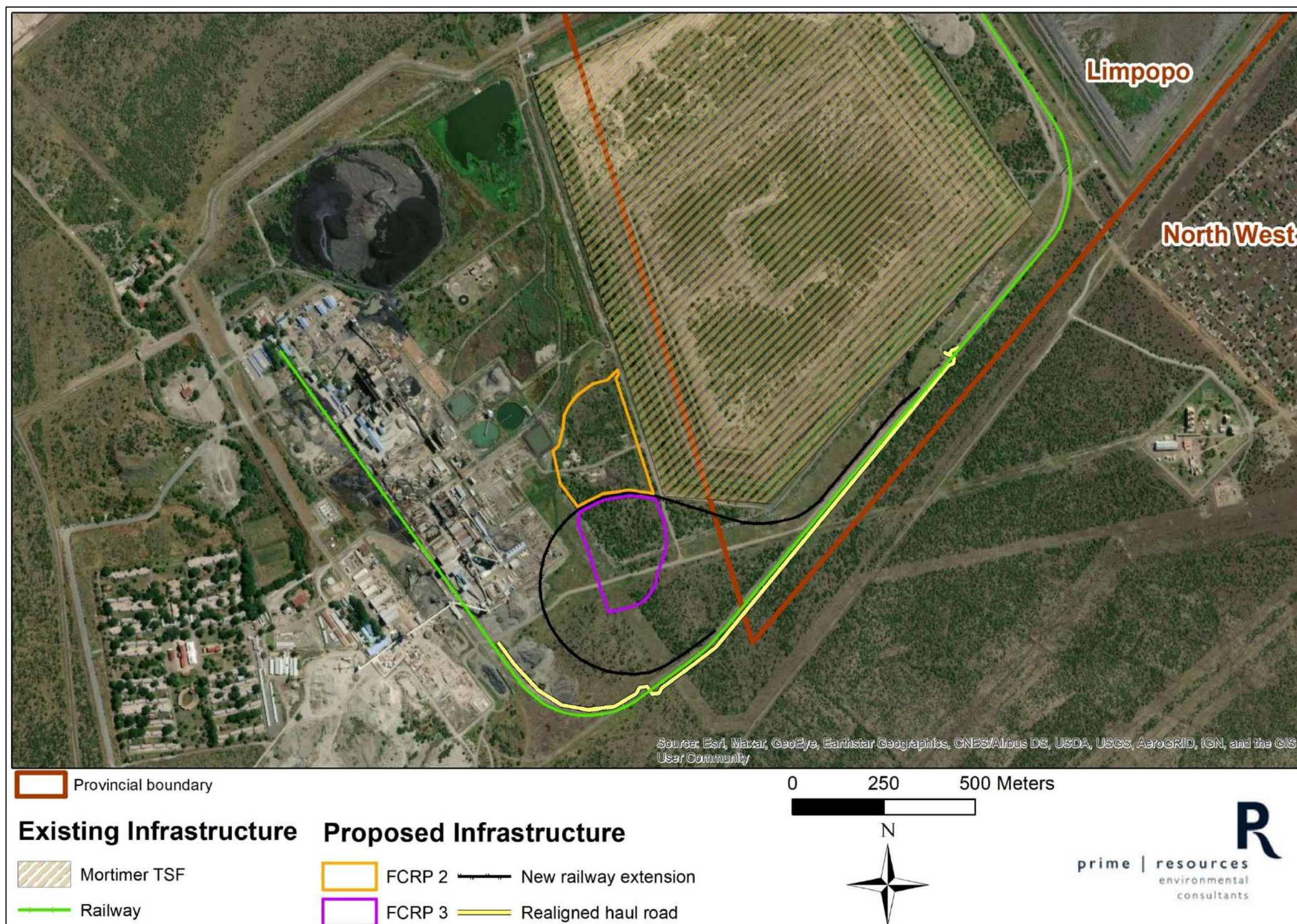
The Draft Scoping Report and Environmental Management Programme can be downloaded (data free) from <http://resourcesza.datafree.co/downloads> during the 30-day public commenting period, from **9 November 2020 to 10 December 2020**. Background Information Documents (BIDs) are available at the Mantserre Community Hall, Sefikile Clinic and Swartklip Post Office. BIDs and the Scoping Report can be provided by email upon request. Please forward comments to Prime Resources by **10 December 2020**.

For more information, please contact Stephen Tarlton at Prime Resources.

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NOTICE OF PUBLIC PARTICIPATION PROCESS

Siyanda Bakgatla Platinum Mine (SBPM) is proposing the expansion of its current chrome beneficiation operation by installing two Fine Chrome Recovery Plants as well as an extension to the existing railway. The proposed expansion project is located on the border of the Northwest and Limpopo Provinces, near Swartklip. These Fine Chrome Recovery Plants will extract further chrome from the tailings stream. The proposed location of these facilities has been determined by the location of the existing railway line and other related processing infrastructure. All components of this expansion project will be within the boundaries of the existing mine.



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Report



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SBPM is applying for Environmental Authorisation for activities listed in terms of the National Environmental Management Act, 1998 (NEMA) EIA Regulations (2014 as amended): Listed activities 27 and 64 of Listing Notice 1 (GNR983 of 2014) and activity 6 of Listing Notice 2 (GNR984 of 2014). A Scoping and EIA process will be undertaken. Prime Resources (Pty) Ltd has been appointed as the Environmental Assessment Practitioner to facilitate the above process.

REGISTER AS AN INTERESTED AND AFFECTED PARTY

Individuals and organisations are invited to register or request additional information by submitting their contact details to Prime Resources. SMS or WhatsApp “**Siyanda**” followed by your full name and contact number to **076 403 3386** or email prime@resources.co.za.

INVITATION TO COMMENT

The Draft Scoping Report and Environmental Management Programme can be downloaded (data free) from <http://resourcesza.datafree.co/downloads> during the 30-day public commenting period, from **9 November 2020 to 10 December 2020**. Background Information Documents (BIDs) are available at the Mantserre Community Hall, Sefikile Clinic and Swartklip Post Office. BIDs and the Scoping Report can be provided by email upon request. Please forward comments to Prime Resources by **10 December 2020**. For more information, please contact Stephen Tarlton at Prime Resources.

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	Sandra Mafisa	Moses Kotane Local Municipality
	Sharon Rasepae	
	Reuben Mashego	Waterberg District Municipality
	Stanley Koanaite	
	Maboe Mampa	
	Vincent Raphunga	
	Piet van Rensburg	Thabazimbi Local Municipality
	Molatelo Mabitsela	
	JM Nkoana	
	Vusi Maluleke	Limpopo Economic Development, Environment and Tourism (LEDET)
	Portia Masedi	
	Melinda Rodgers	
	Tinyiko Malungani	
	Nicoline Gulwakon	
	Joel Tsholedi Ngoasheng	
	Meshak Masindi	
	Victor Mongwe	
	Lufuno Maise	
	Phumudzo Thivhafuni	

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Masina Litsoane	
Bathandwa Ncube	
Shiba Sebone	
EIA Admin	
Zingisa Phohlo	
Zama Langa	
Zama Mtembu	
Mpho Morudu	
Benny Sekgobela	
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E Ntsoane	
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Tele Maphoto	
Julius Mashaphu	
Semakaleng Mabeba	
Miyelani Nkathingi	
Charles Neluheni	
Molatelo Makhuvha	

	Portia Ramalamula	Limpopo Provincial Heritage Resources Authority
	Noel Nkhetheni Nemauluma	
	Donald Lithole	
	Malebane Matthews	
	Phillip Hine	South African Heritage Resources Agency
	Lebogang Mataboge	Bakgatla ba Kgafela Tribal Authority
Landowners		Turfbult 404 KQ Portion 0
		Zwartklip 405 KQ Portion 1
Adjacent landowners		Haakdoorn 6 JQ
	Lebogang Mataboge (Bakgatla Tribe)	Spitskop 410 KQ Portion 1
		Spitskop 410 KQ Portion 2
		Grootkuil 409 KQ Portion 3
	Pier De Vries	Grootkuil 409 KQ Portion 4
		Grootkuil 409 KQ Portion 5
		Nooitgedacht 406 KQ Portion 2
	William Roodt	Nooitgedacht 406 KQ Portion 6
		Nooitgedacht 406 KQ Portion 7
		Nooitgedacht 406 KQ Portion 10
	Pier De Vries	Nooitgedacht 406 KQ Portion 14
	Liselotte Van Der Westhuizen	Nooitgedacht 406 KQ Portion 22
	Baphalane Tribe	Varkensvlei 403 KQ Portion 0
		Varkensvlei 403 KQ Portion 1

Surrounding landowners / uses	Mmamogale Bontlane	Varkensvlei 403 KQ Portion 2
		Elandsfontein 402 KQ Portion 0
	Martha Margaretha Schoeman (son)	Grootkuil 409 Portion 0
	Ingrid Morrison	Grootkuil 409 Portion 2
		Grootkuil 409 Portion 6
	Hendrik Malan	Leeuwkopje 415 Ptn 3 (and Portion 9 of Wildebeeslaagte)
	Masood Mohammed	Wildebeestlaagte 411 Portion 10
	Pier De Vries	Zwartklip 405 Portion 2
	Barbara	Kameelhoek 408 Portion 3
	Cobus Schoevers	
	Gustuv	
	Herman	
	Stewart McQuade	Mining Right holder on Kameelhoek 408 Portion 3
	Dirkie Van der Westhuizen	
	Alta Koekemoer	

Environmental Authorisation process
for the **Siyanda Bakgatla Platinum Mine**
- Fine Chrome Recovery Plants and
Railway Extension,
boundary of North West and Limpopo

Scoping Phase Information Booklet

9 November 2020 – 10 December 2020

This document summarises the information currently available. Additional information will be included in the EIA Phase Information Booklet, which is anticipated to be made available in **January 2021**. Registered Interested and Affected Parties (IAPs) will be notified of the availability of the EIA Phase Information Booklet.

The Draft Scoping Report is currently available for public review and comment and **can be requested via email or can be downloaded from the Prime Resources website data free**

(<http://resourcesza.datafree.co/downloads>).

You are invited to review the Scoping Report and/or this Information Booklet.

Please submit comments by 10 December 2020.

All comments submitted will be included into the final documentation to be sent to the Department of Mineral Resources and Energy for consideration during the decision-making process.

Prime Resources has been appointed as the independent Environmental Assessment Practitioner (EAP) to conduct the regulated environmental processes for the project.

Independent specialists have been appointed to undertake studies for the project. Neither Prime Resources nor independent specialists have any vested interest in the project proceeding.

Project description

Siyanda Bakgatla Platinum Mine (SBPM) is proposing the development of two Fine Chrome Recovery Plants (FCRPs), as well as an extension to the existing railway. The project is located on the border of the North West and Limpopo Provinces, near the town of Swartklip (Figure 1). The new plants will allow for additional chrome to be abstracted from the tailings stream (prior to being deposited on the Tailings Storage Facility – TSF) and will therefore considerably reduce the quantity of tailings to be deposited on the TSF. The proposed location of these facilities is determined by the location of the existing railway line and other related infrastructure. All components of the project will occur within the boundaries of the SBPM.

The FCRPs will make use of existing water storage facilities on the site, and a new concrete thickener tank will form part of the proposed FCRP infrastructure. The plants are closed systems and no emissions will be released from them. No chemicals are used in the process.

The recovered chromite will be separated according to grade (chemical versus metallurgical) and stored on a concrete-lined loading pad until it can be loaded onto rail wagons and transported from the site.

The rail turning loop (or balloon) would allow for the turning and shunting of rail wagons and would be 2.1 km in length. The proposed track layout will require the repositioning of some of the existing infrastructure:

- The fence surrounding the TSF will be re-positioned
- The existing haul road will be rerouted to continue parallel to the existing railway
- Four power transmission lines cross the proposed rail track. These will have to be raised approximately 3.6 m. The raised powerlines will remain within the existing powerline servitudes

Please refer to the map on the final page

Process to be followed

South Africa's main environmental law is the **National Environmental Management Act, 1998 (NEMA)**. NEMA contains Regulations, which include lists of activities, which have been identified as potentially harmful to the environment. These are referred to as "listed activities". Before undertaking any of these activities, a company is required to apply for Environmental Authorisation (EA) for these activities. Depending on the nature of these activities, a *Basic Assessment* (BA) or *Scoping and Environmental Impact Assessment* (EIA) process will be required to support the application for EA.

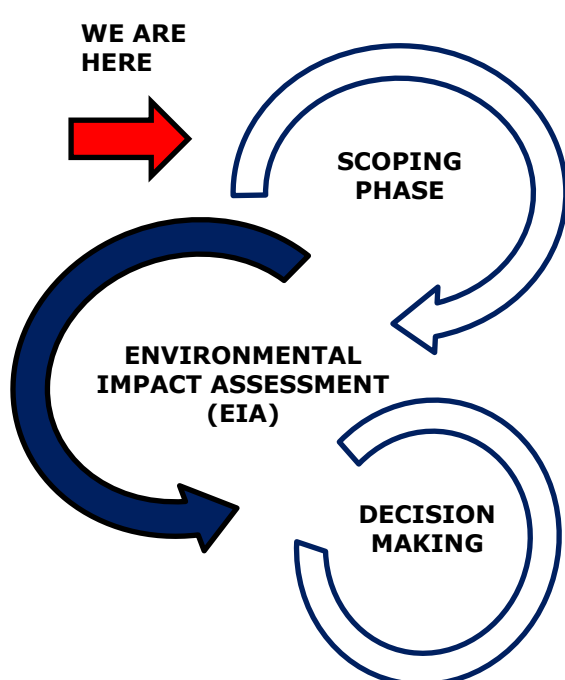
For the proposed project, a **Scoping and EIA process is required**. The two phases - Scoping and EIA - each have a 30-day public participation period (allowing review of documents and raising of comments, questions and concerns – which need to be included in the final documentation).

The relevant listed activities (in terms of the NEMA Regulations of 2014 *as amended*) (as described above) include:

Type of activity	Applicable Listing Notice
Clearing of land for the development, approximately 14 ha	Listing Notice 1 (GNR 983 of 2014), activity no 27 The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
Decommissioning, closure, rehabilitation and restoration (once the infrastructure is removed)	Listing Notice 1 (GNR 983 of 2014), Activity 31 The decommissioning of existing facilities, structures or infrastructure for – (i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014.
Construction / installation of the railway extension	Listing Notice 1 (GNR 983 of 2014), Activity 64 The expansion of railway lines, stations or shunting yards where there will be an increased development footprint, excluding— (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in mines; or (iii) additional railway lines within the railway line reserve.
Update Water Use Licence to include the ore stockpiles (Section 21g)	Listing Notice 2 (GNR 984 of 2014), Activity 6 The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.

The **Department of Mineral Resources and Energy (DMRE)** is considered the Competent Authority for this process because the activities occur within a mining site. All of the information gathered during the Scoping and EIA phases and all comments made by the public are provided to the DMRE. The DMRE decides whether to grant Environmental Authorisation for the activities.

SBPM also requires two additional water uses to be added to its existing Water Use Licence, in terms of Section 21 of the **National Water Act, 1998**. Project activities that require a Water Use Licence include the two stockpiles / loading areas for the chromite.



- Public notified via site notices, newspaper and background information documents
- Registration of Interested and Affected Parties
- 30-day review and commenting period: 9 November to 10 December 2020
- All comments and concerns sent to DMRE in a final Scoping Report

- Registered Interested and Affected Parties are notified of the availability of the Environmental Impact Assessment (EIA) Report and Environmental Management Programme (EMPr).
- 30 day review and commenting period
- All comments and concerns sent to DMRE in the final EIA Report

- Registered Interested and Affected Parties will be notified of the decision by the DMRE to accept or reject the application
- Registered Interested and Affected Parties will be informed about the of Appeals Process

How will the project impact on the environment and communities?

At the Scoping Phase, potential impacts are identified but the severity / significance of these impacts is not yet known, as the specialist studies have not been completed. **The assessment of potential impacts will be made available during the EIA phase of the project.** The potential positive and negative impacts of the project are currently being assessed, and include (but are not limited to):

Potential negative impacts

- Dust generation causing temporary nuisance to surrounding sensitive receptors
- Increased noise causing temporary nuisance to surrounding sensitive receptors
- Loss of soil resources due to water and wind erosion, compaction and lack of adequate topsoil management
- Earthworks may damage buried archaeological or palaeontological resources, if any
- In-migration of job seekers resulting in pressure on local infrastructure and services

Loss of soil capability due to hydrocarbon spills and soil compaction Potential positive impacts

- Employment opportunities
- Improved visual aesthetics associated with the demolition of infrastructure at decommissioning

Register as an Interested and Affected Party (IAP)

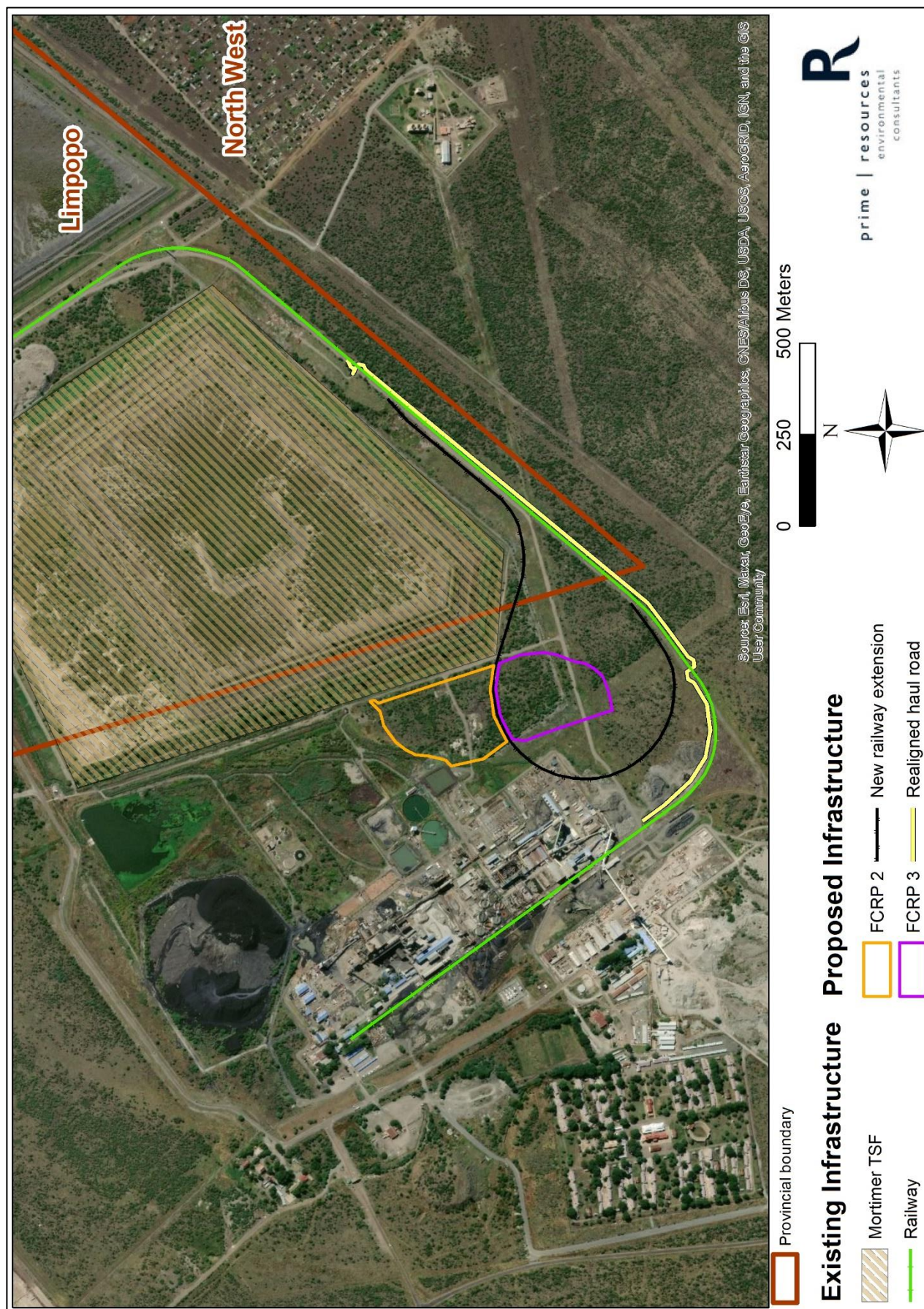
If you would like to register as an IAP, please submit your contact details to Prime Resources via SMS (to 076 403 3386) or email (prime@resources.co.za). Please include the subject line **"Siyanda"** and indicate your interest.

Opportunity to participate

The Draft Scoping Report and Environmental Management Programme can be downloaded (data free) from <http://resourcesza.datafree.co/downloads> during the 30-day public commenting period, from **9 November 2020 to 10 December 2020**. BIDs are available at the Mantserre Community Hall, Sefikile Clinic and Swartklip Post Office. BIDs and the Scoping Report can be provided by email upon request. All comments regarding the proposed project are welcome. In particular, we would like to invite comments or suggestions on:

- How the project might affect you and your community
- Information on any environmental or social features that may have been overlooked
- Suggestions to lessen any anticipated environmental or social impacts
- Suggestions as to the standard you feel the site should be rehabilitated to

Please ensure that you submit your comments or concerns to Prime Resources by **10 December 2020**. Email (prime@resources.co.za) - Fax (+27 86 604 2219) - Tel (+27 11 447 4888)



Appendix 4



Report on the Geotechnical Investigation for the
**RAILWAY BALLOON TRACK LAYOUT AT
UNION MINE**

North West Province, South Africa

Report no.: NWS20617/G0219


JUNE 2020






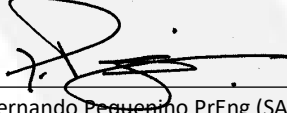
Specialist Tunneling, Engineering Geological and Geotechnical Engineering Consultancy
Emerging, BBBEE Level 2, Empowering Enterprise

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Report to	 WSP Africa Building C Knightsbridge 33 Sloane Street Bryanston 2191
Project name	Mortimer Railway Balloon Project
Report title	Report on the Geotechnical Investigation for a Railway Balloon Track Layout at Union Mine, Rustenburg
Report number	NWS20617/G0219 – F0

Revision	Date	Comment	Prepared by	Reviewed by
P0. PRELIM	24/05/2020	Issued to client for distribution	KPS	FPP
F0. FINAL	22/06/2020	Issued to client for distribution	KPS	FPP

Revision Details: N/A

Report by	Reviewed by:
 Katlego Segole MSc (Eng. Geology) CSAIEG	 Fernando Pequeno PrEng (SA) 20070109 BEng (Civil) BEng Hons (Geotech) MSAICE

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1. Introduction

1.1. Terms of Reference

GaGE Consulting (Pty) Ltd was appointed by WSP, on behalf of their client, Union Mine, to conduct a design-level geotechnical investigation, for a Railway Balloon Track Layout, at Union Mine, Rustenburg, in the North West Province.

The investigation is aimed at assessing the ground conditions for the new structure, in order to identify geotechnical constraints that may limit the development or result in increased risk or costs for foundations and to provide detailed foundation design recommendations for the proposed structure. The investigation consisted of the machine excavation of trial pits, in-situ testing, and conducting laboratory testing of the site materials.

This report sets out the methodology, findings and recommendations for geotechnical and foundation works for the proposed development. The report is prepared in accordance with the requirements of the relevant Codes of Practice as noted below.

1.2. Objective and Methodology

The objectives of the study were to:

- i. To analyse the geotechnical conditions prevalent along the railway balloon layout;
- ii. To comment on the geotechnical constraints that would result in increased risk or costs for foundations or ground treatment, to enable economic design and construction of the proposed development;
- iii. To identify relevant ground-related features and determine the variability of ground conditions and effects thereof on the new structure(s); and
- iv. To provide foundation recommendations for the proposed development

The following methodology was adopted in order to realise the aims of this study:

- v. A general site walk-over along with a review of existing available geological and geotechnical information sources;
- vi. Geotechnical investigation including the machine excavation of trial pits and the undertaking of *in-situ* geotechnical testing; and
- vii. Laboratory testing of soils to establish geotechnical and materials design parameters for the new structures.

1.3. Scope and Limitations of the Assessment

The report is based on the information available in the public domain as well as a visual appraisal of the site, and is not likely to reveal the detail of the conditions that will become evident during development. Thus, it must be emphasised that this report is for pre-feasibility evaluation only and should not be used for any design purpose or be used as a design-level geotechnical report.

This report has been prepared for the exclusive use of the client, with specific application to Mortimer Balloon Project. Changes in design loads or the development in general may require a review of the recommendations made in this report.

1.4. Codes of Practice

The services performed by GaGE Consulting (Pty) Ltd were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession practising under similar conditions in the locality of the project. The investigation was carried out according to standard practice codes and guidelines, including:

- i. Inspecting the trial pits and recording the soil profiles using the standard procedures as recommended in the guidelines by, AEG/SAICE/SAIEG (2001) "Guidelines for Soil and Rock Logging in South Africa;

- ii. The SAICE (2010) Geotechnical Division “Code of Practice for Site Investigations”; and
- iii. South African National Standard (2010) SANS 10160 Part 5: *Basis of geotechnical design and actions*

1.5. Information Sources

The following principal sources were consulted and/or made available:

- I. Topocadastral map of Thabazimbi (sheet 2427CB) at a scale of 1:50 000, published in 2002;
- II. Geological map of Thabazimbi (sheet 2426) at a scale of 1:250 000, published in 1981;
- III. Google Earth satellite imagery.

2. Site Characterisation and Description

2.1. Site Location and Description

The new railway layout balloon is approximately 2km in length and lies 10km east of R510. Swartklip area falls under the Moses Kotane Local Municipality with the mine located 12km south westerly of Northam; 18km north of the National Route 4 (N4) and 136km north west of Pretoria.

The location of the proposed railway track balloon is given in Figure 2-1.

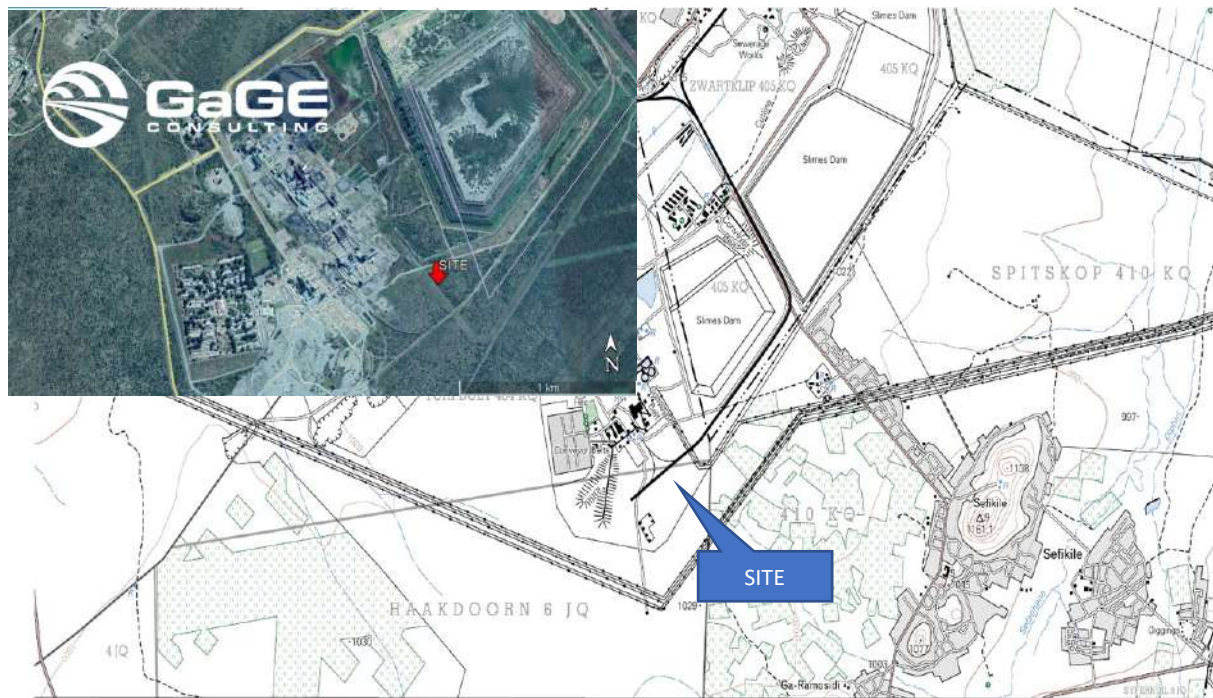


Figure 2-1 Extract from the 1:50 000 topocadastral sheet, 2427CB Johannesburg (2002), showing the locality of the site.

2.2. Topography, Drainage and Vegetation

Regionally, the area is characterised by slightly to undulating plains and pans of low relief. Locally, the study area is characterised by a relatively flat topography and lies at an approximate elevation of 1035 m Average Mean Sea Level (AMSL) with an average slope angle of less than 1°.

Drainage is anticipated to occur towards the non-perennial Bierspruit River in the north west, joining the Crocodile River near Thabazimbi to the outlet of the quaternary catchment A24F. The catchment area falls under the Crocodile (West) and Marico Water Management Area (WMA) boundaries with its main rivers being the Crocodile and Marico which give rise to the Limpopo River at their confluence. The main water users of these rivers are agriculture, industry, mining and urban users.

The vegetation of the investigation area is defined by the Dwaalboom which comprises a layer of scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species, and an almost continuous herbaceous layer dominated by grass species (Mucina and Rutherford, 2006).

2.3. Climate

The Northam area(s) is defined by a local steppe/semi-arid climate with the area receiving very little rainfall throughout the year. This climate classifies as a BSh according to the Köppen-Geiger climate classification. In addition, the average annual temperature in Northam is 20.4 °C and the annual rainfall is around 594 mm per year.

Climate determines the mode of weathering as well as the rate of weathering, with the effect of climate on the weathering process (i.e. soil formation) determined by the climatic N-value defined by Weinert (1964). The site has an approximate N-value of 3.5, which implies it has a water surplus and suggests that chemical decomposition will prevail; resulting in deep residual soil profiles with ferruginisation of the soil profile where permanent and or perched groundwater levels occur.

2.4. Geology

The site and surrounding area are underlain by the Pyramid Formation of the Rustenburg Layered Suite (RLS), on the western limb of the Bushveld Igneous Complex, as shown in Figure 2-2. The suite of mafic sills, which intruded the basal rocks of the Transvaal Supergroup, comprises rocks that range from norites, pyroxenite, harzburgite, gabbro-norite, magnetite and olivine-magnetite rich gabbro-norite, anorthosite and olivine-apatite rich gabbro-norite.

The most prominent feature from the RLS is the distinct layering in the different rock types due to differentiation of magma that Brink (1989) describes as pseudo-stratification. The originally placed layers of the Bushveld Complex rocks dips centripetally at between 10° and 20°, which is attributed to the effect of the crustal flexure in response to the load of the RLS and associated granites.

Freshly exposed Bushveld norites and gabbros from the RLS are hard and massive rocks that are highly resistant to weathering and thus have high strength and deformation values. According to Brink (1979), residual soils derived from the weathering of the RLS are characterised by seven typical profiles, where residual soils are often deep and comprise black clays, these form by the extensive weathering of feldspars (plagioclases) in norites and pyroxenes.

The residual soils developed from the gabbro-norites of the Rustenburg Layered Suite are the most expansive soils in South Africa. This is due to the soils having clay content of over 30% and sometimes as high as 60% with montmorillonite being the major clay mineral (Brink, 1979).

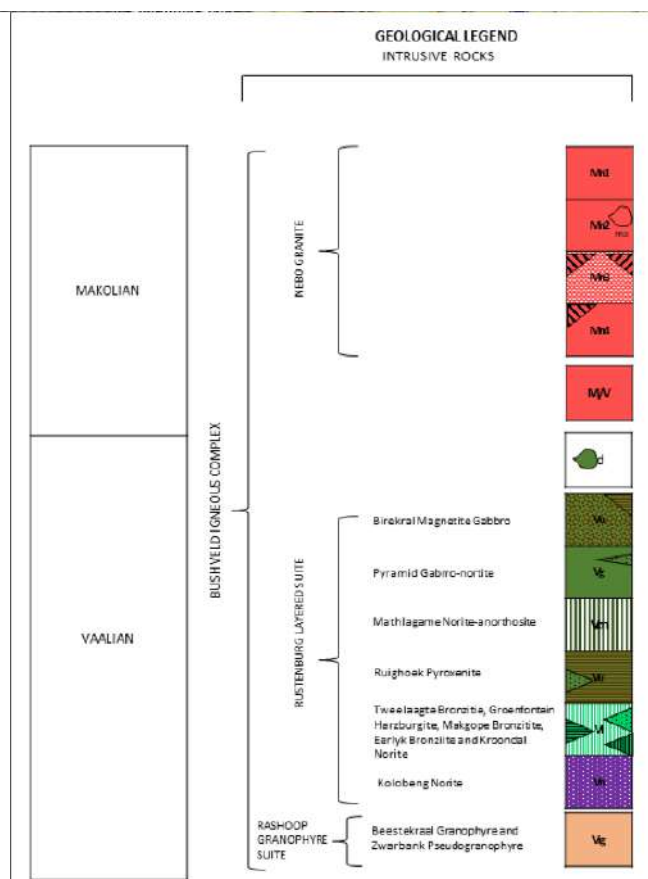
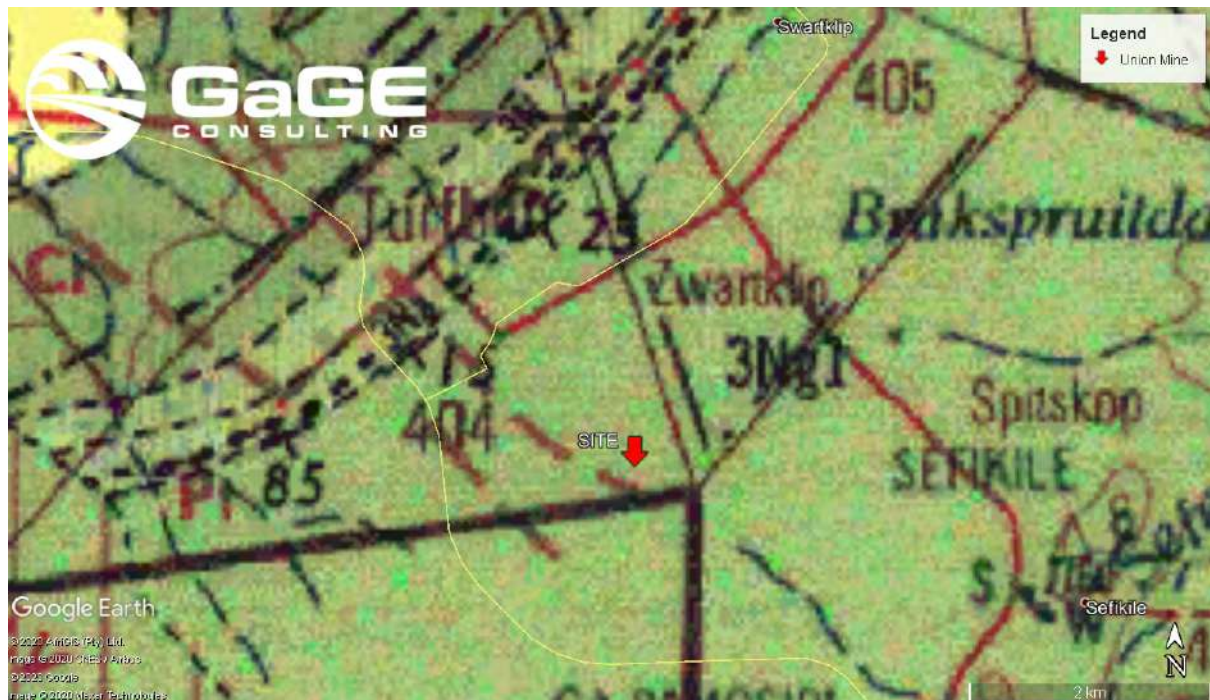


Figure 2-2 Extract from the 1:50 000 geological sheet 2426 Thabazimbi, showing the local geology.

3. Geotechnical Investigation

3.1. Overview

The investigation comprised the machine excavation of five (05 No.) trial pits to a maximum depth of 2.45m below ground level (BGL). Soil sample(s) were recovered from representative soil horizons and submitted to Specialist Testing Laboratory (Pty) Ltd for various laboratory tests.

The location of the respective trial pits and borehole positions is illustrated in Figure 3 1, and in conjunction with Table 3 1, which summarises their coordinates and final depths. The trial pit logs are included in Appendix A, the associated profiling and logging parameters in Appendix B, and the laboratory results in Appendix C.



Figure 3-1 Locality of trial pit excavations and DCP locations across the site during geotechnical investigation

3.2. Trial Pits

The trial pits were excavated using a tractor loaded-backhoe model: 416E CAT to a maximum depth of 2.45m below ground level (BGL), or refusal at depths as shallow 1.85m BGL. Once excavated, the trial pits were photographed, and profiled according to the relevant profiling standards (AEG/SAICE/SAIEG, 2001). The generalised profiles of the trial pits are summarised in Table 3.2.

Table 3-1 Summary of data point coordinates, final depths and termination conditions.

ID	Co-ordinates		Final Depth (m BGL)	Termination
	Latitude(°)	Longitude(°)		
UTP01	-24.979785°	27.150322°	1.85	Refusal on Norite
UTP02	-24.978352°	27.148515°	2.35	Refusal on Norite
UTP03	-24.975877°	27.148800°	2.15	Required Depth
UTP04	-24.975533°	27.151895°	2.00	Required Depth
UTP05	-24.976131°	27.154753°	2.45	Required Depth

Table 3-2 Summary of profiles observed in the excavated trial pits

Trial Pit ID	Profile		
	Depth (m BGL)	Material Description;	Ground Unit*
UTP01	0.60	Very soft, silty Clay. Residual Norite	RNC
	1.70	Very stiff, silty Clay. Residual Norite	RNC
	1.85	Very soft to soft rock, Norite	VSRN
UTP02	0.60	Very soft, silty Clay. Residual Norite	RNC
	2.14	Very stiff, silty Clay. Residual Norite	RNC
	2.35	Medium dense, sandy Gravel. Residual Norite	RNR
UTP03	1.70	Very soft, silty Clay, Residual Norite	RNC
	2.15	Medium dense, sandy Gravel. Residual Norite	RNR
UTP04	1.50	Very soft, silty Clay, Residual Norite	RNC
	2.00	Medium dense, sandy Gravel. Residual Norite	RNR
UTP05	0.50	Soft sandy Silt, Fill	SFIL
	1.00	Very loose, silty Gravel, Fill	SFIL
	2.20	Stiff, silty Clay, residual Norite	RNC
	2.45	Medium dense, silty Sand	RNR
RNC - Residual Norite Clay; RNR-Residual Norite; VSRN- Very Soft Rock Norite; SFIL - Fill			

3.2 Laboratory

The representative soil samples were submitted to Specialised testing Laboratory (Pty) Ltd testing, and the following laboratory tests were scheduled:

- I. Three (03 No.) Foundation Indicator tests, with grading to 0.002mm, Atterberg limits, and moisture contents;
- II. One (01 No.) California Bearing Ratio: and
- III. A single Bulk Density Test.

3.2.1 Foundation Indicator Testing

A summary of the foundation indicator results is provided in Table 3-1.

Table 3-2 Summary of foundation Indicator Test Results

Sample ID	Depth (m)	Particle Size				Atterberg Limits		Grading modulus	Moisture Content (%)	Material Classification		Expansive Potential
		Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Liquid limit (%)	Plasticity Index			AASHTO	USCS	
UTP01	1.70-1.85	2	7	70	21	26	6	1.69	3.1	A-1-b	SW-SC	Low
UTP02	2.14-2.35	7	15	40	38	38	17	1.63	8.7	A-2-6	SC	Low
UTP03	0.00-1.70	72	14	12	2	89	46	0.15	27.9	A-7-5	MH	V. High
Notes: RNR-Residual Norite; VSRN- Very Soft Rock Norite; GM – Grading modulus; MC – Moisture content; LL – Liquid limit; PI – Plasticity index; LS – Linear shrinkage; PE – Potential expansiveness												

3.2.1 California Bearing (CBR) Testing

The CBR results are summarised in Table 3 3, with respect to the optimum moisture content (wopt), maximum dry density (MDD), maximum swell potential, and CBR at the respective Mod. AASHTO compactive efforts.

Testing was undertaken on the sandy gravelly norite residuum. The material is defined by poor compactive efforts of less than 4%. The tested material is also defined by moderate fines (clay+silt>20%) and high plasticity, classing the material as poorer than G9.

Table 3-2 Summary of CBR Test Results

Pit ID	Depth (m)	PI	GM	MOD AASHTO		CBR			Material classification
				Optimum moisture content (%)	Maximum dry density (kg/m ³)	93%	95%	Swell (%)	TRH14
UTP02	2.14-2.35	17	1.63	13.1	1924	3.3	3.6	3.9	>G9

3.2.2 Bulk Density

Bulk density tests were undertaken on residual norites (black turf) and the results are summarised in Table 3-3. The low dry density of the samples correlates to the soft consistency described for the residuum from the trial pit.

Table 3-3 Summary of Bulk Density Test Results

ID	Depth (m BGL)	NMC (%)	Bulk Density (g/cm ³)	Dry Density (g/cm ³)	Degree of Saturation (%)*	Porosity (%)*
UTP03	1.50	34.3	1.721	1.281	4.23	13.9
Note: Assumed Gs=2						

3.3 Dynamic Penetrometer - Light(DPL) Testing

In situ Dynamic Penetrometer - Light (DPL) tests were conducted. The DPL tests are summarised in Figure 3-2 and generally corresponded to the logged consistency

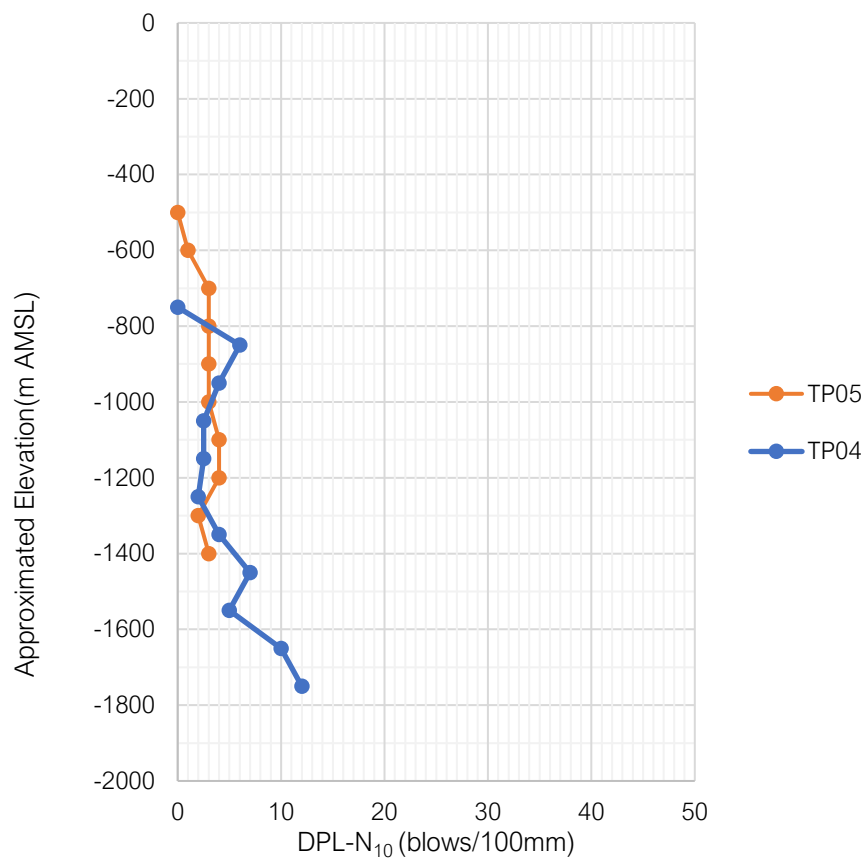


Figure 3-2 DPL-N₁₀ with depth

3.4 Problem Soils

3.4.1 Expansive Soils

The heave potential of the site was quantified using van der Merwe (1964) method which provides a qualitative measure by determining the degree of potential expansiveness. A summary of the estimated heave using the method is presented in Table 3-4.

The average calculated heave (mm) expected from the shale residuum at a depth of 1.50m is in the order of magnitude 34mm which subsequently classes as very highly expansive.

Table 3-4 Potential heave determined using van der Merwe's method

Trial Pit ID	Depth Estimated (m)	Ground unit	Total Estimated Heave (mm)
UTP03	1.50	RNC	34.00
Note: RNR-Residual Norite Clay			

4. Geotechnical Evaluation

4.1. Overview

The evaluation of the ground conditions is based on the site walk-over, desk-study, profiles observed in the excavated trial pits, *in-situ* tests (DCP), and site material testing from the representative samples that were retrieved. The geology and ground conditions are relatively consistent.

The typical ground profiles consisted:

RNC A blanketing horizon of black speckled white, residual norite (black turf) with a consistency varying between soft (to an average depth of 0.60m BGL) to stiff (to an average depth of 1.84m BGL), often with visible slickensided and shattered soil structure, indicative of heaving.

RNR This is underlain by a cream white speckled olive green, medium dense with pockets of loose, silty sandy gravel, residual norite. Often, rapidly grading to completely to highly weathered, very soft to soft rock. Refusal was encountered at minimum and maximum depths of 1.85m and 2.00m, respectively, at UTP01 and UTP04.

However, UTP05 differed from the afore-described profiles. The profile comprised:

SFIL A blanketing layer of fill/imported material recovered with clay bricks; underlain by very loose slag ash to a depth of 1.00m BGL.

RNC Underlain by black clays to a depth of 2.20m BGL;

RNR Which in turn, is underlain by sugary residual gabbro-norite to a maximum depth of 2.45m BGL.

Based on the observations during the investigation, the principal geotechnical constraints for the site are as follows:

1. Very highly expansive gabbro-norite residuum; and
2. Seasonal shallow groundwater and ponding surface water.

The above considerations result in ground conditions being considered as highly expansive. As mentioned previously the black clays are known to be the most expansive soils in South Africa.

4.2. Foundation Recommendations

The residual gabbro-norite clayey soils are highly expansive and together with the seasonal moisture fluctuations result in predictive heaves well in excess of 100mm. Fortunately bedrock is generally shallow over the site, so the most practical solution is generally to merely remove and replace the black turf, up to the residual norite white sand or gravelly sand, with a granular subgrade material.

It must be noted that the residual norite white sand normally grades rapidly into bedrock with depth, with the upper portion of the profile sometimes being more clayey or silty, and thus being poorer as shown the test result UTP02. Care therefore needs to be exercised where the upper portion of this profile appears more clayey that this is also removed.

Although bedrock levels appeared consistent between test pits, at about 1.90m, these are likely to vary as can be expected from any igneous rock. Allowance for removal of clays up to 3m should be provided for.

4.3. Groundwater Conditions

Brink (1979) recorded the presence of calcrete nodules at the base of several residual profiles of the RLS, indicating that the occurrence of seasonal moisture changes and perched water conditions should be anticipated. Water has a significant influence on the behavior of clayey soils, and consequently, these should be accommodated in the design and construction.

4.4. Excavatability and Stability of Trenches

The excavatability of on-site materials is evaluated according to SANS 1200 D Earthwork Classification. Excavation conditions class as “Soft” to an average depth of 2.15m BGL. Notwithstanding, the profiles may rapidly grade to “intermediate” conditions and these would require heavy equipment and or pneumatic equipment. Also, the level of the gabbro-norite may vary (e.g. UTP05), and hard rock spheroids or “floaters” need to be anticipated.

4.5. Material Utilisation

The on-site materials (to an approximate depth of 2.0m BGL) were very clayey. Subsequently rendering the material poor. and not recommended for any engineering applications or use in pavement layers. Construction materials will need to be imported to the site from commercial sources. Notwithstanding, the sugary norite residuum are defined by a moderate average grading modulus of 1.66 and have good to fair compaction characterised; these maybe used for general fill works.

4.6. Construction Quality Assurance and Validation

Based on the above evaluation, there are no conditions that preclude the development from taking place and ground conditions are relatively consistent. No further investigations are recommended.

Notwithstanding, the nature of geotechnical engineering is such that variations in what is reported here may become evident during construction, once the site has been excavated and opened-up. It is thus imperative that a competent geo-professional (geotechnical engineer or engineering geologist) inspect excavations and/or foundation platforms to ensure that conditions at variance with those predicted do not occur, and to undertake an interpretation of the facts applied in this report so as to validate the design and recommendations made. These requirements are also mandated under the SAICE Code of Practice, and the relevant SANS codes for dolomite

References

Brink, A.B.A. (1979). Engineering Geology of Southern Africa. Volume1. Building Publications, Parklands.

SANS, South African National Standards (2009) SANS10160-5: Basis of Structural Design and Actions for Buildings and Industrial Structures — Part 5: Basis of Geotechnical Design and Actions, Pretoria, SANS.

South African Institution of Civil Engineering SAICE - Geotechnical Division (2010) *Site Investigation Code of Practice*, 1st Edition, January 2010.

Weinert, H.H. (1964) *Basic igneous rocks in road construction*. CSIR Research Report No. 218 (Natn. Inst. Res. Bull. No. 5), Pretoria, CSIR, 47 p.

Appendix A. Trial Pits

TRIAL PIT LOG

CLIENT: Railway Union Mine
PROJECT: Railway Union Mine
PROJECT NO: NWS20617
SITE:

HOLE NO: UTP01

X COORD: -24.979785°

Y COORD: 27.150322°

ELEVATION:

PAGE 1 of 1

Depth		Description	Dynamic Probe Light DCP N10				
			5	10	15	20	25
0.0	0.00	Ground Surface					
		Very soft, silty CLAY Dry to slightly moist; black speckled white; very soft; intact and shattered; slightly sandy silty clay. Residual with scattered plant roots and trees.					
	0.60						
		Very stiff, silty CLAY Slightly moist; black; slickensided and shattered; very stiff; slightly sandy silty clay. Residual norite.					
1.0							
	1.70						
	1.85	Very soft to soft rock, NORITE Cream white, speckled olive green and black; highly weathered; very soft to soft rock, norite.					
2.0		Note: 1) Excavates as sandy gravel					
		Termination due to refusal on soft rock, Norite					
		End of Log					
3.0							
4.0							

NOTES 1: Sample taken at 1.70-1.85m for FI+MC

5:

2: No sidewall collapse

6:

3: No ground water seepage

7:

4:

8:

MACHINE: 416E CAT

DATE PROFILED: 2020/05/12

DIAM: Test Pit

PROFILED BY: KPS

Prof Reg:

FILE REF:

CHECKED BY: FPP

Prof.Reg: 20070109



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TRIAL PIT LOG

CLIENT: Railway Union Mine
PROJECT: Railway Union Mine
PROJECT NO: NWS20617
SITE:

HOLE NO: UTP03

X COORD: -24.976058°

Y COORD: 27.148846°

ELEVATION:

PAGE 1 of 1

Depth		Description	Dynamic Probe Light DCP N10				
			5	10	15	20	25
0.0	0.00	Ground Surface					
1.0		Very soft, silty CLAY Moist; black speckled white; soft to stiff at depth; slickensided and shattered; sandy silty clay, with plant roots (reeds). Residual norite					
2.0	1.70	Very stiff, silty CLAY Light olive green, speckled and light brown; medium dense with pockets of loose; intact; silty sandy gravel. Residual norite grading to completely weathered very soft rock.					
	2.15	Termination at required depth					
3.0		End of Log					
4.0							

NOTES 1: Sample taken at 0.00-1.70FI+MC

5:

2: In-Situ density at 1.50m

6:

3: No sidewall collapse

7:

4: No ground water seepage

8:

MACHINE: 416E CAT

DATE PROFILED: 2020/05/12

DIAM: Test Pit

PROFILED BY: KPS

Prof Reg:

FILE REF:

CHECKED BY: FPP

Prof.Reg: 20070109



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TRIAL PIT LOG

CLIENT: Railway Union Mine
PROJECT: Railway Union Mine
PROJECT NO: NWS20617
SITE:

HOLE NO: UTP04

X COORD: -24.975533°

Y COORD: 27.151895°

ELEVATION:

PAGE 1 of 1

Depth		Description	Dynamic Probe Light DCP N10				
			5	10	15	20	25
0.0	0.00	Ground Surface					
1.0		Very soft, silty CLAY Slightly moist to moist; black, speckled white; soft to firm at depth; slightly sandy silty clay with plant roots. Residual norite.					
1.50							
2.0	2.00	Very stiff, silty CLAY Light olive green, speckled white and mottled light brown; medium dense with pockets of loose; silty sandy gravel. Residual rapidly grading to highly weathered, soft rock.					
		Termination at required depth					
		End of Log					
3.0							
4.0							

NOTES 1: No sample taken
2: No sidewall collapse
3: No ground water seepage
4:

5:
6:
7:
8:

MACHINE: 416E CAT

DIAM: Test Pit

FILE REF:

DATE PROFILED: 2020/05/12

PROFILED BY: KPS

CHECKED BY: FPP

Prof Reg:

Prof.Reg: 20070109



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TRIAL PIT LOG

CLIENT: Railway Union Mine
PROJECT: Railway Union Mine
PROJECT NO: NWS20617
SITE:

HOLE NO: UTP05

X COORD: -24.976131°

Y COORD: 27.154753°

ELEVATION:

PAGE 1 of 1

Depth		Description	Dynamic Probe Light DCP N10				
			5	10	15	20	25
0.0	0.00	Ground Surface					
		Soft, FILL Slightly moist; dark orangish red, blotched black; soft; intact; gravelly sandy silt. Fill with plant roots and clay bricks					
	0.50						
		Very loose, FILL Slightly moist; dark grey mottled black; very loose; intact; silty gravel. Engineered fill/ slag ash					
	1.00						
1.0		Stiff, silty CLAY Slightly moist; black mottled red; stiff; intact and shattered; sandy silty clay. Residual norite (?)					
	2.00						
2.0							
	2.20						
	2.45	Medium dense, silty SAND Slightly moist; light olive green, white and black; medium dense with pockets of loose; silty sand. Residual norite grading to highly weathered, very soft rock					
		Termination at required depth					
		End of Log					
3.0							
4.0							

NOTES 1: No sample taken
2: No sidewall collapse
3: No ground water seepage
4:

5:
6:
7:
8:

MACHINE: 416E CAT

DIAM: Test Pit

FILE REF:

DATE PROFILED: 2020/05/12

PROFILED BY: KPS

CHECKED BY: FPP

Prof Reg:

Prof.Reg: 20070109



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Appendix B. Profiling and Logging Parameters

SOIL DESCRIPTIVE TERMS

Reference: Brink, ABA and Bruin, RMH (2002) Guidelines for Soil and Rock Logging in South Africa, AEG/SAICE/SAIEG

DESCRIPTIVE ORDER: 1. Consistency; 2. Soil type; 3. Moisture condition; 4. Colour; 5. Soil structure; and 6. Origin

1a Consistency: Granular Soils			
SPT "N"	GRAVELS & SANDS Generally free draining soils		Dry density (kg/m ³)
< 4	VERY LOOSE	Crumbles very easily when scraped with geological pick	< 1450
4-10	LOOSE	Small resistance to penetration by sharp pick point	1450-1600
10-30	MEDIUM DENSE	Considerable resistance to penetration by sharp pick point	1600-1750
30-50	DENSE	Very high resistance to penetration by sharp pick point. Requires many blows of pick for excavation	1750-1925
> 50	VERY DENSE	High resistance to repeated blows of geological pick. Requires power tools for excavation	> 1925

1b Consistency: Cohesive Soils			
SPT "N"	SILTS & CLAYS and combination with SANDS Generally slow draining soils		UCS (kPa)
< 2	VERY SOFT	Pick point easily pushed in 100mm. Easily moulded by fingers	< 50
2-4	SOFT	Pick point easily pushed in 30-40mm. Moulded by fingers with some pressure. Easily penetrated by thumb.	50-125
4-8	FIRM	Pick point penetrates up to 10mm. Very difficult to mould with fingers. Indented by thumb with effort. Spade just penetrates.	125-500
8-15	STIFF	Slight indentation by pushing in pick point. Cannot be moulded by fingers. Penetrated by thumbnail. Pick necessary to excavate.	250-500
15-30	VERY STIFF	Slight indentation by blow of pick point. Requires power tools for excavation.	500-1000

2 Soil Type	
SOIL TYPE*	PARTICLE SIZE (mm)
CLAY	< 0,002
SILT	0,002 – 0,06
SAND	0,06 – 2
GRAVEL	2 – 60*
COBBLES	60 – 200*
* Specify average and maximum sizes, hardness, shape as well as proportion	

3 Moisture Condition	
DRY	No water detectable
SLIGHTLY MOIST	Water just discernable
MOIST	Water easily discernable
VERY MOIST	Water can be squeezed out
WET	Generally below the water table

4 Colour	
Described at natural moisture content, as seen in profile (unless otherwise specified) and using bedding thickness criteria. (e.g. thickly banded, thinly streaked, etc.)	
SPECKLED	Very small patches of colour < 2 mm
MOTTLED	Irregular patches of colour 2 – 6 mm
BLOTCHED	Large irregular patches 6 – 20 mm
BANDED	Approximately parallel bands of varying colour
STREAKED	Randomly orientated streaks of colour
STAINED	Local colour variations: associated with discontinuity surfaces

5 Soil Structure	
INTACT	No structure present
FISSURED	Presence of discontinuities, possibly cemented
SLICKENSIDED	Very smooth, glossy, often striated discontinuity planes
SHATTERED	Presence of open fissures. Soil breaks into gravel size blocks
MICRO-SHATTERED	Small scale shattering, very closely spaced open fissures. Soil breaks into sand size crumbs
RESIDUAL STRUCTURES	Relict bedding, lamination, foliation, etc.

5 Origin	
TRANSPORTED	Alluvium, hillwash, talus, etc.
RESIDUAL	Weathered from parent rock e.g. residual granite
PEDOCRETES	Ferricrete, laterite, silcrete, calcrete, etc.

Pedocretes		
DEGREE OF CEMENTATION		UCS (MPa)
VERY WEAKLY CEMENTED	Some material can be crumbled between finger and thumb. Disintegrates under knife blade to a friable state.	0,1 – 0,5
WEAKLY CEMENTED	Cannot be crumbled between strong fingers. Some material can be crumbled by strong pressure between thumb and hard surface. Under light hammer blows disintegrates to friable state.	0,5 – 2
CEMENTED	Material crumbles under firm blows of sharp pick point. Grains can be dislodged with some difficulty by a knife blade.	2 – 5
STRONGLY CEMENTED	Firm blows of sharp pick point on hand-held specimen show 1-3mm indentations. Grains cannot be dislodged by knife blade.	5 – 10
VERY STRONGLY CEMENTED	Hand-held specimen can be broken by single firm blow of hammerhead. Similar appearance to concrete.	10 - 25

ROCK DESCRIPTIVE TERMS

Reference: Brink, ABA and Bruin, RMH (2002) Guidelines for Soil and Rock Logging in South Africa, AEG/SAICE/SAIEG

DESCRIPTIVE ORDER: 1. Hardness; 2. Rock type; 3. Weathering; 4. Colour; 5. Fracture spacing; 6. Discontinuity surface description; 7. Grain Size; and 8. Rock formation name

1a Rock Hardness: <25 MPa			1b Rock Hardness: >25 MPa		
HARDNESS	DESCRIPTION	UCS (MPa)	HARDNESS	DESCRIPTION	UCS (MPa)
VERY SOFT	Material crumbles under firm blows of pick point. Can be peeled with a knife. SPT refusal. Too hard to cut triaxial sample by hand	1 – 3	HARD ROCK	Breaks with difficulty, rings when struck Point load or laboratory test results necessary to distinguish between categories	25 – 70
SOFT ROCK	Firm blows with pick point: 2-4mm indents. Can just be scraped with a knife	3 - 10	VERY HARD ROCK		70 – 200
MEDIUM HARD ROCK	Firm blows of pick head will break hand-held specimen. Cannot be scraped or peeled with a knife.	10 - 25	EXTREMELY HARD ROCK		> 200

2 Rock Type	4 Colour
Quartzite, sandstone, granite, limestone, etc.	Described in the wet state unless otherwise indicated

3. Weathering					
DEGREE OF WEATHERING	EXTENT OF DISCOLOURATION	FRACTURE CONDITION	SURFACE CHARACTERISTICS	ORIGINAL FABRIC	GRAIN BOUNDARY CONDITION
UNWEATHERED	None	Closed or stained	Unchanged	Preserved	Tight
SLIGHTLY WEATHERED	< 20% of fracture spacing on both sides of fracture	Discoloured, may contain thin filling	Partial discolouration. Often unweathered rock colour	Preserved	Tight
MODERATELY WEATHERED	>20% of fracture spacing on both side of fracture	Discoloured, may contain thick filling	Partial to complete discolouration. Not friable except poorly cemented rocks	Preserved	Partial opening
HIGHLY WEATHERED	Throughout	-	Friable, possibly pitted	Mainly preserved	Partial separation. Not easily indented with knife. Does not slake
COMPLETELY WEATHERED	Throughout	-	Resembles a soil	Partially preserved	Complete separation. Easily indented with knife. Slakes

5 Discontinuity Spacing			6a Discontinuity Surface Description: Joint Filling	
SEPARATION (mm)	SPACING (foliation, cleavage, bedding, etc.)	SPACING (fractures, joints, etc.)	JOINT FILL TYPE	DEFINITION (wall separation specified in mm)
< 6	very intensely	very highly	CLEAN	No fracture filling
6 – 20	intensely		STAINED	Colouration of rock only. No recognisable filling material
20 – 60	very thinly	highly	FILLED	Fracture filled with finite thickness filling material
60 – 200	thinly			
200 – 600	medium	moderately		
600 – 2000	thickly	slightly		
> 2000	very thickly	very slightly		

6c Discontinuity Surface Description: Roughness of Discontinuity Planes		7 Grain size		
CLASSIFICATION	DESCRIPTION	CLASSIFICATION	SIZE (mm)	RECOGNITION
SMOOTH	Appears smooth and is essentially smooth to the touch. May be slickensided *	VERY FINE GRAINED	< 0.2	Individual grains cannot be seen with a hand lens
SLIGHTLY ROUGH	Asperities on the fracture surface are visible and can be distinctly felt	FINE GRAINED	0.2 – 0.6	Just visible as individual grains under hand lens
MEDIUM ROUGH	Asperities are clearly visible and fracture surface feels abrasive	MEDIUM GRAINED	0.6 – 2	Grains clearly visible under hand lens, just visible to the naked eye
ROUGH	Large angular asperities can be seen. Some ridge and high side angle steps evident	COARSE GRAINED	2 – 6	Grains clearly visible to the naked eye
VERY ROUGH	Near vertical steps and ridges occur on the fracture surface	VERY COARSE GRAINED	> 6	Grains measurable

*Where slickensides occur the direction of the slickensides should be recorded

8 Rock Formation
Pietermaritzburg Formation, Cape Granite Suite etc.

Appendix C. Laboratory Results



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Asphalt | Aggregate | Bitumen | Geotechnical

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Quality | Excellence | On Time

Client Name: GaGE Consulting
Project Name: Mortimer Railway Ballon Track
Job Number: GGC-71
Date: 2020-06-11
Method: SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

FOUNDATION INDICATOR

Sheet Ref:
R-STL-011-Rev02

Grading & Hydrometer Analysis (Particle Size (mm) & % Passing)

Atterberg Limits & Classification

Sample	UTP01	UTP02	UTP03	Sample	UTP01	UTP02	UTP03
Depth (m)	1.7 - 1.85	2.14 - 2.35	1.7	Depth (m)	1.7 - 1.85	2.14 - 2.35	1.7
Lab No	GGC-71-399	GGC-71-400	GGC-71-401	Lab No	GGC-71-399	GGC-71-400	GGC-71-401
53.0	100	100	100	Liquid Limit (%)	26	38	89
37.5	100	100	100	Plastic Limit (%)	20	21	43
26.5	100	97	100	Plasticity Index (%)	6	17	46
19.0	100	81	100	Linear Shrinkage (%)	2.5	8.5	33.5
13.2	100	80	100	PI of whole sample	2	9	45
9.5	100	78	100				
6.7	100	74	100	% Gravel	21	38	2
4.75	100	70	100	% Sand	70	40	12
2.00	79	62	98	% Silt	7	15	14
1.00	59	57	97	% Clay	2	7	72
0.425	41	51	97	Activity	3.0	2.4	0.6
0.250	24	40	95				
0.150	16	31	94	% Soil Mortar	79	62	98
0.075	11	24	90				
0.060	9	22	86	Grading Modulus	1.69	1.63	0.15
0.050	8	20	85	Moisture Content (%)	3.1	8.7	27.9
0.035	7	16	82	Relative Density (SG)*	2.65	2.65	2.65
0.020	5	13	78				
0.006	3	10	74	Unified (ASTM D2487)	SW-SC	SC	MH
0.002	2	7	72	AASHTO (M145-91)	A - 1 - b	A - 2 - 6	A - 7 - 5

Remarks: *: Assumed
N / T: Not Tested

Although everything possible is done to ensure testing is performed accurately, neither Specialised Testing Laboratory (Pty) Ltd nor any of its directors, managers, employees or contractors can be held liable for any damages whatsoever arising from any error made in performing any tests, nor from any conclusions drawn therefrom. Test results are to be published in full. Samples will be kept for 1 month after the submission of test results due to limited storage space, unless other arrangements are in place.



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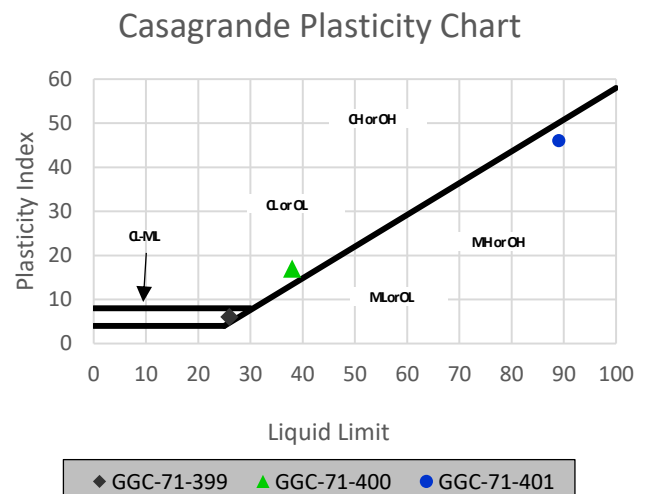
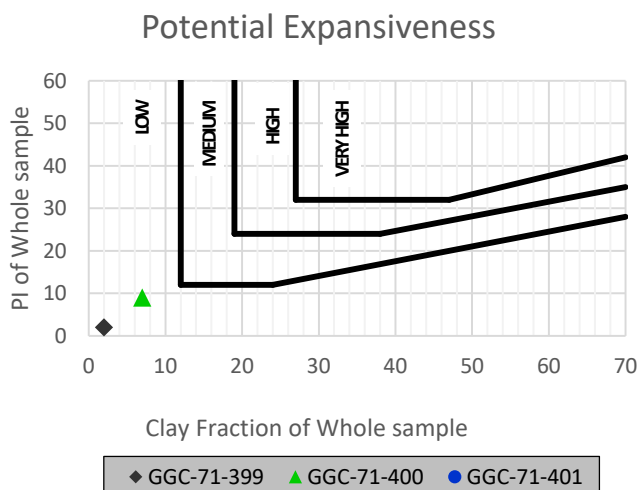
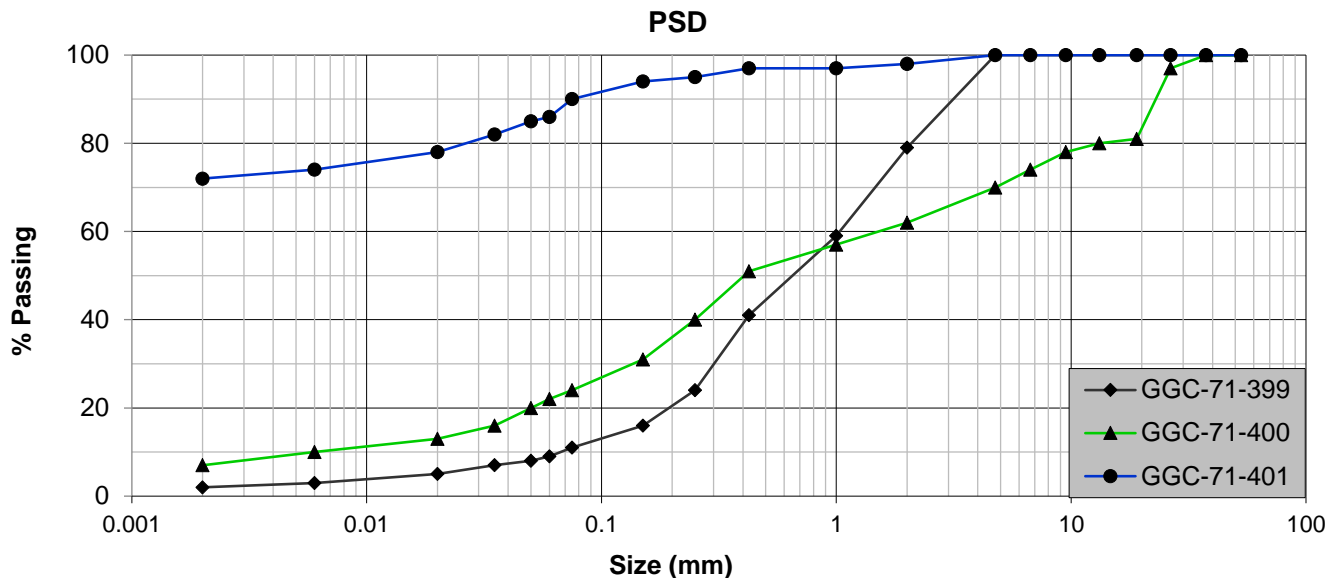
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Client Name: GaGE Consulting
Project Name: Mortimer Railway Ballon Track
Job Number: GGC-71
Date: 2020-06-11
Method: SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

FOUNDATION INDICATOR

Sheet Ref:
R-STL-011-Rev02



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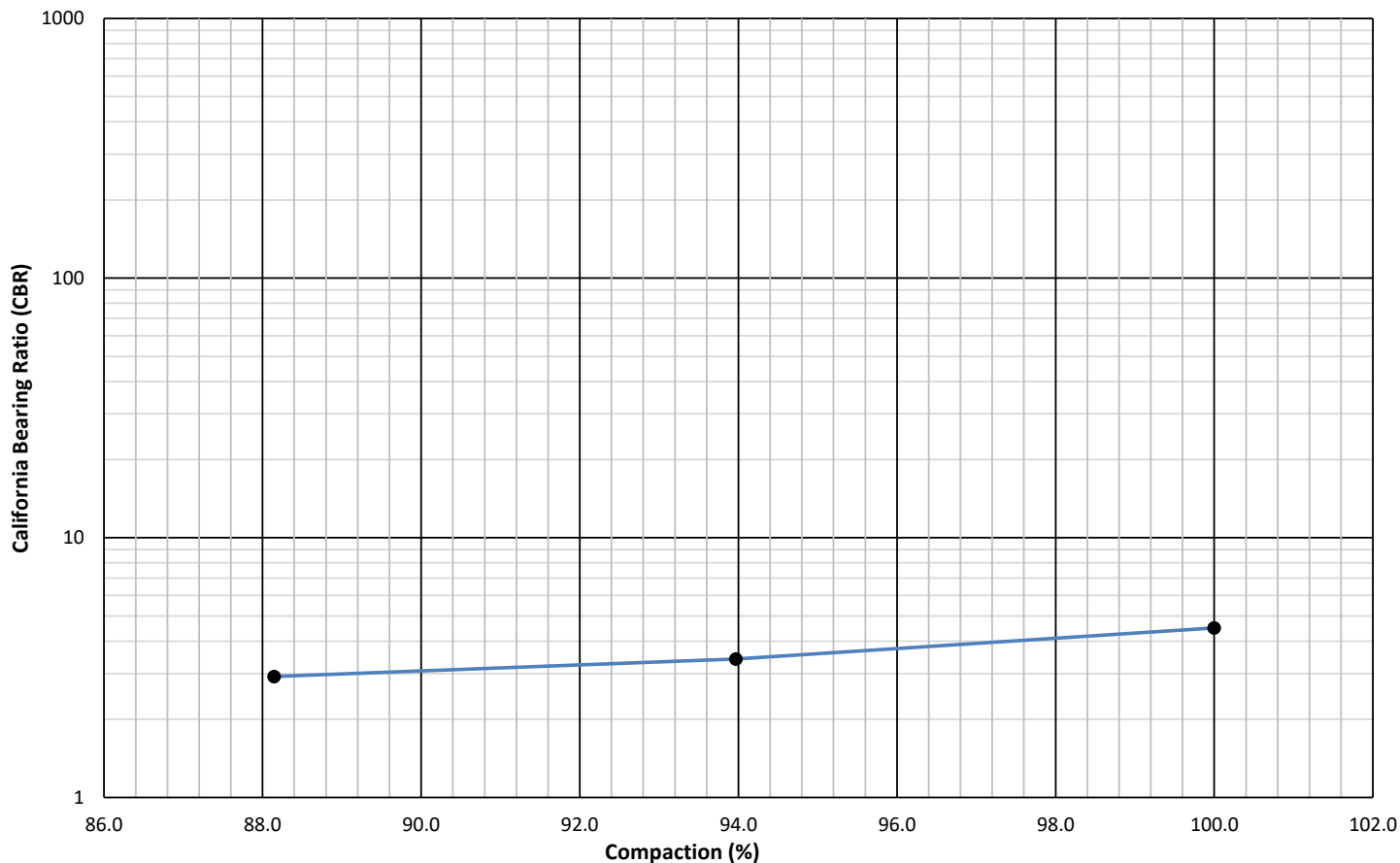
Quality | Excellence | On Time

Client Name: GaGE Consulting
Project Name: Mortimer Railway Ballon Track
Sample: UTP02
Depth: (m) 2.14 - 2.35

Job Number: GGC-71
Lab Number: GGC-71-400
Method: SANS 3001 GR40
Date: 11-Jun-20

CALIFORNIA BEARING RATIO

Mod. AASHTO Values		Compaction Data: CBR			Swell	CBR at (mm)			CBR Values	
MDD	OMC	Dry Dens.	MC	Comp.		2.5	5.0	7.5	Compaction (%)	CBR
(kg/m ³)	(%)	(kg/m ³)	(%)	(%)	(%)					
1924	13.1	1923	12.0	100.0	4.7	4	4	5	100	4.5
									98	4.1
									97	3.9
1924	13.1	1807	12.0	94.0	3.6	3	5	5	95	3.6
									93	3.3
1924	13.1	1695	12.0	88.1	3.4	3	3	3	90	3.1



Although everything possible is done to ensure testing is performed accurately, neither Specialised Testing Laboratory (Pty) Ltd nor any of its directors, managers, employees or contractors can be held liable for any damages whatsoever arising from any error made in performing any tests, nor from any conclusions drawn therefrom. Test results are to be published in full. Samples will be kept for 1 month after the submission of test results due to limited storage space, unless other arrangements are in place.



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Gerrie | 082 309 4448 | gerrie@stlab.co.za

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Quality | Excellence | On Time

Client Name: GaGE Consulting
Project Name: Mortimer Railway Ballon Track
Sample: UTP02
Depth: (m) 2.14 - 2.35

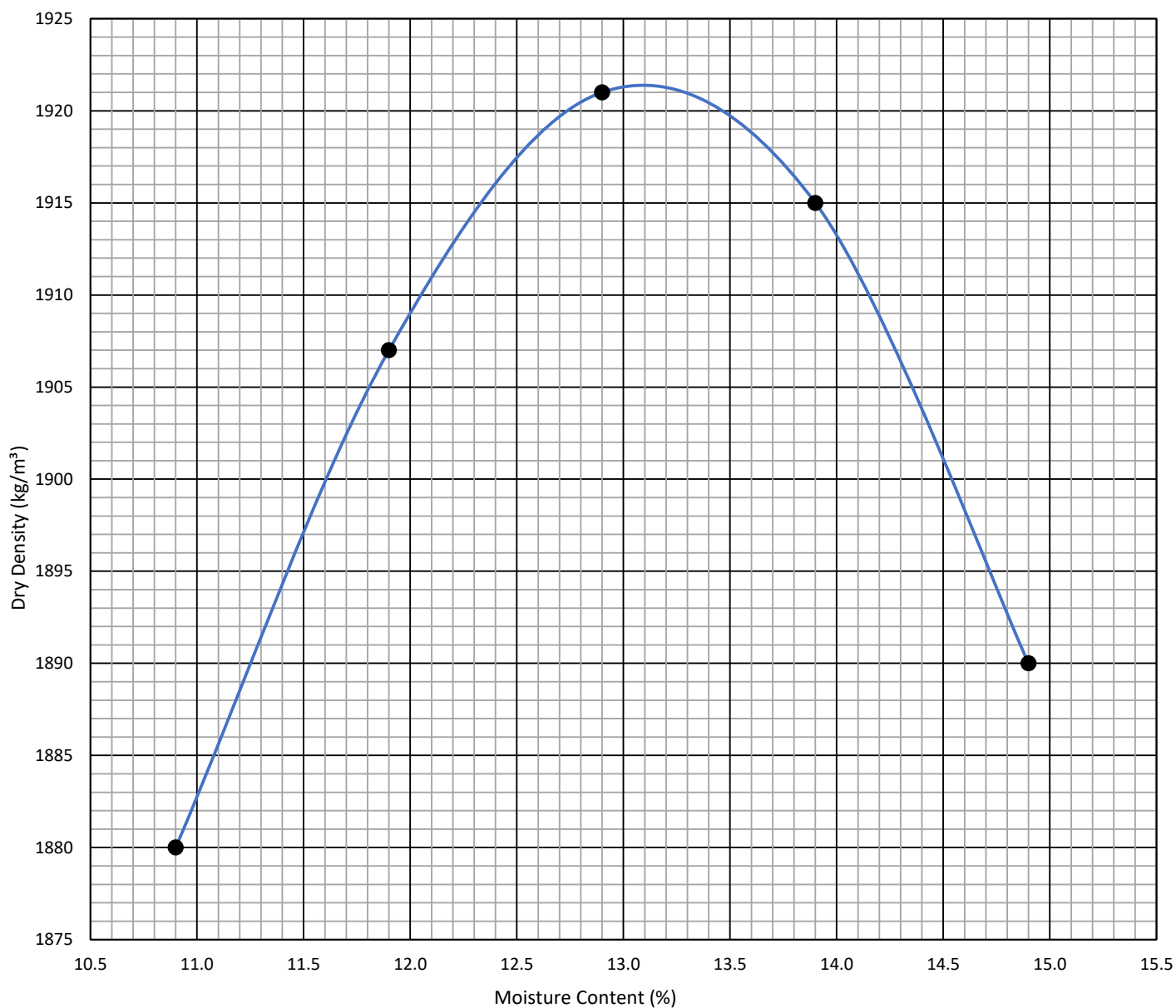
Job Number: GGC-71
Lab Number: GGC-71-400
Method: SANS 3001 GR30
Date: 11-Jun-20

MDD & OMC DETERMINATION (Mod. AASHTO)

Maximum Dry Density: **1924** kg/m³

Optimum Moisture Content: **13.1** %

Moisture Content (%):	10.9	11.9	12.9	13.9	14.9			
Dry Density (kg/m ³)	1880	1907	1921	1915	1890			



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Method: BS 1377 Part 2
Date: 11/06/2020

Appendix 5



Scientific Terrestrial Services

Applying science to the real world

29 Arterial Road West, Oriel, Bedfordview, 2007

Tel 011 616 7893

Fax 011 615-6240

admin@sasenvgroup.co.za

www.sasenvironmental.co.za

Name: Kim Marais
Christopher Hooton
Date: Tuesday, 06 October 2020
Ref: STS 200046

Prime Resources Environmental Consultants (Pty) Ltd

Tel: 011 447 4888

Fax: 086 607 2219

Cell: 071 493 1582

E-mail: gene@resources.co.za

Attention: Ms Gené Main

RE: TERRESTRIAL ECOLOGICAL IMPACT STATEMENT CONSIDERING THE PROPOSED ACTIVITIES AT THE MASA CHROME MINE.

1. INTRODUCTION AND BACKGROUND SETTING

Scientific Terrestrial Services (STS) was appointed by Prime Resources Environmental Consultants to prepare a Terrestrial Biodiversity verification memorandum as per the National Screening Tool for the proposed infrastructure development at the existing Masa Chrome Mine near Northam which includes the following infrastructure, hereafter referred to as the “study area”. The following are the proposed activities/ infrastructure units that will be developed within the study area:

- Access road;
- Haul Road;
- Rail Road (Entry and Exist);
- FCR Plants; and
- Loading Pads

This verification report will follow the requirements as stated in the procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The outcome of the site sensitivity verification will be recorded in the form of a report that:

- Confirms or disputes the current use of the land and the environmental sensitivity as identified by the national web based environmental screening tool (2020), such as new developments or infrastructure, the change in vegetation cover or status etc.; and
- Contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

The study area lies within an existing mining setting where limited natural corridors exist that would have connected and supported ecologically intact floral or faunal assemblages. This limited connectivity as well as long term edge effects from the existing mining activities have limited the conservation value of the sites. Furthermore, historic disposal of rubble and current earthworks and Alien and Invasive Plant species (AIPs) proliferation will continue to degrade the site in the absence of targeted rehabilitation by the mine.

2. OUTCOMES OF THE APPLICATION OF THE NATIONAL WEB BASED ENVIRONMENTAL SCREENING TOOL

The protocol (as stipulated in Government Notice 648 promulgated in Government Gazette 45421 of 2019) for the assessment of terrestrial (fauna and flora) biodiversity prepared in support of the National Web-based Environmental Screening Tool (2020) provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation. The assessment requirements of this protocol are associated with a level of environmental sensitivity determined by the screening tool. For terrestrial biodiversity, the requirements are for landscapes and/or sites which support various levels of threatened or unique biodiversity. The relevant faunal and floral biodiversity data stated in the National Web-based Environmental Screening Tool has been provided by the South African National Biodiversity Institute (SANBI).

As part of the process of initiating the Environmental Impact Assessment process Prime Resources Environmental Consultants applied the National Web- Based Environmental screening tool (2020) to the study area. According to the screening tool, the study area falls within an area of “Low and Medium” (Figure A5) sensitivity for animals and “Low” sensitivity for plants. The terrestrial biodiversity combined sensitivity (Figure A4) is indicated as “Low” for the western portion of the study area in which the FCR Plants, Loading Pads and to a large extent the railway and haul roads are located. The eastern portion of the railway and haul road are located in an area indicated as “Very High” sensitivity for Terrestrial Biodiversity. This is due to the fact that this eastern portion of the site is located within the Rustenburg Platinum Mines (Union Section) Private Nature Reserve, however, from the imagery and confirmed by the site visit, the portion of the reserve in which the study area is situated comprises of an old tailings dam in various stages of rehabilitation and is therefore not considered ecologically sensitive.

Prior to the site visit, the SANBI was consulted as to the medium sensitivity of for the animal species theme. They indicated that the [REDACTED] species, [REDACTED], VU) may potentially occur within the study area. As such this was taken into consideration during the site assessment, where signs of the species and suitable habitat availability was assessed.

3. DEFINITIONS AND LEGISLATIVE REQUIREMENTS

The legislation considered during this investigation included the following:

- The Constitution of the Republic of South Africa, 1996¹;
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA);
- The Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- Government Notice R598 Alien and Invasive Species Regulations as published in the Government Gazette 37885 dated 1 August 2014 as it relates to the National Environmental Management Biodiversity Act, 1998 (Act 107 of 1998);
- The Conservation of Agricultural Resource Act, 1983 (Act No. 43 of 1983) (CARA);
- The North West Biodiversity Management Act, 2016 (Act No. 4 of 2016); and
- The Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003) (LEMA).

4. INVESTIGATION FINDINGS

For the purpose of the desktop analysis and database review, a polygon was drawn around the various infrastructure units, hereafter referred to as the “proposed development sites” and information for these areas compiled. The results of this desktop assessment are summarised in the points below and in Appendix B, with the relevant maps presented in Appendix A.

Study Area:

- The National List of Threatened Ecosystems indicates that the study area falls within the Dwaalboom Thornveld vegetation type which is listed as Least Concern;

¹ Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the ‘Constitution of the Republic of South Africa, 1996’. It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers.

- According to the Limpopo C-Plan most of the study area is located within an area listed as “Other Natural Areas”. These are natural and intact areas, which are not required to meet targets, nor have been identified as a Critical Biodiverse Areas (CBA) or Ecological Support Areas (ESA); and
- A very small portion of the new proposed haul road intersects with a portion of an area indicated as a Critical Biodiversity Area 2 (CBA2). CBA2’s represent areas where there are spatial options for achieving targets and the selected sites are the ones that best achieve targets within the landscape design objectives of the plan.

For the purpose of this screening report and the field assessment, the site visit focussed only on the proposed development sites and did not include the entire study area or surroundings, though these may form part of the discussion. The results of the site visit are discussed below.

A field investigation to ground truth the desktop findings was undertaken on the 2nd of September 2020. The broader study area was considered utilising digital satellite imagery prior to and after the field investigation. The survey was undertaken in early spring, and it was noted that the region had not received sufficient rains prior to the site visit, as such the vegetation had not yet recovered from winter dormancy. Although the area through which the railway loop traverses had been recently burnt, the overall vegetation structure and the digital signature of this area is similar to that of the non-burnt areas, and as such results and conclusions pertaining to this area can be inferred. Seasonal changes in vegetation and weather are also known to result in cascading impacts on faunal classes, leading to a potential misrepresentation of the species components of the study area. However, information from online databases, habitat evaluation and the specialist knowledge of the area is deemed sufficient to infer the potential importance of the study area for faunal species.

Historical imagery (June 1949) indicates that prior to the onset of mining activities the study area had a notably lower density of large tree species. It also appears that portions of the study area may have been subjected to some levels of crop cultivation (Figure 1), whilst it is possible that the remaining areas would have also been used for grazing. It must be noted that the low tree density as seen in Figure 1 is indicative of the Dwallboom Thornveld vegetation type as described by Mucina and Rutherford.



Figure 1: Historical image from June 1949 roughly indicating the location of the currently proposed mine activities.

During the field assessment it was evident that the vegetation within the study area as described by Mucina and Rutherford (2006) has subsequently been altered, with a distinct increase in woody species density and signs of woody encroachment in areas (Figure 2). This change in vegetation structure is attributable to the onset of mining activities, as the ecological processes necessary for the maintenance of the vegetation structure as described by Mucina and Rutherford (2006) will have been hindered / ceased, whilst edge effects and habitat disturbance will have stimulated the onset of bush encroachment.

Mining associated disturbances, both historical and current, are evident, with old roads and the dumping of waste material (rubble and gravel) being associated with several of the proposed development sites (Figure 3). More recently, within the northern portion of the study area, earth works (excavations) are evident and have led to extensive habitat loss within the FCR Plant 2 footprint (Figure 4). Both the historical and current impacts from earth works and disposal of rubble have impacted upon the habitat associated with the loading pads, the FCR plants and the proposed access road in the north. Within these footprints there are still areas where the habitat has not been anthropogenically disturbed, however, the overall ecological functioning and sensitivity of these areas has evidently decreased. Although several indigenous floral species were still evident within the proposed development sites, it is evident that the lack of suitably managed ecological processes such as controlled burns and grazing/browsing activities has led to a loss of floral species diversity and a noted increase in encroachment species such as *Dichrostachys cinerea* and *Asparagus* sp in many areas. Such encroachment is evidence of either previous disturbances to the area or improper ecological management which favours the proliferation of these species. The herbaceous layer did not appear notably species rich and was dominated by dense clumps of graminoid species such as *Enneapogon cenchroides* and *Panicum maximum*. Other graminoid species such as *Eragrostis* sp, *Eragrostis rigidior*, *Setaria sphacelata* and *Aristida congesta* were observed. The woody layer was dominated by species such as *Vachellia tortilis*, *V. karoo*, *Searsia pyroides*, *Combretum* sp, *Grewia flava* and *D. cinerea*. Graminoid species such as *Panicum maximum* are expected to occur within this region, notably in clumps under *Vachellia* spp, however many of the other graminoid species observed are often associated with areas that have previously undergone some form of ecological disturbance.



Figure 2: Representative images of the vegetation observed that has not been disturbed within the proposed development footprint areas.



Figure 3: Representative images of the disturbed areas associated with the proposed footprint areas. Historical gravel dumping (left) and recent earth works (right).



Figure 4: Representative images of the disturbed areas associated with the proposed footprint areas. Relatively recent stockpiling of excavated material (left) along the proposed access road and historical dumping of rubble (right).

Edge effects from mining and the historical anthropogenic impacts has further led to the proliferation of AIPs within the study area, most notably within the areas where previous disturbance has occurred. It is likely that the proliferation of these AIP species will continue and spread, if not suitably controlled and managed in the long term.

From the brief site assessment it was evident that the faunal assemblage of the study area has been impacted upon. The overall faunal species diversity and abundance of the study area was lower than expected, however this may also be attributed to the season. Considering the current anthropogenic activities in the region, the available habitat and the overall levels of habitat connectivity, the study area is not expected to host a high diversity or abundance of fauna. Mine related infrastructure (tailings dam, fences, railways, pipelines and buildings) has led to a notable loss of habitat connectivity, which will further impact on the useability of the study area for faunal species. Due to the location of the study area and the lack of habitat connectivity, the study area is not considered important as a migratory route or a corridor of movement for faunal species between other areas of intact and important habitat. The screening tool indicated that the species [REDACTED], VU) may occur on site, however, database searches indicate that this species has never been recorded within the study area or immediate adjacent areas. The site assessment further highlighted that due to the loss of habitat connectivity and disturbed habitat as well as the lack of rocky hillsides and outcrops, it is unlikely that this species will occur within the study area. Following the site assessment, it is evident that the habitat within the study area correlates with the low sensitivity for plants and animals as indicated by the national web based environmental screening tool. The eastern portion of the study area indicated as medium sensitivity for animals and as very high for terrestrial biodiversity cannot be supported following the site assessment. These areas identified to be of increased sensitivity are located within and adjacent to an existing TSF and in areas that have been previously disturbed (Figure 5). A visual depiction of all disturbed areas associated with the proposed development sites within the study area is provided in Figure 6 below.



Figure 5: Images of the areas associated with the rail road exit: Dumping of rubble and notable habitat disturbance (left) and the TSF and with evidence of tailings spill into adjacent areas (right)

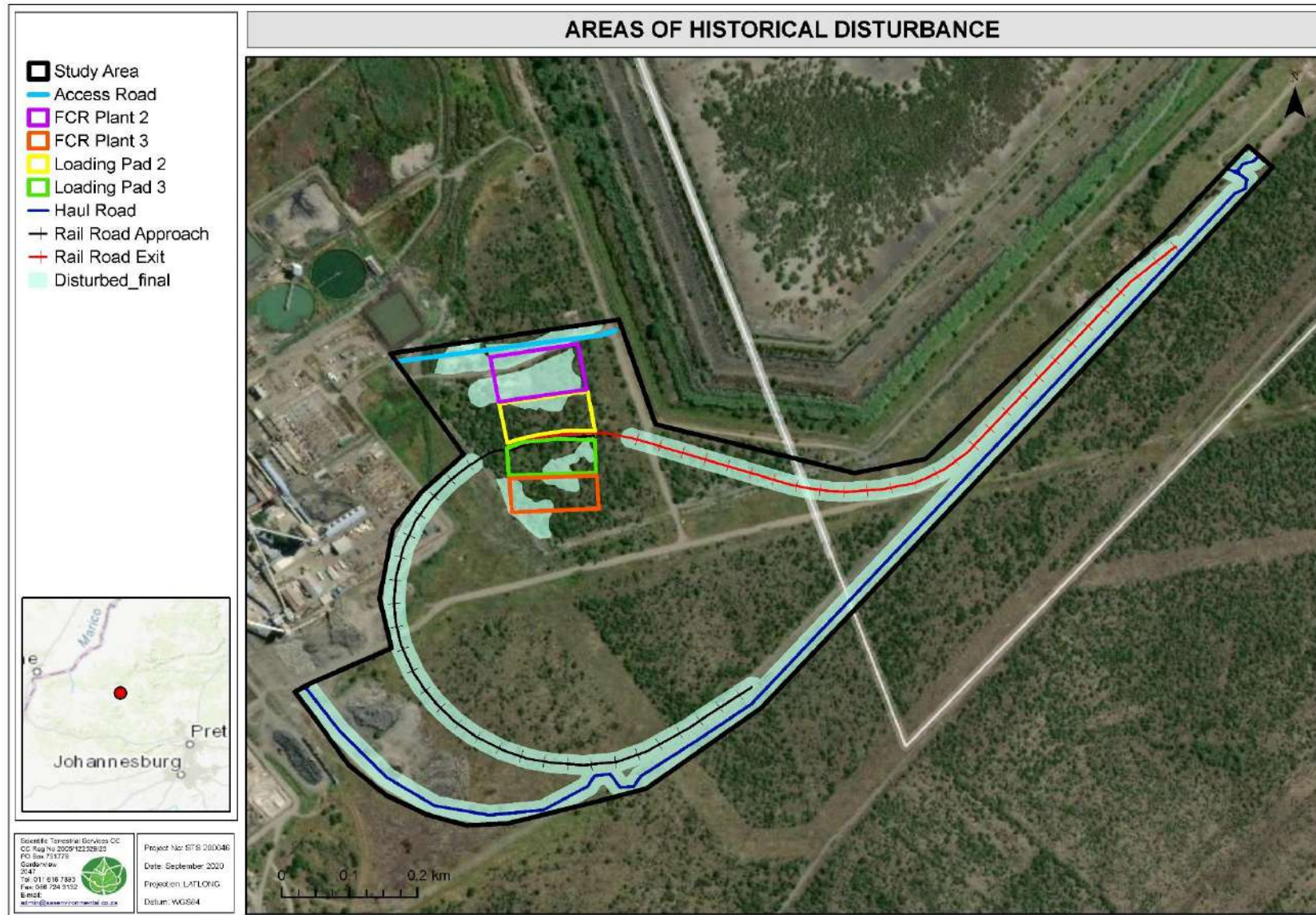


Figure 6: Map indicating disturbed areas identified to be associated with the proposed development sites.

5. BUSINESS CASE, OPPORTUNITIES AND CONSTRAINTS APPLICABLE TO THE PROPOSED DEVELOPMENT OF THE STUDY AREA.

The proposed development sites are located both within and adjacent to an active mining area, where the habitat has already been disturbed and degraded as a result of the lack of well managed ecological processes, disturbances from the development of the mine and ancillary services (railways and roads), edge effects and disposal of waste material within portions of the development footprint areas.

During the site assessment, it was evident that the vegetation and plant species composition within the proposed development sites corroborates that of the national web-based environmental screening tools "low plant sensitivity theme". In addition to this, continued mining activities, earth works, lack of ecological management and AIP proliferation will result in further habitat disturbance and degradation within the proposed development sites.

The faunal composition within the study area is not anticipated to be of significant conservation value due the lack of habitat connectivity, degraded habitat and past and current mining related impacts. Following the site assessment, it is evident that the western portion of the study area, indicated as a medium sensitivity zone as per the national web-based environmental screening tool, is part of a tailings facility whilst the far western portion has been subjected to earth works and used for the disposal of both rubble and household waste. The screening tool indicated that the SCC [REDACTED] VU) may occur within the study area, however it is considered unlikely due to the lack of suitable rocky hillsides and outcrops which are favoured by this species.

Following the desktop and site assessment it is expected that the impacts on the receiving environment resulting from the proposed activities are anticipated to be low. Furthermore, it is recommended that as part of the development a suitable AIP control plan is developed to manage and control the current AIP species and prevent further proliferation into surrounding areas.

We trust that we have interpreted your requirements correctly. Please do not hesitate to contact us if there are any aspects of this memorandum that you would like to discuss.

Yours Faithfully,

Kim Marais
SACNASP REG.NO: 117137/17

Declaration of independence and CV included in Appendix B and C respectively

REFERENCES

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- Threatened Ecosystems: National Environmental Management Biodiversity Act: National list of ecosystems that are threatened and in need of protection (G 34809, GoN 1002). 2011. Department of Environmental Affairs. Online available: <http://bgis.sanbi.org/ecosystems/project.asp>.

APPENDIX A- PROJECT MAPS

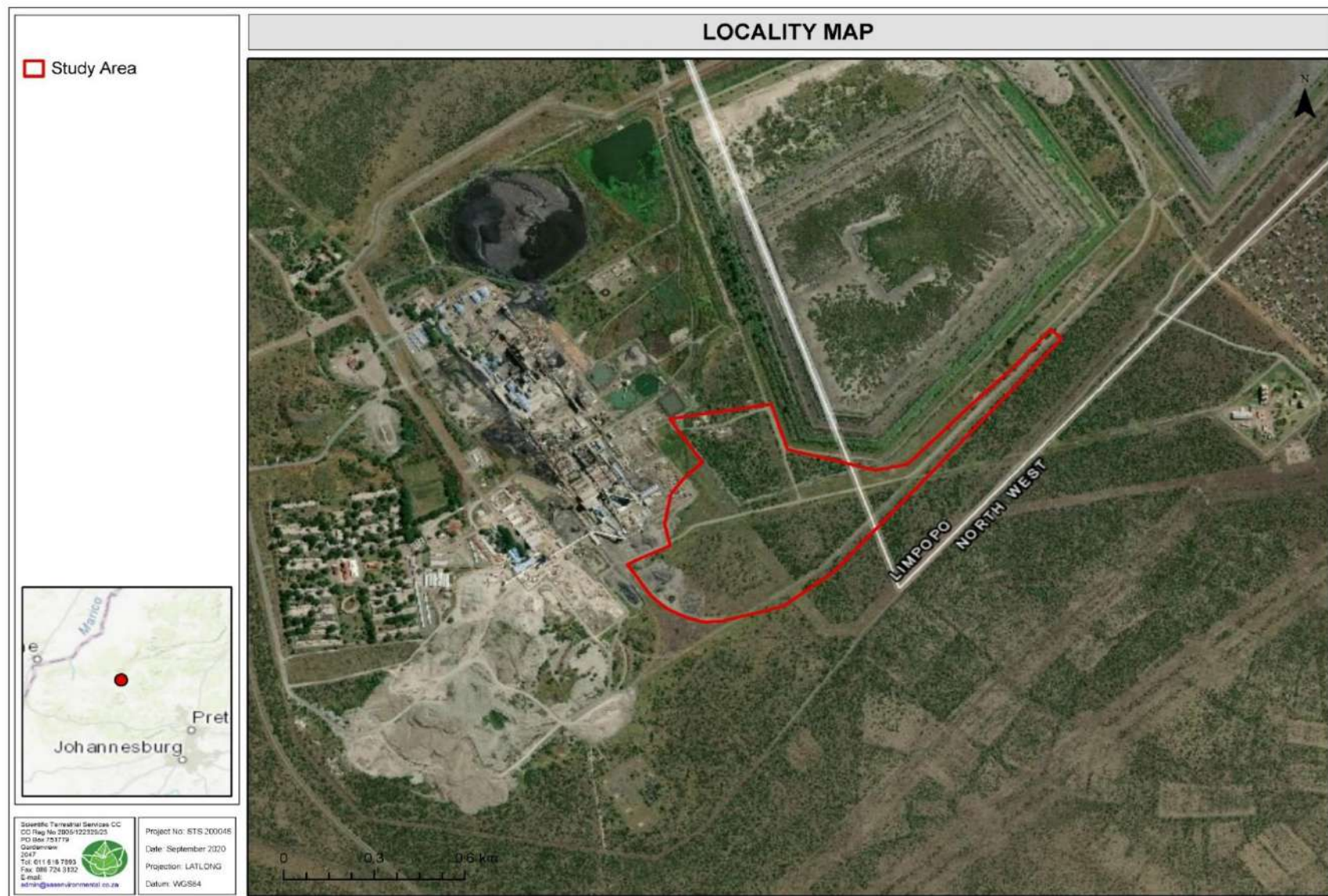


Figure A1: Satellite image depicting the location of the study area in relation to surrounding areas.

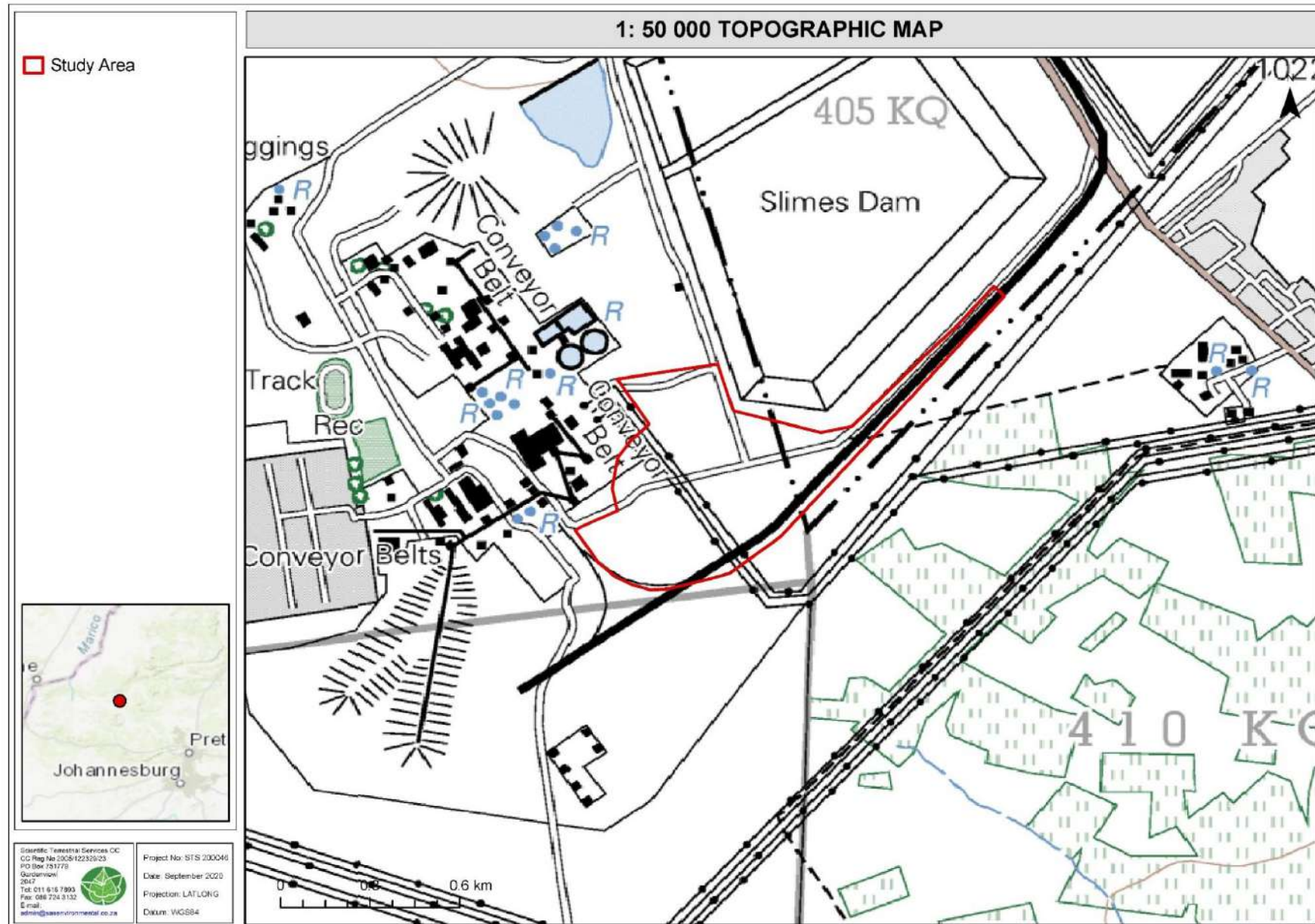


Figure A2: The study area depicted on a 1:50 000 topographical map in relation to the surrounding area.

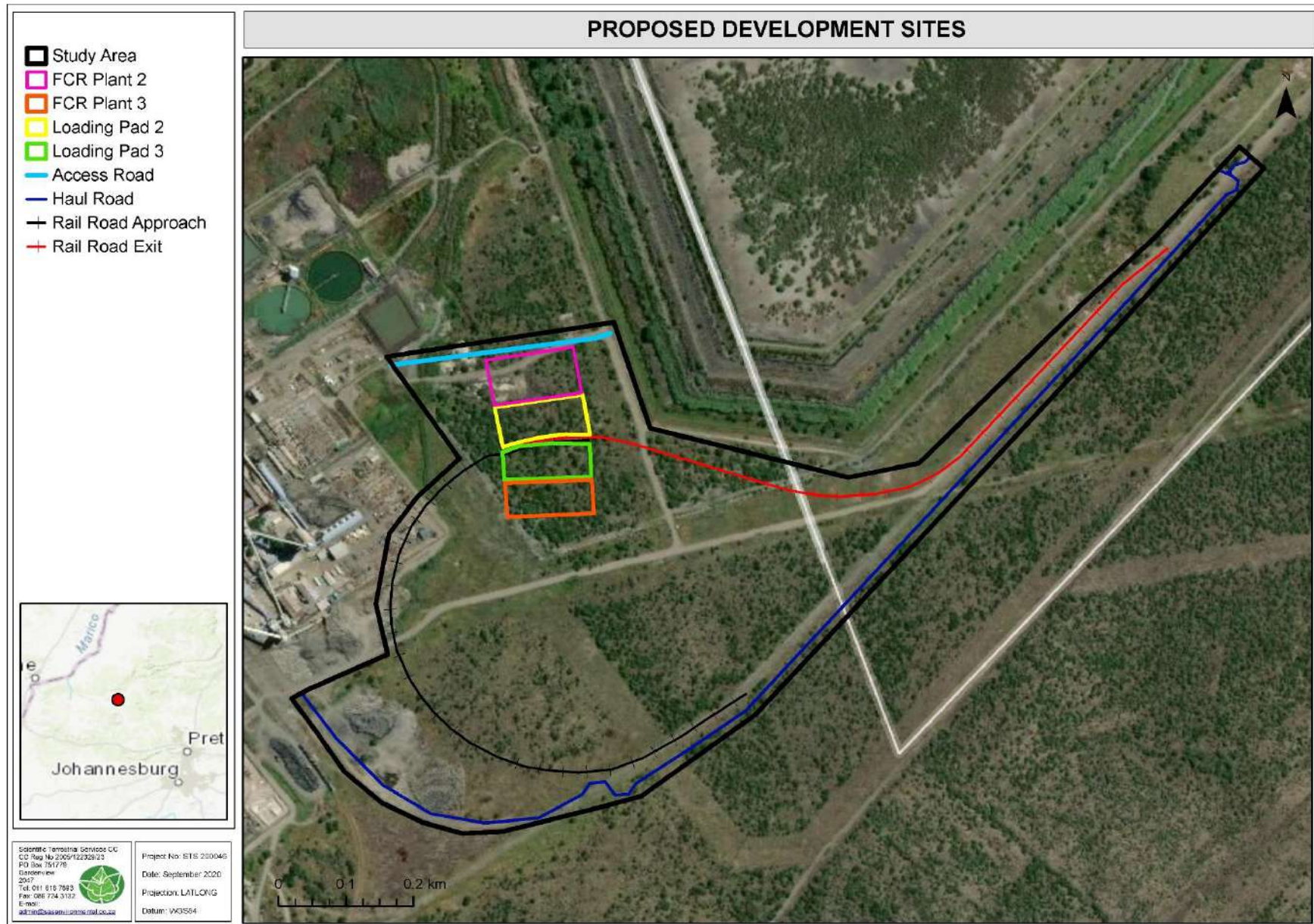


Figure A3: The proposed development sites within the study area.

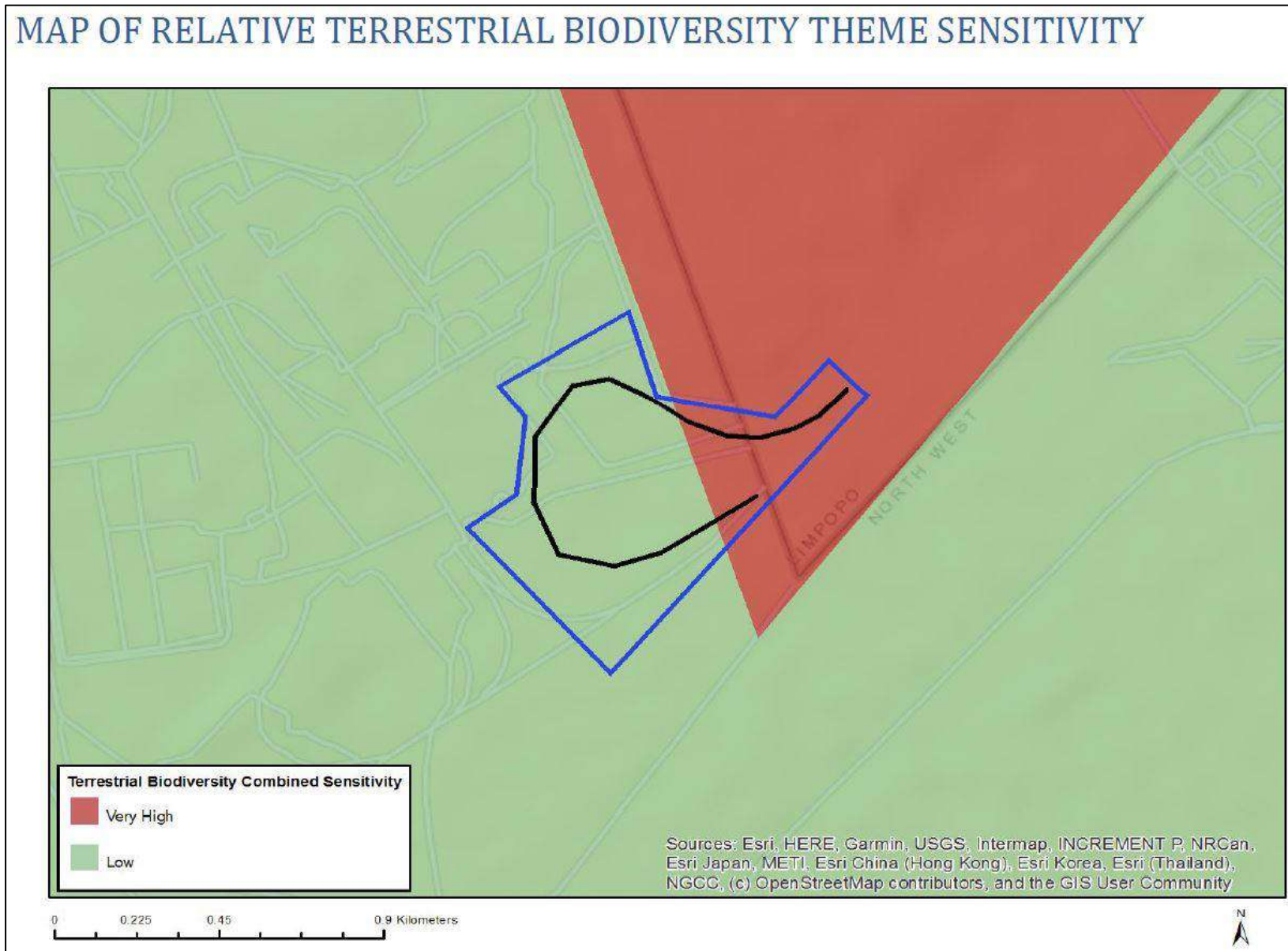


Figure A4: National web-based Environmental Screening Tool (2020) Terrestrial Biodiversity Theme for the proposed development layout within the study area.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

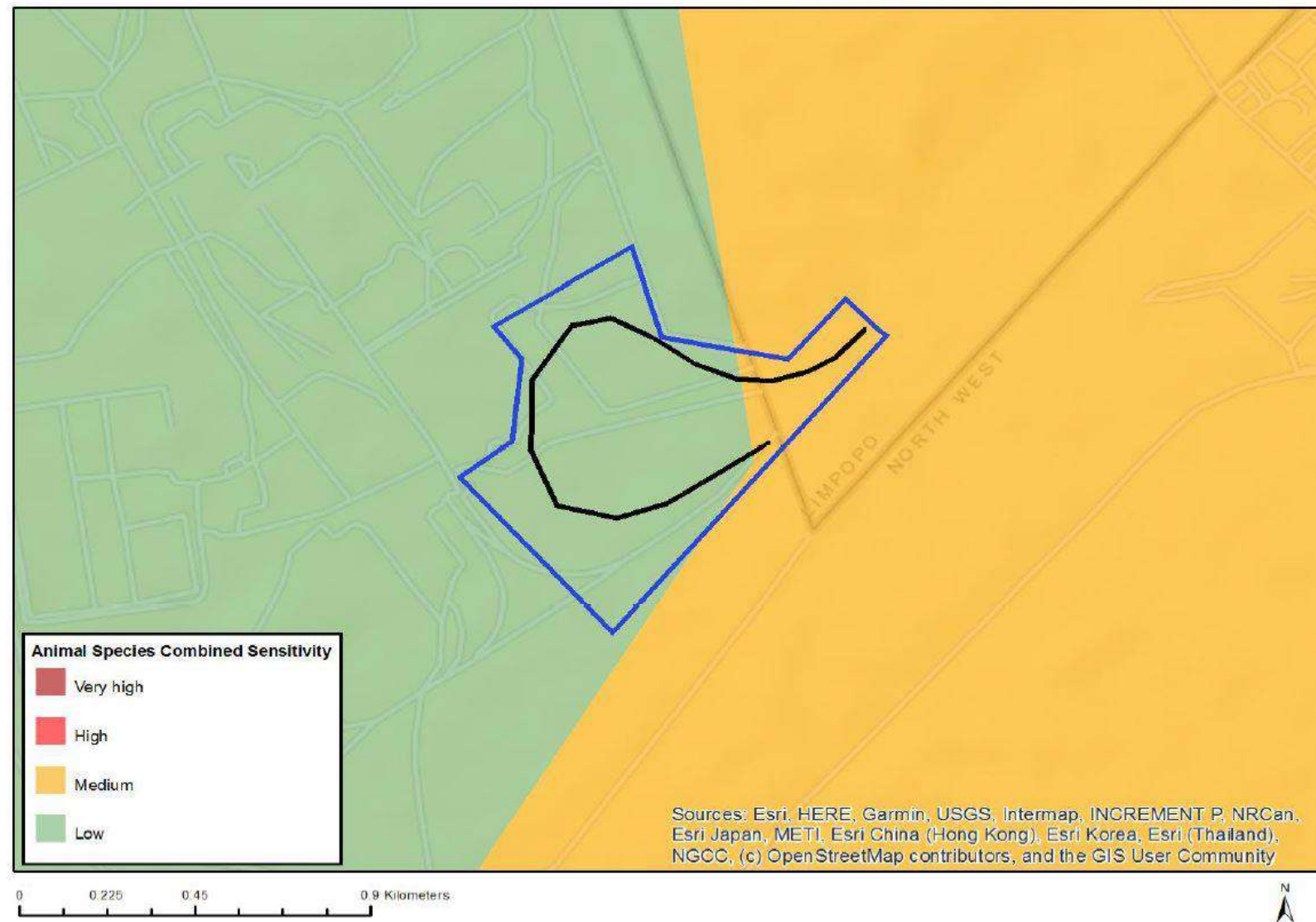


Figure A5: National web-based Environmental Screening Tool Animal Species Theme for the proposed development layout within the study area.

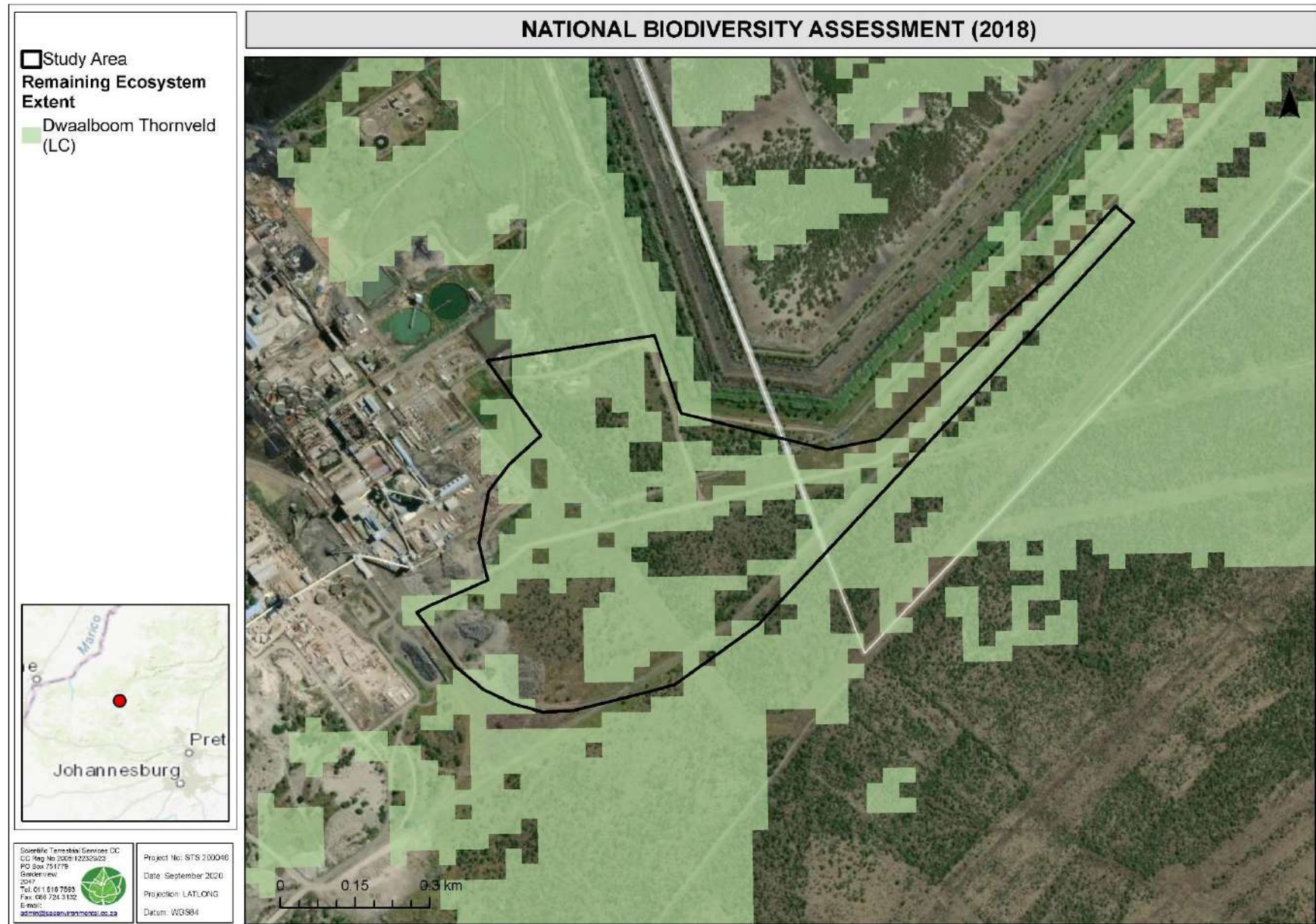


Figure A6: Extent and threat status of vegetation type(s) according to the National Biodiversity Assessment (NBA, 2018).

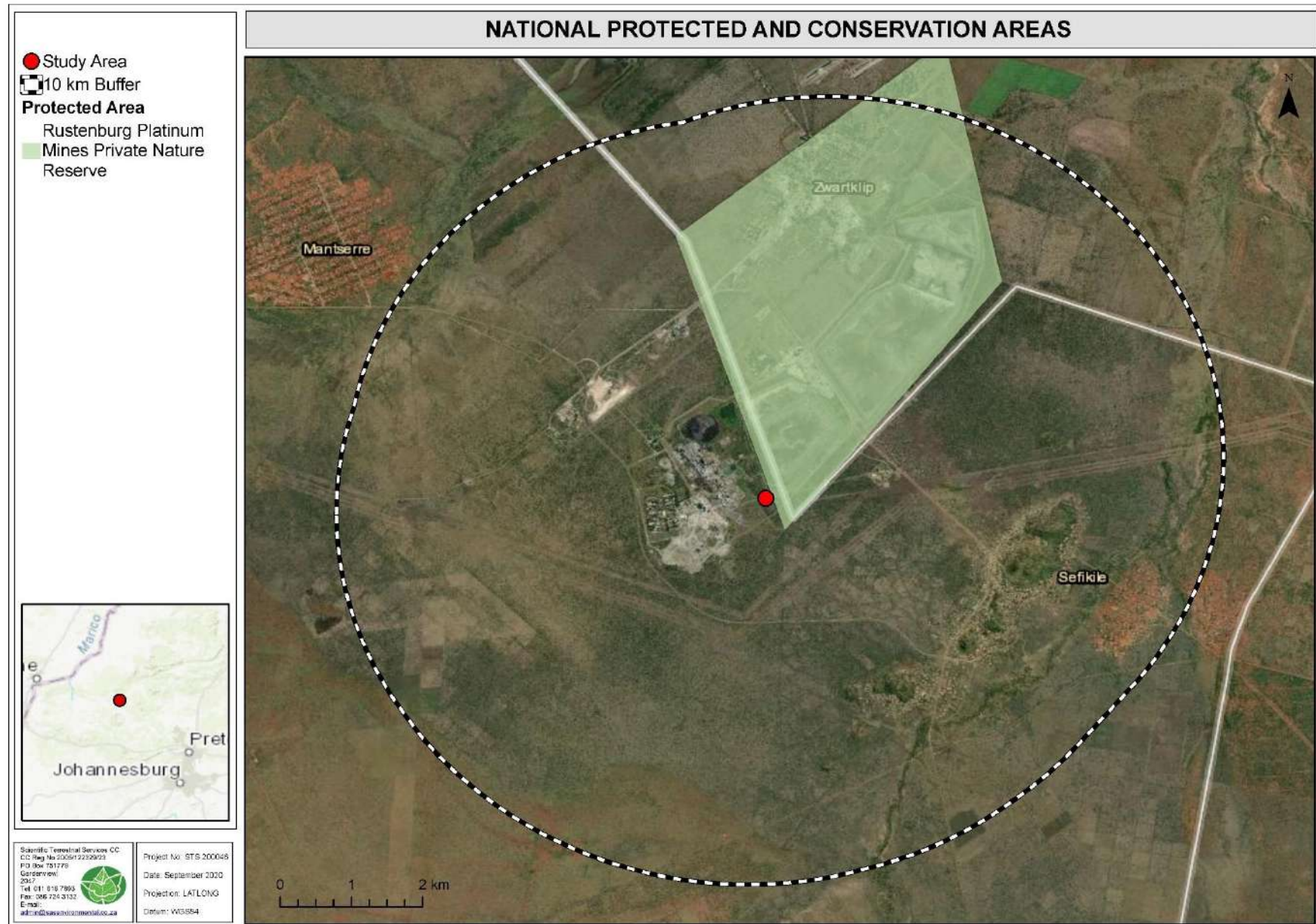


Figure A7: Protected areas within a 10km radius of the study area, according to SAPAD (Q4, 2019), SACAD (Q4, 2019) and NPAES (2009).



Figure A8: Importance of the study area according to the Limpopo Conservation Plan Version 2 (2013).

APPENDIX B- BACKGROUND INFORMATION

Table 1: Summary of the conservation characteristics for the study area with a focus on terrestrial database sets.

CONSERVATION DETAILS PERTAINING TO THE AREA OF INTEREST (VARIOUS DATABASES)		DETAILS OF THE AREA OF INTEREST IN TERMS OF MUCINA & RUTHERFORD (2006, 2012, 2018)					
NATIONAL BIODIVERSITY ASSESSMENT (NBA): Ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA), and compared with the biodiversity target for that ecosystem type. The ecosystem protection level status is assigned using the following criteria: I. if an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either a or b, it is classified as well protected; II. when less than 100% of the biodiversity target is met in formal a or b protected areas it is classified it as moderately protected; III. if less than 50% of the biodiversity target is met, it is classified it as poorly protected; and IV. If less than 5% it is hardly protected.		Biome	The area of interest is situated within the Savanna Biome .				
		Bioregion	The area of interest is located within the Central Bushveld Bioregion				
		Vegetation Type Figure A4	The study area is located within the Dwallboom Thornveld .				
		Climate	Summer rainfall with very dry winters				
			MAP* (mm)	MAT* (°C)	MFD* (Days)	MAPE* (mm)	MASMS* (%)
			551	19.4	41	2 060	75
Altitude (m)	900 -1 200						
NBA (2018): Figure A6 1) Ecosystem Protection Level 2) Ecosystem Threat Status	NBA 2018 dataset (Figure A4): The study area falls within the Dwallboom Thornveld which is a Least Concern ecosystem and is currently Moderately Protected .	Distribution	Limpopo and North-West Provinces: Flats north of the Dwarsberge and associated ridges mainly west of the Crocodile River in the Dwaalboom area but including a patch around Sentrum. South of the ridges it extends eastwards from the Nietverdiend area, north of the Pilanesberg to the Northam area.				
		Conservation	Least threatened. Target 19%. Some 6% statutorily conserved, mostly within the Madikwe Game Reserve approximately 88km to the west. About 14% transformed mainly by cultivation. Erosion is very low to low. Main use is extensive cattle grazing.				
National Threatened Ecosystems (2011) Figure A7	Ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type. The ecosystem protection level status is assigned using the following criteria: v. If an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either A or B, it is classified as Well Protected;	Geology & Soils	Vertic black ultramafic clays which developed from norite and gabbro also locally in small depressions along streams. Some areas have less clay. Some with high base status and eutrophic red soils. Underlying geology is an Archaean granite-gneiss terrane of the Swazian Erathem that is covered in parts by the mainly clastic as well as chemical sediments and volcanics of the Rayton and Silverton Formation, both Pretoria Group (Transvaal Supergroup). Mafic intrusive rocks of the Rustenburg Layered Suite, Bushveld Igneous Complex (Late Vaalian) are present in the east and include the Bierkraal Manetite Gabbro. Bronzite, harzburgite, norite and anorthosite are the major mafic rocks of the Rustenburg Suite. Land types mainly Ea and Ae.				

	<div><div><div><div><div><div>vi.</div><div>When less than 100% of the biodiversity target is met in formal A or B protected areas it is classified it as Moderately Protected;</div></div><div><div>vii.</div><div>If less than 50% of the biodiversity target is met, it is classified it as Poorly Protected; and</div></div><div><div>viii.</div><div>If less than 5% it is Hardly Protected.</div></div></div></div><div>The study area, area falls within the remaining extent of the Dwaalboom Thornveld (Least Concern), which is currently moderately protected.</div></div><td><div><div><div>Vegetation & landscape features</div></div></div><div>Plains with layers of scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species, and an almost continuous herbaceous layer dominated by grass species. <i>Vachellia tortilis</i> and <i>V. nilotica</i> dominate on the medium clays (at least 21% clay in the upper soil horizon but high in the lower horizons. On particularly heavy clays (>55% clay in all horizons) most other woody plants are excluded and the diminutive <i>V. tenuispina</i> dominates at a height of less than 1 m above ground. On the sandy clay loam soils (with not more than 35% clay in the upper horizon but high in the lower horizons) <i>V. erubescens</i> is the most prominent tree (Pauw 1988) The alternation of these substrate types creates a mozaic of patches typically 1–5 km across, for example in the unit west of Thabazimbi.</div></td></div>	<div><div><div>Vegetation & landscape features</div></div></div> <div>Plains with layers of scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species, and an almost continuous herbaceous layer dominated by grass species. <i>Vachellia tortilis</i> and <i>V. nilotica</i> dominate on the medium clays (at least 21% clay in the upper soil horizon but high in the lower horizons. On particularly heavy clays (>55% clay in all horizons) most other woody plants are excluded and the diminutive <i>V. tenuispina</i> dominates at a height of less than 1 m above ground. On the sandy clay loam soils (with not more than 35% clay in the upper horizon but high in the lower horizons) <i>V. erubescens</i> is the most prominent tree (Pauw 1988) The alternation of these substrate types creates a mozaic of patches typically 1–5 km across, for example in the unit west of Thabazimbi.</div>
IBA (2015)	The study area does not fall within a 10km radius of any Important Bird Areas.	
SAPAD (2019, Q3); SACAD (2019, Q3); NPAES (2009). Figure A7	The South African Protected Areas Database (SAPAD, 2019) and the National Protected Areas Expansion Strategy (NPAES, 2009) indicates that the Rustenburg Platinum Mines Private Nature Reserve falls within a 10km zone of the study area.	
NORTH WEST BIODIVERSITY SECTOR PLAN (2015)		
Terrestrial Ecosystems	The study area does not fall within any Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), or Other Natural Areas according to this dataset.	
LIMPOPO CONSERVATION PLAN V2 (2013)		
CRITICAL BIODIVERSITY AREAS FIGURE A8	<div>A very small section of the study area falls within an area that is a CBA 2.</div> <div>CBA 2's represents areas where there are spatial options for achieving targets and the selected sites are the ones that best achieve targets within the landscape design objectives of the plan.</div>	
OTHER NATURAL AREAS AND NO NATURAL AREAS REMAINING FIGURE A8	<div>Most of the of the study area is considered as “Other Natural Areas”. These are natural and intact areas, which are not required to meet targets, nor have been identified as a CBA or ESA. The remaining sections of the study area fall within an area where “no natural areas remain”. These are areas with no significant direct biodiversity value.</div> <div>No management objectives, land management recommendations or land-use guidelines are prescribed. These areas are nevertheless subject to all applicable town and regional planning guidelines and policy. Where possible existing “Not Natural” areas should be favoured for development before "Other Natural Areas".</div>	
NATIONAL WEB BASED ENVIRONMNETAL SCREENING TOOL (2020)		
The screening tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the EA process. this assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas		
Terrestrial Theme	The Terrestrial Sensitivity for the entire study area is considered of Very High sensitivity . The triggered sensitivity features include a Protected Area within a 10 km zone of the study area.	

Plant Species Theme	For the plant species theme, the entire study area is considered of Low sensitivity .
Animal Species Theme	For the animal species theme, the entire study area is considered of Low and Medium sensitivity . Species identified include Sensitive species 13.
IMPORTANCE OF THE STUDY AREA TO THE MINING AND BIODIVERSITY GUIDELINES (2013)	
MINING and BIODIVERSITY GUIDELINES	The study area does not fall within an important area identified for Biodiversity and Mining.

CBA = Critical Biodiversity Area; DWS = Department of Water and Sanitation; EI = Ecological Importance; ES = Ecological Sensitivity; EPL = Ecosystem Protection Level; ESA = Ecological Support Area; ETS = Ecosystem Threat Status; m.a.m.s.l = Metres Above Mean Sea Level; MAP = Mean Annual Precipitation; NBA = National Biodiversity Assessment; NFEPA = National Freshwater Ecosystem Priority Areas; PES = Present Ecological State; SAIIE = South African Inventory of Inland Aquatic Ecosystems; WMA = Water Management Area

APPENDIX B- Declaration of Independence

DETAILS, EXPERTISE AND CURRICULUM VITAE OF SPECIALISTS

1. (a) (i) Details of the specialist who prepared the report

Kim Marais BSc (Hons) Zoology (Herpetology) (University of the Witwatersrand)

1. (a). (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Kim Marais		
Postal address:	221 Riverside Lofts, Tygerfalls Boulevard, Bellville,		
Postal code:	7539	Cell:	074 580 6823
Telephone:	011 616 7893	Fax:	086 724 3132
E-mail:	kim@sasenvgroup.co.za		
Qualifications	MSC Environmental Science		
Registration / Associations	Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP) Member of the South African Wetland Forum		

1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Kim Marais, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct

Kim Marais

I, Christopher Hooton, declare that -

- I act as the **independent specialist (reviewer)** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.

Christopher Hooton

Specialist Signature

APPENDIX B- CV of specialist



SAS ENVIRONMENTAL GROUP OF COMPANIES –

CURRICULUM VITAE OF KIM MARAIS

PERSONAL DETAILS

Position in Company

Senior Scientist
Water Resource Manager
2015

Joined SAS Environmental Group of Companies

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions
(SACNASP – Reg No. 117137/17)
Member of the Western Cape Wetland Forum (WCWF)

EDUCATION

Qualifications

BSc (Hons) Zoology (University of the Witwatersrand)	2012
BSc (Zoology and Conservation) (University of the Witwatersrand)	2011

Short Courses

Aquatic and Wetland Plant Identification (Cripsis Environment)	2019
Tools for Wetland Assessment (Rhodes University)	2018
Certificate in Environmental Law for Environmental Managers (CEM)	2014
Certificate for Introduction to Environmental Management (CEM)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, KwaZulu-Natal, Northern Cape, Eastern Cape,
Africa - Uganda

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Biodiversity Action Plans (BAP)
- Alien and Invasive Control Plans (AICP)
- Faunal Eco Scans
- Faunal Impact Assessments

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Watercourse Maintenance and Management Plans
- Freshwater Offset Plans

Aquatic Ecological Assessment and Water Quality Studies

- Riparian Vegetation Integrity (VEGRAI)
- Water quality Monitoring
- Riverine Rehabilitation Plans

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions
- Public Participation processes



SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF **CHRISTOPHER HOOTON**

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Biodiversity Specialist
Joined SAS Environmental Group of Companies	2013

EDUCATION

Qualifications

BTech Nature Conservation (Tshwane University of Technology)	2013
National Diploma Nature Conservation (Tshwane University of Technology)	2008

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Eastern Cape, Western Cape, Northern Cape, Free State
Africa - Zimbabwe, Sierra Leone

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Faunal Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning

Appendix 6



Archaetnos Culture & Cultural
Resource Consultants
BK 98 09854/23

**A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE
PROPOSED EXPANSION OF THE MASA CHROME PLANTS, RAILWAY TRACK
EXTENSION AND NEW LOADING PADS AT THE SIYANDA BAKGATLA
PLATINUM MINE NEAR SWARTKLIP IN THE LIMPOPO AND NORTH WEST
PROVINCES**

For:

Prime Resources
E-mail: Gené Main - gene@resources.co.za

REPORT NO.: AE02028V

By:

Prof. A.C. van Vollenhoven (L.AKAD.SA.)
Accredited member of ASAPA (Accreditation number: 166)
Accredited member of SASCH (Accreditation number: CH001),
Johan Smit, BA (Hons)
&
Daniël Viljoen, BA (Hons)

7 September 2020

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Member: AC van Vollenhoven BA, BA (Hons), DTO, NDM, MA (Archaeology) [UP], MA (Culture History) [US], DPhil (Archaeology) [UP], Man Dip [TUT], D Phil (History) [US]

SUBMISSION OF REPORT

Please note that the South African Heritage Resources Agency (SAHRA) or one of its subsidiary bodies needs to comment on this report.

It is the client's responsibility to do the submission via the SAHRIS System on the SAHRA website.

Clients are advised not to proceed with any action before receiving the necessary comments from SAHRA.

DISCLAIMER

Although all possible care is taken to identify all sites of cultural importance during the survey of study areas, the nature of archaeological and historical sites is as such that it always is possible that hidden or subterranean sites could be overlooked during the study. Archaetnos and its personnel will not be held liable for such oversights or for costs incurred as a result thereof.

Should it be necessary to visit a site again as a result of the above mentioned, an additional appointment is required.

Reasonable editing of the report will be done upon request by the client if received within 60 days of the report date. However, editing will only be done once, and clients are therefore requested to send all possible changes in one request. Any format changes or changes requested due to insufficient or faulty information provided to Archaetnos on appointment, will only be done by additional appointment.

Any changes to the scope of a project will require an additional appointment.

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No.	Requirement	Section in report
1	A specialist report prepared in terms NEMA EIA Regulation 982 must contain:	
a)	Details of -	
(i)	The specialist who prepared the report	Title page
(ii)	The expertise of that specialist to compile a specialist report including a curriculum vitae	After contents page
b)	A declaration that the specialist is independent	After contents page
c)	An indication of the scope of, and the purpose for which, the report was prepared	1
cA)	An indication of the quality and age of base data used for the specialist report	7
cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	n/a
d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	4
e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	4
f)	Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of site plan identifying site alternatives	n/a
g)	An identification of any areas to be avoided, including buffers	9
h)	A map superimposing the activity including the associated structure and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	n/a
i)	A description of any assumption made and any uncertainties or gaps in knowledge	5
j)	A description the findings and potential implication\ of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities	8
k)	Any mitigation measures for inclusion in the EMPr	9
l)	Any conditions for inclusion in the environmental authorisation	9
m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	9
n)	A reasoned opinion -	
(i)	As to whether the proposed activity, activities or portions thereof should be authorised	9
(iA)	Regarding the acceptability of the proposed activity or activities	9
(ii)	If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	9
o)	A description of any consultation process that was undertaken during the course of preparing the specialist report	4
p)	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
q)	Any other information requested by the competent authority	3, 6 and 7

EXECUTIVE SUMMARY

Archaeos cc was requested by Prime Resources to conduct a cultural heritage impact assessment (HIA) for the proposed expansion of the Masa Chrome Plants, railway track extension and new loading pads at the Siyanda Bakgatla Platinum Mine. This is close to Swartklip on the Limpopo - Northwest Province border.

The methodology for the study includes a survey of literature and a field survey. The latter was conducted according to generally accepted HIA practices and was aimed at locating all possible objects, sites and features of cultural significance in the area of proposed development.

If required, the location/position of any site was determined by means of a Global Positioning System (GPS), while photographs were also taken where needed. The survey was undertaken by doing a physical survey via off-road vehicle and on foot and covered as much as possible of the area to be studied. Certain factors, such as accessibility, density of vegetation, etc. may however influence the coverage.

All sites, objects, features and structures identified were documented according to the general minimum standards accepted by the archaeological profession. Co-ordinates of individual localities were determined by means of the GPS. The information was added to the description in order to facilitate the identification of each locality.

During the survey no sites of cultural heritage significance were identified within the immediate project area.

Recommendations:

- This report is seen as ample mitigation, since nothing of heritage value were identified in both the surveyed areas.
- The proposed development may continue.
- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.
- In This regards the following 'Chance find Procedure' should be followed:
 1. Upon finding any archaeological or historical material all work at the affected area must cease.
 2. The area should be demarcated in order to prevent any further work there until

- an investigation has been completed.
3. An archaeologist should be contacted immediately to provide advice on the matter.
 4. Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
 5. SAHRA's APM Unit may also be notified.
 6. If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
 7. The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
 8. Work on site will only continue after removal of the archaeological/ historical material was done.

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CURRICULUM VITAE OF SPECIALIST: PROF ANTON CARL VAN VOLLENHOVEN

Tertiary education

- BA 1986, University of Pretoria
- BA (HONS) Archaeology 1988 (cum laude), University of Pretoria
- MA Archaeology 1992, University of Pretoria
- Post-Graduate Diploma in Museology 1993 (cum laude), University of Pretoria
- Diploma Tertiary Education 1993, University of Pretoria
- DPhil Archaeology 2001, University of Pretoria.
- MA Cultural History 1998 (cum laude), University of Stellenbosch
- Management Diploma 2007 (cum laude), Tshwane University of Technology
- DPhil History 2010, University of Stellenbosch

Employment history

- 1988-1991: Fort Klapperkop Military Museum - Researcher
- 1991-1999: National Cultural History Museum. Work as Archaeologist, as well as Curator/Manager of Pioneer Museum (1994-1997)
- 1999-2002: City Council of Pretoria. Work as Curator: Fort Klapperkop Heritage Site and Acting Deputy Manager Museums and Heritage.
- 2002-2007: City of Tshwane Metropolitan Municipality. Work as Deputy Manager Museums and Heritage.
- August 2007 – present – Managing Director for Archaeos Archaeologists.
- 1988-2003: Part-time lecturer in Archaeology at the University of Pretoria and a part-time lecturer on Cultural Resources Management in the Department of History at the University of Pretoria.
- 2014: Part-time lecturer for the Honours degree in Museum Sciences in the Department of History and Heritage Studies at the University of Pretoria
- 2015: Appointed extraordinary professor in history at the Mafikeng Campus of the Northwest University

Other

- Published 75 articles in scientific and popular journals on archaeology and history.
- Author and co-author of over 580 unpublished reports on cultural resources surveys and archaeological work. A list of reports can be viewed on www.archaeos.co.za
- Published a book on the Military Fortifications of Pretoria.
- Contributed to a book on Mapungubwe.
- Delivered more than 50 papers and lectures at national and international conferences.
- Member of SAHRA Council for 2003 – 2006.
- Member of the South African Academy for Science and Art.
- Accredited professional member of Association for South African Professional Archaeologists.
- Accredited professional member of the South African Society for Cultural History (Chairperson 2006-2008; 2012-2014).
- Has been editor for the SA Journal of Cultural History 2002-2004.
- Member of the Provincial Heritage Resources Agency, Gauteng's Council.
- Member of Provincial Heritage Resources Agency, Gauteng's HIA adjudication committee (Chairperson 2012-2019).

ASAPA Accreditation number: 166

SASCH Accreditation number: CH001

DECLARATION OF INDEPENDENCE

I, Anton Carl van Vollenhoven from Archaetnos, hereby declare that I am an independent specialist within the field of heritage management.

Signed:



Date: 7 September 2020

LIST OF ACRONYMS:

AIA – Archaeological Impact Assessment
CMP – Cultural Management Plan
EAP – Environmental Assessment Practitioner
EIA – Environmental Impact Assessment
HIA – Heritage Impact Assessment
PIA – Palaeontological Impact Assessment
SAHRA –South African Heritage Resources Agency

1. INTRODUCTION

Archaeos cc was requested by Prime Resources to conduct a cultural heritage impact assessment (HIA) for the proposed expansion of the Masa Chrome Plants, railway track extension and new loading pads at the Siyanda Bakgatla Platinum Mine. The project is located in the Moses Kotane and Thabazimbi local municipalities in the Bojanala Platinum and Waterberg District Municipalities, respectively. This is close to Swartklip on the Limpopo - Northwest Province border (Figure 1-2).

The HIA forms part of the Environmental Authorisation process for the mine which currently is in its BAR phase. The applicable farms related to the project is Turfbult 404 KQ and Portion 1 of the farm Swartklip 405 KQ. A central coordinate for the development is: Latitude: -24.976244°; Longitude: 27.153118° and the 1:50 000 topographic map number is 2427CC.

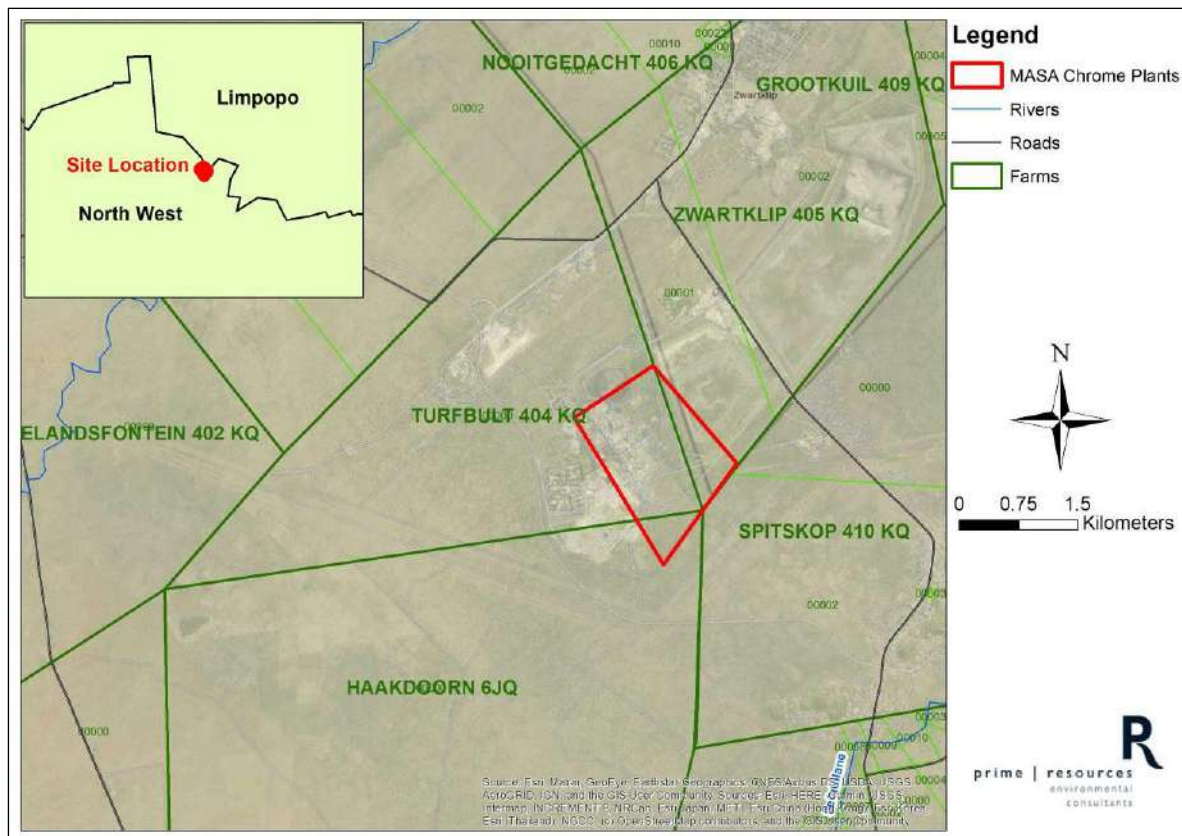


FIGURE 1: LOCATION OF SWARTKLIP IN THE LIMPOPO PROVINCE (PRIME RESOURCES).

MASA Chrome Company (Pty) Ltd is proposing the expansion of its current chrome beneficiation operation by installing two FCRPs at the Siyanda Bakgatla Platinum Mine (SBPM), as well as an extension to the existing railway to facilitate the transport of the final product. The proposed location of these facilities has been determined by the

location of the existing railway line and other related processing infrastructure. All components of this expansion project will occur within the boundaries of the SBPM.

The FCRPs allow for the optimal use of the chrome rich tailings originating from the existing PGM separation plant, by extracting the finer chromite fraction from the tailings before the tailings are deposited on the Tailings Storage Facility (TSF). The proposed FCRPs will reduce the current deposition rate from 180 000 tpm to 130 000 tpm, further extending the life of the TSF. The FCRPs will make use of existing water storage facilities on the site, and a new concrete thickener tank will form part of the proposed FCRP infrastructure. The plants are closed systems and no emissions will be released from them. No chemicals are used in the process.

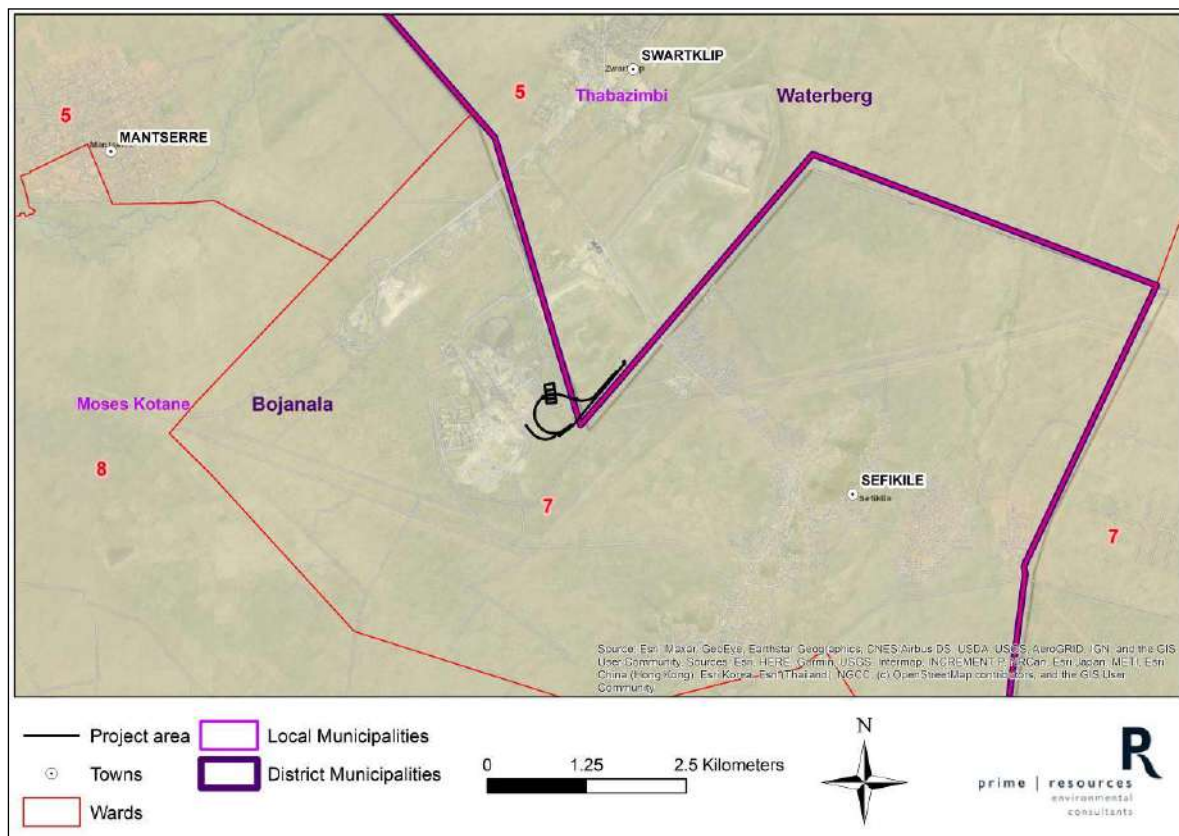


FIGURE 2: LOCATION OF THE INVESTIGATED AREAS IN RELATION TO THE TOWN OF SWARTKLIP (PRIME RESOURCES).

The recovered fine chromite will be separated according to grade (chemical versus metallurgical) and stored on a concrete-lined loading pad until it can be loaded onto rail wagons and transported from the site. The chromite loading pads will be designed as a railway platform conforming to Transnet Freight Rail (TFR) requirements. This would allow 8 to 12 wagons to be placed alongside the platform for loading. The stockpile areas on the loading pad will be constructed from concrete slabs.

The rail turning loop (or balloon) would allow for the turning and shunting of 100 CR type wagon trains and would be 2.1 km in length. During construction, the black turf will be removed to the underlying residual norite horizon. Waste rock or similar clean aggregate material will be used as layer works to build up the levels to above natural ground level where feasible, to facilitate drainage.

The proposed track layout will require the repositioning of some of the existing infrastructure:

- The track passes through a corner of the existing mine stores area. The stores will be relocated within the premises and the fence will be repositioned.
- The fence surrounding the Mortimer TSF will require repositioning as the track will be located between 25 and 60 m from the toe of the TSF.
- The track will cross an excavated drainage trench in two places; specified pre-cast culvert portals will be used.
- The existing haul road will be rerouted to continue parallel to the existing railway with level crossings installed where needed.
- Four power transmission lines cross the proposed rail track. The current vertical alignment of the rail track will not allow for the sufficient clearance for the lines therefore the transmission lines will have to be raised approximately 3.6 m to achieve these clearances. The raised powerlines will remain within the existing powerline servitudes
- The proposed rail track layout will cross pipelines and the service road associated with the operation of the TSF. Pipelines may require a diversion and be lowered in order to pass under the rail track. The service road alongside the pipelines will require a manually operated level crossing to the requirements of the Railway Safety Regulator.

The surveyed area is severely impacted by mining in general, and is mostly a constructed environment, containing a large rehabilitated Tailings Dam. The client indicated the study area (Figure 3), which was surveyed by means of a foot survey and an off-road vehicle.

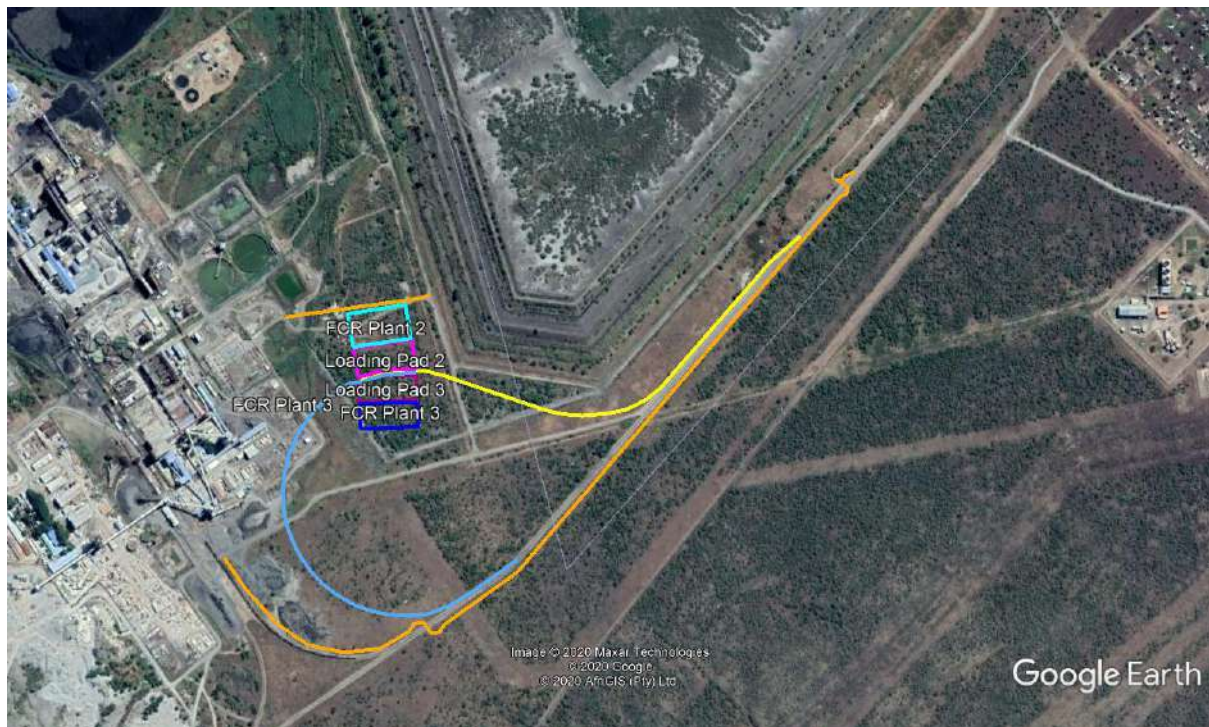


FIGURE 3: DETAILED VIEW OF THE PROPOSED DEVELOPMENT.

2. TERMS OF REFERENCE

The Terms of Reference for the survey were to:

1. Identify objects, sites, occurrences, and structures of an archaeological or historical nature (cultural heritage sites) located on the property (see Appendix A).
2. Document the found cultural heritage sites according to best practice standards for heritage related studies.
3. Study background information on the area to be developed.
4. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value (see Appendix B).
5. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions.
6. Recommend suitable mitigation measures to minimize possible negative impacts on the cultural resources by the proposed development.
7. Review applicable legislative requirements.

3. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. The first of these are the National Heritage Resources Act (Act 25 of 1999) which deals with the cultural heritage of the Republic of South Africa. The second is the National Environmental Management Act (Act 107 of 1998) which inter alia deals with cultural heritage as part of the Environmental Impact Assessment process.

3.1 The National Heritage Resources Act

According to the above-mentioned act the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

The national estate (see Appendix D) includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Archaeological and paleontological importance
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources.

A Palaeontological Impact Assessment (PIA) is an assessment of palaeontological heritage. Palaeontology is a different field of study, and although also sometimes

required by the South African Heritage Resources Agency (SAHRA)¹, should be done by a professional palaeontologist.

The different phases during the HIA process are described in Appendix E. An HIA must be done under the following circumstances:

- a. The construction of a linear development (road, wall, power line canal etc.) exceeding 300m in length
- b. The construction of a bridge or similar structure exceeding 50m in length
- c. Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof
- d. Re-zoning of a site exceeding 10 000 m²
- e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

Structures

Section 34 (1) of the mentioned act states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

Archaeology, palaeontology and meteorites

Section 35(4) of this act deals with archaeology, palaeontology and meteorites. The act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial):

- a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;
- c. trade in, sell for private gain, export, or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite; or
- d. bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or

¹ Please consult SAHRA to determine whether a PIA is necessary.

- recovery of metals or archaeological and paleontological material or objects or use such equipment for the recovery of meteorites.
- e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Human remains

Graves and burial grounds are divided into the following:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

- a. destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Unidentified/unknown graves are also handled as older than 60 until proven otherwise.

Human remains that are less than 60 years old are subject to provisions of the **National Health Act (Act 61 of 2003)** and to local regulations. Exhumation of graves must conform to the standards set out in the **Ordinance on Excavations (Ordinance no. 12 of 1980)** (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated) before exhumation can take place. Human remains can only be handled by a

registered undertaker or an institution declared under the **National Health Act (Act 61 of 2003)**).

3.2 The National Environmental Management Act

This act (Act 107 of 1998) states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

3.3 The International Finance Corporations' performance standard for cultural heritage

This standard recognizes the importance of cultural heritage for current and future generations. It aims to ensure that clients protect cultural heritage in the course of their project activities.

This is done by clients abiding to the law and having heritage surveys done in order to identify and protect cultural heritage resources via field studies and the documentation of such resources. These need to be done by competent professionals (e.g. archaeologists and cultural historians). Any possible chance finds, encountered during the project development, also needs to be managed by not disturbing it and by having it assessed by professionals.

Impacts on the cultural heritage should be minimized. This includes the possible maintenance of such sites in situ, or when not possible, the restoration of the functionality of the cultural heritage in a different location. When cultural historical and archaeological artifacts and structures need to be removed, this should be done by professionals and by abiding to the applicable legislation. The removal of cultural heritage resources may, however, only be considered if there are no technically or financially feasible alternatives. In considering the removal of cultural resources, it should be outweighed by the benefits of the overall project to the affected communities. Again, professionals should carry out the work and adhere to the best available techniques.

Consultation with affected communities should be conducted. This entails that such communities should be granted access to their cultural heritage if this is applicable. Compensation for the loss of cultural heritage should only be given in extra-ordinary circumstances.

Critical cultural heritage may not be impacted on. Professionals should be used to advise on the assessment and protection thereof. Utilization of cultural heritage resources should always be done in consultation with the affected communities in

order to be consistent with their customs and traditions and to come to agreements with relation to possible equitable sharing of benefits from commercialization.

4. METHODOLOGY

4.1 Survey of literature

A survey of literature was undertaken in order to obtain background information regarding the area. Sources consulted in this regard are indicated in the bibliography.

4.2 Reference to other specialist desktop studies

Specialist studies are being commissioned. A few heritage reports are known from previous studies in the area (see later).

The geotechnical investigation undertaken by WSP for the rail design found that residual soils in the area developed from the gabbro-norites. The test pits indicated that the site was overlain with black clayey vertisol known as “black turf” with a norite horizon below. The geotechnical investigation indicated that the geology directly under the proposed site was gabbro-norites of the Rustenburg Layered Suite.

From a visual perspective, the landscape surrounding the proposed project area contains mine shafts with headgear, TSFs and a processing plant / smelter complex these existing facilities detract considerably from the otherwise natural scenery. The TSF to the west of the proposed FCRPs and processing plant / smelter complex will act as a visual barrier, shielding most of the proposed infrastructure from the view of sensitive receptors. Furthermore, sections of the railway track will be placed within cuttings and therefore will not be visible from long distances. In light of the considerable infrastructure surrounding the site, the addition of the proposed infrastructure is expected to negligibly alter the visual landscape, therefore further investigation into the resulting impacts were not pursued.

4.3 Public consultation and stakeholder engagement

This is handled by the EIP, Prime Resources. It is done in detail in accordance with Environmental practice. Details, if needed, can be obtained from them.

4.4 Physical field survey

The survey was conducted according to generally accepted HIA practices and was aimed at locating all possible objects, sites and features of cultural significance in the area of proposed development. One regularly looks a bit wider than the demarcated area, as the surrounding context needs to be taken into consideration.

If required, the location/position of any site was determined by means of a Global Positioning System (GPS)², while photographs were also taken where needed. The survey was undertaken by doing a physical survey via off-road vehicle and on foot and covered as much as possible of the area to be studied. Since certain sections were surveyed during the previous site visit for the first report, only the new areas were now surveyed (Figure 4).

The study was done during the winter, e.g. August 2020. Certain factors, such as accessibility, density of vegetation, etc. may however influence the coverage. The vegetation coverage was varied from low too high in height and with a relatively open under footing. Both the horizontal and the vertical archaeological visibility for most of the surveyed area were therefore good due to recent burning, but where the vegetation was denser to the northern the vertical and horizontal visibility was influenced negatively. However, the area is deemed to be a low risk area for containing heritage sites, due to the presence of build infrastructure in and around the surveyed area (e.g. roads, pipelines and railway tracks). The site of the proposed development is 3,5 Ha for the Plant and loading platform and 2,1 km for the Rail loop. The survey took 5 hours to complete.

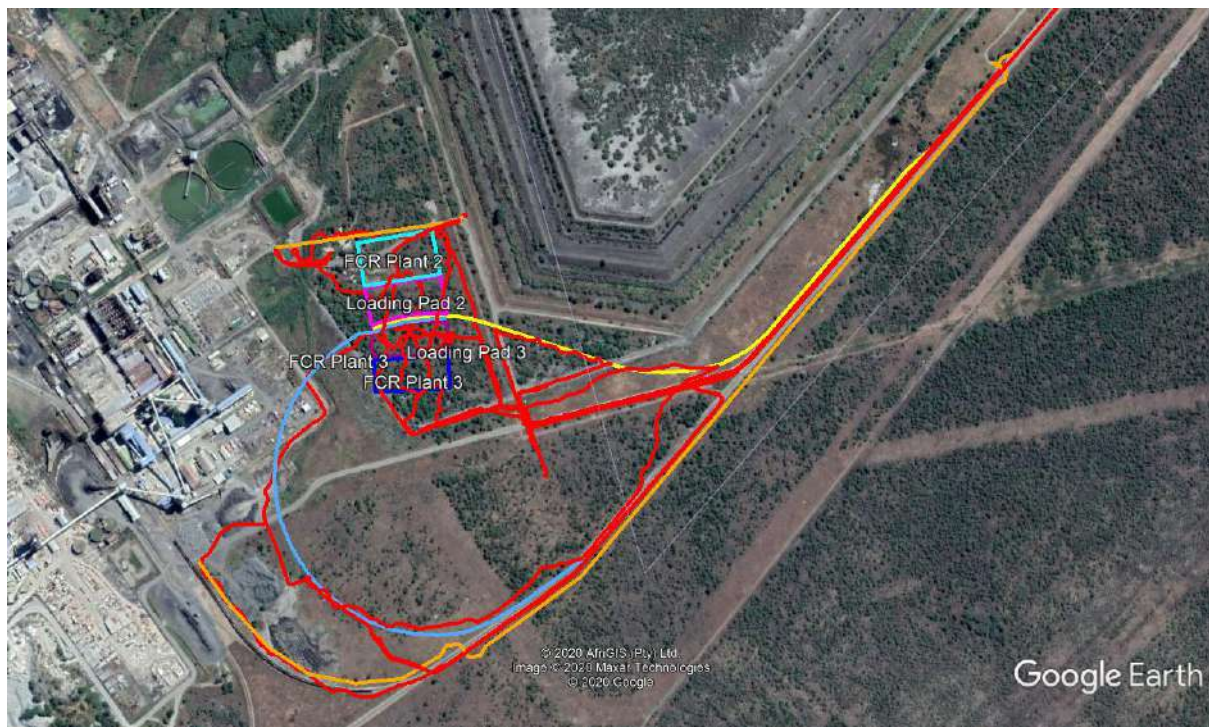


FIGURE 4: TRACK ROUTE OF THE SURVEY (RED LINES).

4.5 Documentation

All sites, objects, features and structures identified were documented according to the general minimum standards accepted by the archaeological profession. Co-ordinates

² A Garmin Oregon 550 with an accuracy factor of a few meters.

of individual localities were determined by means of the GPS. The information was added to the description in order to facilitate the identification of each locality.

4.6 Evaluation of Heritage sites

The evaluation of heritage sites is done by giving a field rating of each (see Appendix C) using the following criteria:

- The unique nature of a site
- The integrity of the archaeological deposit
- The wider historic, archaeological and geographic context of the site
- The location of the site in relation to other similar sites or features
- The depth of the archaeological deposit (when it can be determined or is known)
- The preservation condition of the site
- Uniqueness of the site and
- Potential to answer present research questions.

5. ASSUMPTIONS, GAPS, RESTRICTIONS, CONDITIONS AND LIMITATIONS

The following conditions and assumptions have a direct bearing on the survey and the resulting report:

1. Cultural Resources are all non-physical and physical man-made occurrences, as well as natural occurrences associated with human activity (Appendix A). These include all sites, structures and artifacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. Graves and cemeteries are included in this.
2. The significance of the sites, structures and artifacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects.
3. Cultural significance is site-specific and relates to the content and context of the site. Sites regarded as having low cultural significance have already been recorded in full and require no further mitigation. Sites with medium cultural significance may or may not require mitigation depending on other factors such as the significance of impact on the site. Sites with a high cultural significance require further mitigation (see Appendix C).
4. The latitude and longitude of any archaeological or historical site or feature, is to be treated as sensitive information by the developer and should not be disclosed to members of the public.
5. All recommendations are made with full cognizance of the relevant legislation.

6. It has to be mentioned that it is almost impossible to locate all the cultural resources in a given area, as it will be very time consuming. Developers should however note that the report should make it clear how to handle any other finds that might occur.
7. In this particular case the entire surveyed area has been disturbed by recent human activities. Accordingly, these areas are seen as low risk areas to reveal heritage sites due to it being almost entirely disturbed.
8. The vegetation cover in southern areas was reasonably low and open, which had a positive effect on archaeological visibility. Denser vegetation covers the northern area, which had a negative effect on both the horizontal and the vertical archaeological visibility.
9. At the sites the entire area could not be accessed due to safety concerns (locked gates and high fences). However, the entire area here is disturbed giving it an extremely low chance of concealing heritage sites.

6. DESCRIPTION OF THE PHYSICAL ENVIRONMENT

The surveyed area shows signs of recent human activities in the form of power lines, dirt roads, pipelines, a railway track, slimes dam, earthworks and processing plant all associated with the processes of mining (Figure 5-11). Where the area is less disturbed the vegetation varied in height, in the southern part it was open due to recent bushfires (Figure 12) and denser to the north (Figure 13). The vegetation cover consists of mostly endemic grasses shrubs and trees (Figure 14).

The topography of the area is reasonably flat, with loose and sandy soil. No rivers or outstanding natural features were present.



FIGURE 5: POWER LINE IN THE SOUTH OF THE SURVEYED AREA.



FIGURE 6: INTERSECTING DIRT ROAD NORTH OF PROPOSES LOADING PAD AREA.



FIGURE 7: PIPELINES TO THE SOUTH AND WEST OF PROPOSES LOADING PAD AREAS.



FIGURE 8: RAILWAY TRACK ALONG THE SURVEYD AREA.



FIGURE 9: SLIMES DAM EAST OF THE PROPOSED AREA.



FIGURE 10: EARTHWORKS NORTH IN THE SURVEYED AREA.



FIGURE 11: PROSSESING PLANT NORTH WEST OF SURVEYED AREA.



FIGURE 12: GENERAL ENVIROMENT OF SOUTHERN SURVEYED AREA AFFECTED BY BUSHFIRE



FIGURE 13: GENERAL ENVIROMENT OF NORTHERN SECTION OF THE SURVEYED AREA.



FIGURE 14: ENDEMIC PLANT SPECIES IN THE SURVEYED AREA.

7. HISTORICAL CONTEXT

No sites of cultural heritage significance were located during the survey. Some background information is given in order to place the surveyed area in a broad historical and geographical context and to contextualize possible finds that could be unearthed during construction activities.

A few heritage reports were written in the Swartklip area, but a few were done in the Northam area. Most of these indicated that no sites were identified. The exception are two reports, one done at the nearby Northam Platinum Mine and one at the Northam Magnetite Mine (SAHRIS database; Archaetnos' database). The information is included below.

7.1 Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates are relative and only provide a broad framework for interpretation. The division for the Stone Age according to Korsman & Meyer (1999: 93-94) is as follows:

Early Stone Age (ESA) 2 million – 150 000 years ago
Middle Stone Age (MSA) 150 000 – 30 000 years ago
Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

The closest known Stone Age site in the vicinity of Northam is a number of Late Stone Age sites in the Magaliesberg Mountains, which lies approximately 100 km to the south. A rock art site is known to the northeast. Rock engravings are found to the south and east of Rustenburg (the latter lying about 100 km to the south of the surveyed area). These date back to the Late Stone Age (Bergh 1999: 4-5).

No natural shelter exists in the surveyed area, but the mountains to the north-east may have sheltered Stone Age people. The low hills in and around the surveyed area also may have provided shelter. The area probably provided good grazing and the abundance of water make it very likely that Stone Age people may have utilized the surroundings for hunting purposes.

7.2 Iron Age

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D.
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however, indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.

Middle Iron Age (MIA) 900 – 1300 A.D.

Late Iron Age (LIA) 1300 – 1840 A.D.

Many Late Iron Age sites have been identified in the area around the towns of Rustenburg, Koster and Groot Marico as well as in the Waterberg Mountains. This however excludes the surveyed area (Bergh 1999: 7-8). During earlier times the area was inhabited by Tswana groups, namely the Fokeng and Kweni. These people fled from Mzilikazi during the Difaquane, but later on returned (Bergh 1999: 9-11).

Three large Iron Age sites were found at the Northam Zondereinde mine during an earlier survey. This however lies approximately 16 km north-east of the surveyed area (Archaeos' database).

This coupled with a suitable environment proves that these people utilized this area as it would have provided good grazing and water for livestock. There also is ample building material.

7.3 Historical Age

The Historical Age started with the first recorded oral histories in the area. It includes the in-migration of people that were able to read and write. It includes the moving into the area of people that were able to read and write. This era is sometimes called the Colonial era or the recent past.

Due to factors such as population growth and a decrease in mortality rates, more people inhabited the country during the recent historical past. Therefore, and because less time has passed, much more cultural heritage resources from this era have been left on the landscape. It is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are needed in order to determine whether these indeed have cultural significance. Factors to be considered include aesthetic, scientific, cultural and religious value of such resources.

Early travelers have moved through this part of the Northwest and Limpopo Provinces. The first of these was the expedition of Dr. Andrew Cowan and Lt. Donovan in 1808. They were followed by Robert Scoon and William McLuckie in 1827 and 1829 and Dr. Robert Moffat and Reverend James Archbell in 1829 (Bergh 1999: 12, 117-119).

Hume again moved through this area in 1830 followed by the expedition of Andrew Geddes Bain in 1831. After them came Dr. Andrew Smith in 1835 (Bergh 1999: 13, 120-121). Hume again moved through the area with Scoon in 1835. In 1836 William Cornwallis Harris visited the area. The well-known explorer Dr. David Livingston passed through this area in 1847 (Bergh 1999: 13, 119-122).

In 1837 the Voortrekkers also moved through the Swartruggens area (Bergh 1999: 11). During this year a Voortrekker commando moved out against Mzilikazi and was engaged in a battle with his impi to the north of Swartruggens. The area surveyed was inhabited by white settlers between 1841 and 1850 (Bergh 1999: 14-15).

Historical structures, such as farm houses and infrastructure relating to these times, may therefore be found in the area. It also is possible to find graves from this era. In fact, two grave sites were identified at the Northam Zondereinde Mine and others at the Northam Magnetite Mine. At the latter remains of historical dwellings and a farm yard with heritage significance were also identified (Archaeos' database), but again this is outside of the current development.

8. SITES IDENTIFIED DURING THE SURVEY

No sites were identified.

9. CONCLUSION AND RECOMMENDATIONS

The survey of the indicated areas was completed successfully. As indicated no sites of cultural heritage significance were identified.

The following is recommended:

- This report is seen as ample mitigation, since nothing of heritage value were identified in the surveyed area.
- The proposed development may continue.
- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.
- In This regards the following 'Chance find Procedure' should be followed:
 1. Upon finding any archaeological or historical material all work at the affected area must cease.
 2. The area should be demarcated in order to prevent any further work there until an investigation has been completed.
 3. An archaeologist should be contacted immediately to provide advice on the

- matter.
4. Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
 5. SAHRA's APM Unit may also be notified.
 6. If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
 7. The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
 8. Work on site will only continue after removal of the archaeological/ historical material was done.

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APPENDIX A

DEFINITION OF TERMS:

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location.

Structure: A permanent building found in isolation or which forms a site in conjunction with other structures.

Feature: A coincidental find of movable cultural objects.

Object: Artifact (cultural object).

(Also see Knudson 1978: 20).

APPENDIX B

DEFINITION/ STATEMENT OF HERITAGE SIGNIFICANCE:

Historic value:	Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.
Aesthetic value:	Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
Scientific value:	Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period
Social value:	Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.
Rarity:	Does it possess uncommon, rare or endangered aspects of natural or cultural heritage.
Representivity:	Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province region or locality.

APPENDIX C

SIGNIFICANCE AND FIELD RATING:

Cultural significance:

- Negligible – The site has no heritage significance, although it may be older than 60 years.
- Low - A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings. A site with minimal importance which is decreased by its bad state of decay.
- Low-Medium - A site of lesser importance, which is increased by a good state of preservation and contextual importance (e.g. a specific community).
- Medium - Any site, structure or feature being regarded less important due to a number of factors, such as date and frequency. Also any important object found out of context.
- Medium-High - A site that has high importance due to its age or uniqueness, but which decreases due to its bad state of decay.
- High - Any site, structure or feature regarded as important because of its age or uniqueness. Also any important object found within a specific context.
- Very High - A site of exceptional importance due to its age, uniqueness and good state of preservation.

Heritage significance:

- Grade I Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III Other heritage resources of local importance and therefore worthy of conservation

Field ratings:

National Grade I significance: The site should be managed as part of the national estate, should be nominated as Grad I site, should be maintained in situ with a protected buffer zone and a CMP must be recommended. Score above 50.

Provincial Grade II significance: The site should be managed as part of the provincial estate, should be nominated as Grade II site, should be maintained in situ with a protected buffer zone and a CMP must be recommended. Score between 40 and 50.

Local Grade IIIA: The site should be included in the heritage register and not be mitigated (high significance), should be maintained in situ with a protected buffer zone and a CMP must be recommended. Score between 37 and 40.

Local Grade IIIB: The site should be included in the heritage register and may be mitigated (high/ medium significance). Mitigation is subject to a permit application lodged with the relevant heritage authority. Score between 6 and 36.

Local Grade IIIC: The description in the phase 1 heritage report is seen as sufficient recording (low significance) and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation. Score below 5.

APPENDIX D

PROTECTION OF HERITAGE RESOURCES:

Formal protection:

National heritage sites and Provincial heritage sites – grade I and II

Protected areas - an area surrounding a heritage site

Provisional protection – for a maximum period of two years

Heritage registers – listing grades II and III

Heritage areas – areas with more than one heritage site included

Heritage objects – e.g. archaeological, palaeontological, meteorites, geological specimens, visual art, military, numismatic, books, etc.

General protection:

Objects protected by the laws of foreign states

Structures – older than 60 years

Archaeology, palaeontology and meteorites

Burial grounds and graves

Public monuments and memorials

APPENDIX E

HERITAGE IMPACT ASSESSMENT PHASES

1. Pre-assessment or scoping phase – establishment of the scope of the project and terms of reference.
2. Baseline assessment – establishment of a broad framework of the potential heritage of an area.
3. Phase I impact assessment – identifying sites, assess their significance, make comments on the impact of the development and makes recommendations for mitigation or conservation.
4. Letter of recommendation for exemption – if there is no likelihood that any sites will be impacted.
5. Phase II mitigation or rescue – planning for the protection of significant sites or sampling through excavation or collection (after receiving a permit) of sites that may be lost.
6. Phase III management plan – for rare cases where sites are so important that development cannot be allowed.

Appendix 7



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prime | resources
environmental
consultants

SIYANDA BAKGATLA PLATINUM MINE

BASELINE SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED FINE CHROME RECOVERY PLANTS AND ASSOCIATED RAILWAY TRACK EXTENSION AT THE SIYANDA BAKGATLA PLATINUM MINE

OCTOBER 2020

PREPARED FOR



Siyanda Bakgatla Platinum Mine
12th Floor Nedbank Building
81 Main Street
Johannesburg

Declaration of Independence

Prime Resources is an independent environmental consulting firm with no vested interest in the proposed project other than to fulfil the contract for delivery of specialised services including, among others, those stipulated in the terms of reference.

We, Stephen Tarlton and Gené Main, in our capacity as specialist consultants, hereby declare that we –

- Act as independent consultants;
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Have not, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998);
- Will provide the competent authority with access to all information at our disposal regarding the application, whether such information is favorable to the applicant or not;
- Based on information provided to me by the project proponent and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional ability;
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field; and
- Undertake to have my work peer reviewed on a regular basis by a competent specialist.



Report Compiled by:	Reviewed by:
<p>Stephen Tarlton Senior Environmental Scientist Pr.Sci.Nat.: 115011</p> 	<p>Gené Main Principal Environmental Consultant EAPASA Registered EAP: 2019/1257 Pr.Sci.Nat.: 400370</p> 

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Appendix 10: Screening Report: MASA Chrome Rail Extension & Plant Expansion	

LIST OF ACRONYMS

DEFF	Department of Environment, Forestry and Fisheries
DMRE	Department of Mineral Resources and Energy
ECA	Environmental Conservation Act No. 73 of 1989
E-GIS	Environmental Geographical Information Systems
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
FCRP	Fine Chrome Recovery Plant
MPRDA	Mineral and Petroleum Resources Development Act No. 28 of 2002
NEMA	National Environmental Management Act No. 107 of 1998
NWA	National Water Act No. 36 of 1998
TFR	Transnet Freight Rail
TSF	Tailings Storage Facility

1 INTRODUCTION

Siyanda Bakgatla Platinum Mine (SBPM) is in the process of applying for Environmental Authorisation for two Fine Chrome Recovery Plants (FCRPs), as well as the associated extension of a railway track.

SBPM has appointed Prime Resources (Pty) Ltd (Prime Resources) to conduct the scope associated with the application for the Environmental Authorisations of the project. As per GN961 of 2019¹, an Environmental Screening Report was produced for the application using the web-based screening tool. The findings of the environmental screening process identified a number of sensitive themes and proposed a specialist studies to be undertaken in the investigation and assessment of possible impacts to the environment.

This report takes into account the proposed list of specialist assessments that were identified by the Environmental Screening Report. Focus has been applied primarily on those themes having Medium or higher sensitivity and providing a compliance statement. It should be noted that where the screening tool identified the themes as having Low sensitivity, equal attention was paid to ensure that the tool accurately reflected the low sensitivity on the ground. This has been described further within the baseline section of the Basic Assessment Report (BAR).

1.1 Terms of Reference

Section 2 of GN648² of 2019 indicates that the Initial Site Sensitivity Verification must be undertaken through the use of (a) a desktop analysis, using satellite imagery; and (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.

The outcome of the Initial Site Sensitivity Verification must be recorded in the form of a report that (a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web based environmental screening tool; (b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and (c) is submitted together with the relevant reports prepared in accordance with the requirements of the NEMA EIA Regulations (2014).

1.2 Details of authors

Prime Resources is a specialist environmental consulting firm providing environmental and related services, and was established in 2003. Prime Resources was founded by Peter Theron (PrEng, SAImm), who has over 27 years' experience in the field of environmental science and engineering. Stephen Tarlton, an Environmental Scientist, has a M.Sc. and is a registered Professional Natural Scientist (SACNASP) with eight years' experience in the field of environmental management. His experience includes environmental assessment and management in the mining, construction, waste and water sectors. Gené Main, Principal Consultant, has a M.Sc. (Botany) from the University of the Western Cape and 13 years' experience in the

¹ Notice of the Requirement to Submit a Report Generated by the National Web Based Environmental Screening Tool in Terms of Section 24(5)(h) of the National Environmental Management Act, 1998 (Act No 107 of 1998) and Regulation 16(1)(B)(V) of the Environmental Impact Assessment Regulations, 2014, as Amended

² General Requirements for Undertaking an Initial Site Sensitivity Verification

field of environmental science. Gené is a registered Professional Natural Scientist (SACNASP) and a registered Environmental Assessment Practitioner (EAP). Gené has reviewed this report for accuracy and consistency.

2 PROJECT DESCRIPTION

SBPM is proposing the expansion of its current chrome beneficiation operation by installing two Fine Chrome Recovery Plants (FCRPs) and extending the existing railway to facilitate the transport of the final product. The proposed expansion project is located on the border of the North West and Limpopo Provinces, near the town of Swartklip. The proposed location of these facilities has been determined by the location of the existing railway line and other related processing infrastructure. All components of this expansion project will occur within the boundaries of the SBPM (Figure 1).

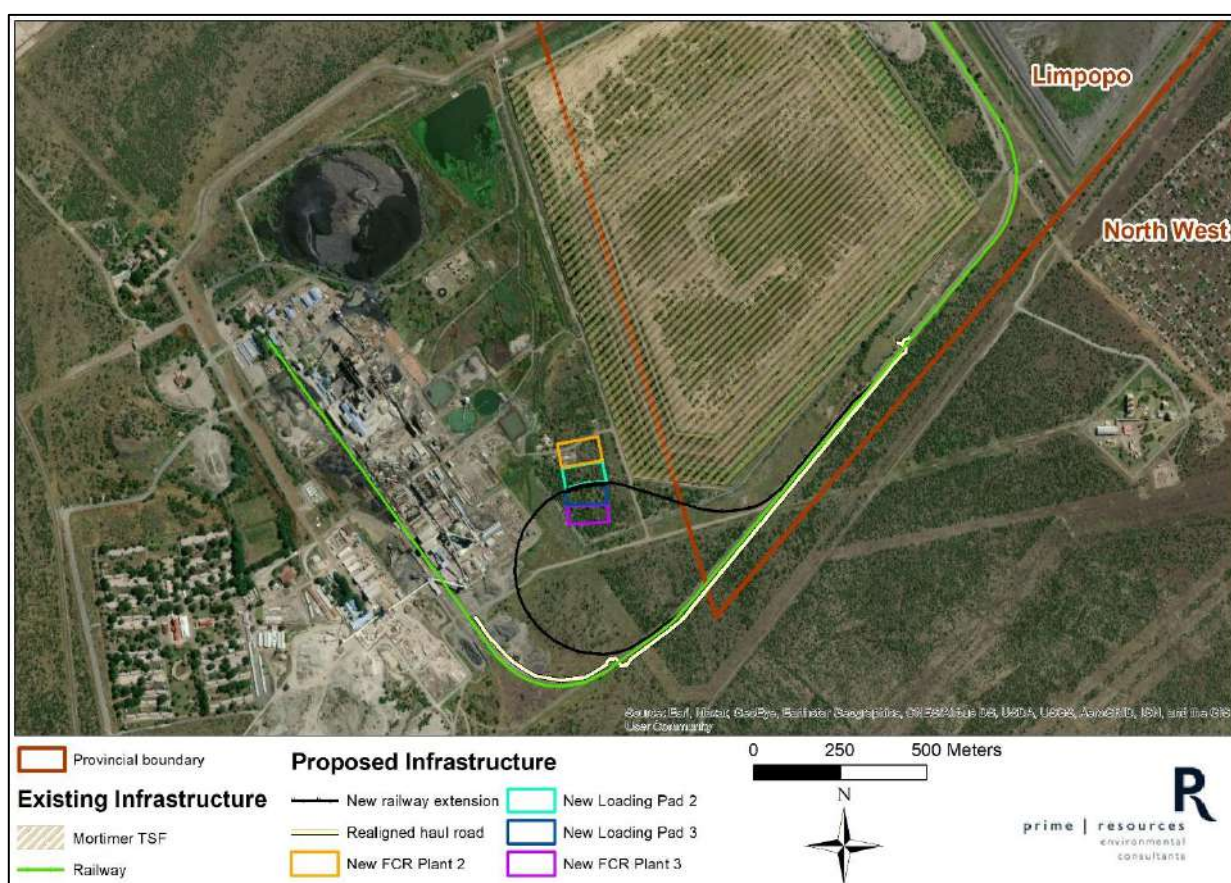


Figure 1: Proposed project layout, showing balloon loop of railway track and proposed loading bays associated with the FCRPs

3 METHODOLOGY

Using the requirements outlined above, motivations for the level of investigation into various sensitivity themes and the need for further specialist assessment is discussed.

3.1 Desktop site review

Geographical data was sourced from the Department of Environmental Affairs (DEA) Environmental Geographical Information Systems (E-GIS), the South African National Biodiversity Institute's (SANBI) Biodiversity GIS spatial datasets, the Department of Agriculture, Forestry and Fisheries (DAFF) ICT Service Strategy and Systems and the spatial datasets provided by Google and Microsoft to assess the expected sensitivity. Existing surface geology maps were also consulted.

3.2 Site photographs

Photographs of the site were provided by WSP on 4 August 2020 (as taken on 11 May 2020). These photographs were used to assess the current status of the site and have been included as evidence as required by GN648 of 2019.

4 ENVIRONMENTAL SENSITIVITY

4.1 Sensitive themes

The national web-based environmental screening tool identified the following sensitive themes in the Environmental Screening Report (Appendix 10).

Table 1: Environmental sensitivity of the site as identified in the Environmental Screening Report

Theme	Predicted Sensitivity	Verification method
Agriculture	Medium	Desktop and visual confirmation
Aquatic biodiversity	Low	Desktop and visual confirmation
Archaeology and cultural heritage	High	<i>Specialist Archaeological and Cultural Heritage Impact Assessment</i>
Palaeontology	<i>Not predicted</i>	Desktop screening confirmation
Civil aviation	Medium	Desktop and visual confirmation
Plant species	Low	Desktop and visual confirmation
Defence	Low	Desktop and visual confirmation
Terrestrial biodiversity	Very high	<i>Specialist Terrestrial Biodiversity Impact Assessment</i>
Animal species	Medium	
Landscape/Visual Impact Assessment	<i>Not predicted</i>	Desktop and visual confirmation
Geotechnical Assessment	<i>Not predicted</i>	Desktop and visual confirmation

This report incorporates a summary of the Archaeological and Cultural Heritage Impact Assessment and Terrestrial Biodiversity Impact Assessment, as compiled by independent specialists. The specialist reports are attached as Appendix 9.2 and 9.3 (respectively) to the report.

It also includes a comment on each of the other sensitive themes as identified in the Environmental Screening Report.

5 RESULTS AND DISCUSSION

5.1 Agriculture

The proposed site for the FCRPs, loading bays and railway extension is located between a TSF, a processing plant / smelter complex, process water dams and ponds, roads and railways. Within the proposed site, there are existing pipelines, haul roads and service roads. These facilities and current land use are not considered in the Environmental Screening Report (refer to Figure 1 and Figure 2).

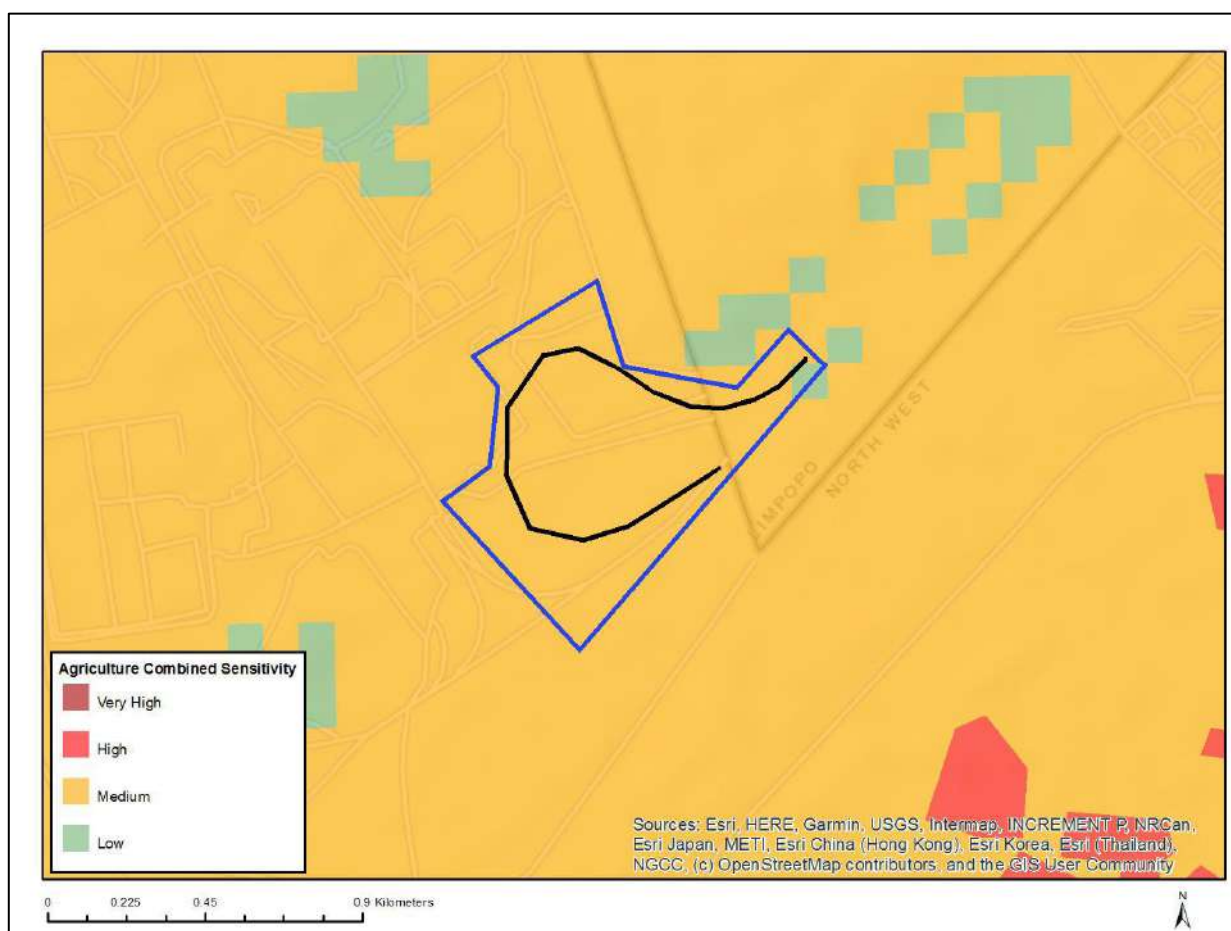


Figure 2: Agricultural sensitivity of the proposed site (as per the Environmental Screening Report)

The soil associated with the (Dwaalboom Thornveld), is described in VegMap (2016) as vertic, black ultramafic clays (which swell when wet and shrink when dry). The clay content of this soil type may result in limited primary production for some plants and therefore the general agricultural land use in this vegetation type is cattle grazing, resulting in a *medium agricultural sensitivity*. As the site it is situated close to industrial processes and moving heavy machinery (Figure 3), grazing is not a compatible land use as animals are likely to be injured.

The small extent of the area as well as the proximity to surrounding land uses of the proposed site result in the site **not being considered to be feasible or compatible with agriculture**.



Figure 3: Haul road and vehicles on and surrounding the project area

5.2 Landscape/visual

The landscape surrounding the proposed project area contains mine shafts and headgear, TSFs and the processing plant / smelter complex with existing rail network. The community of Sefikile is expected to be the main sensitive visual receptor. The area is already considerably impacted on with mining infrastructure and electrical transmission lines which surround the proposed site (Figure 4). Some natural scenery does exist but it is unable to obstruct the view of the existing mining infrastructure (Figure 5 and Figure 6). Furthermore, the 400 kV Medupi – Spitskop transmission line which runs parallel to the 132 kV Spitskop – Segoditshane transmission line considerably impacts the viewshed, detracting from the scenery over a considerable distance.

Through the desktop investigation and site confirmation, the existing infrastructure surrounding the proposed site resulted in a low visual sensitivity. Furthermore, the proposed infrastructure will have a comparably low height and therefore, will minimally alter the visual landscape further.



Figure 4: View of the proposed site from the vantage point of Sefikile to the southeast of the site (Google, Image captured 2012)



Figure 5: Existing mine-related infrastructure with a large viewshed (photo facing west)



Figure 6: Tailings Storage Facility offering a visual absorption to the north and east of the proposed site (photo facing east)

5.3 Archaeological and cultural heritage

As the risk of disturbing objects is unknown, the precautionary approach has been taken and a **specialist assessment was undertaken** (Appendix 9.2). The heritage aspects relating to the construction within a protected area was also addressed by the heritage specialist.

The field survey was undertaken in August 2020 to identify objects, sites and features of cultural significance in the proposed project site. The surveyed area was deemed to be a low-risk area for containing heritage resources due to the presence of built infrastructure such as dirt roads, pipelines, railway tracks, powerlines, slimes dam, earthworks and processing plant all associated with mining. No sensitive features were identified.

5.4 Palaeontology

According to the geological map for the project (Figure 7) and confirmed by the geotechnical investigation for the project, the proposed site is underlain with gabbro-norites of the Rustenburg Layered Suite. Norite is a mafic intrusive igneous rock. Therefore, it is highly unlikely that it would contain fossils contributing to South Africa's palaeontological heritage and follows that the palaeontology sensitivity is considered "insignificant/zero" (Figure 8). There is a slight possibility that fossils could be present in Quaternary alluvial deposits present in low-lying areas however, as stated above the site is predominantly on expansive soils which are unlikely to preserve fossils due to their dynamic nature.

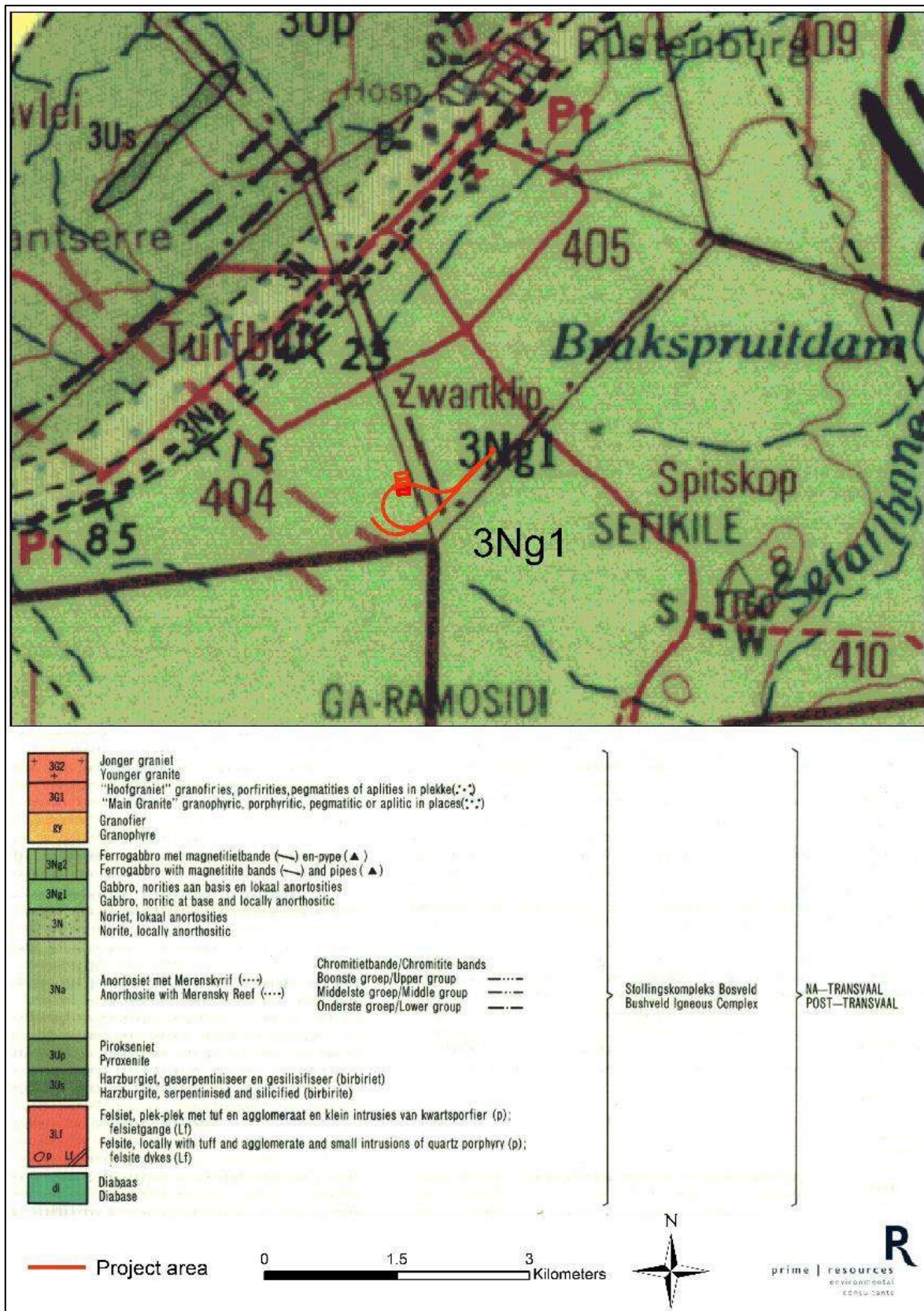


Figure 7: Surface geology underlying the site

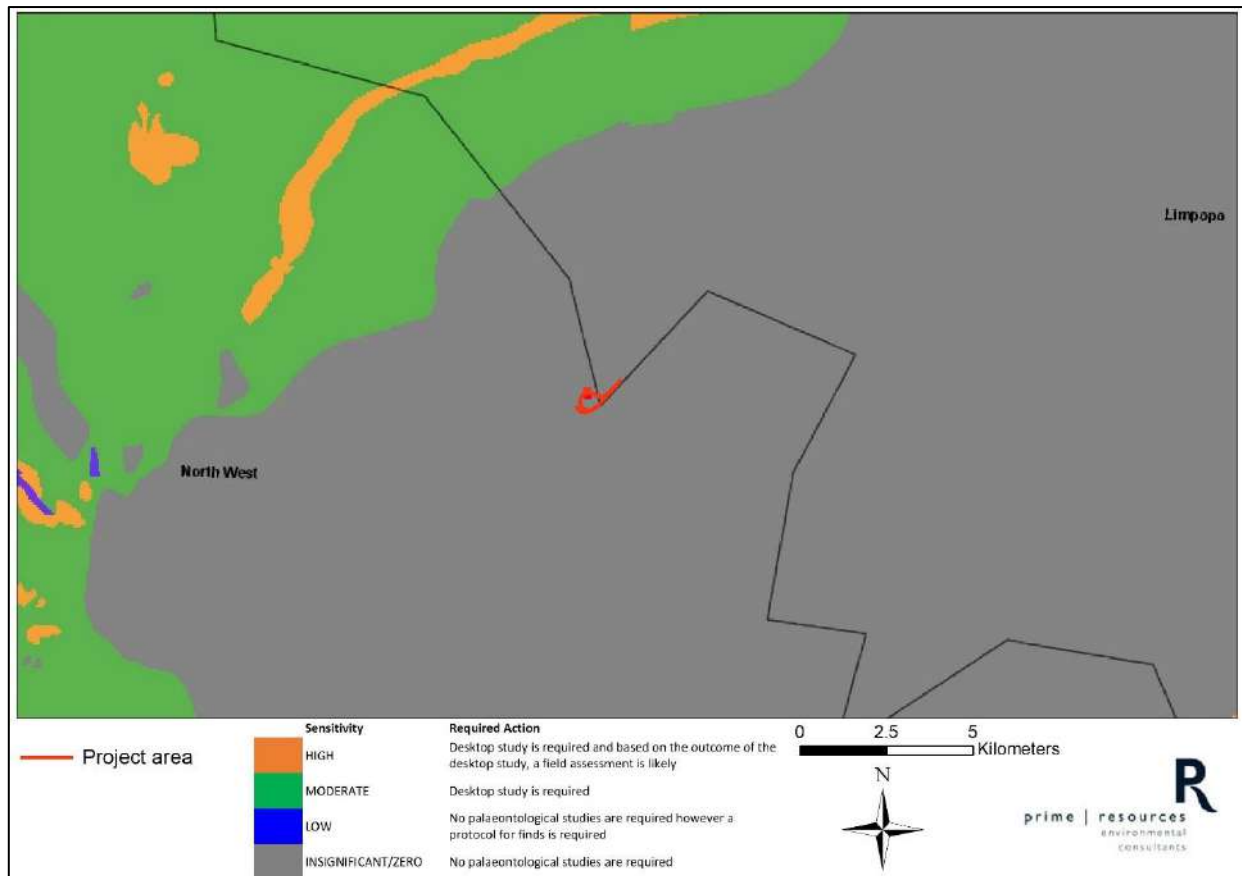


Figure 8: Palaeontological sensitivity of the area

5.5 Terrestrial biodiversity and animal species

Portions of the proposed railway track extension are located in the Rustenburg Platinum Mines (Union Section) Private Nature Reserve (Figure 9) and within the geographic range of a sensitive, vulnerable faunal species.

From a visual assessment the Private Nature Reserve appears to comprise of TSFs and other mining and civil infrastructure, and contributes very little to ecological conservation of species. Desktop research indicates that a sensitive faunal species has an extensive range and is not commonly associated with habitat types identified in the proposed project footprint. A terrestrial ecologist was appointed to confirm the conservation value of the area to be developed in terms of its ecological contribution. A site visit was undertaken by the specialist and a Terrestrial Ecological Impact Statement compiled (Appendix 9.3).

The Terrestrial Ecological Impact Statement (STS, 2020; Appendix 9.3) confirmed that:

- The habitat has already been disturbed and degraded due to disturbances from the mine activities and ancillary services such as railways and roads
- The vegetation and plant species identified on the site **confirmed** the national web-based environmental screening tool's plant sensitivity classification of low
- The faunal composition is **not** anticipated to be of significant conservation value due the lack of habitat connectivity, degraded habitat and past and mining related impacts

- The habitat was **not** considered to be suitable for the sensitive species identified by the environmental screening tool
- The Rustenburg Platinum Mines (Union Section) Private Nature Reserve comprises of an old tailings dam in various stages of rehabilitation. The protected area is **not** considered ecologically sensitive therefore the Terrestrial Biodiversity sensitivity classification of very high sensitivity was **not** supported.

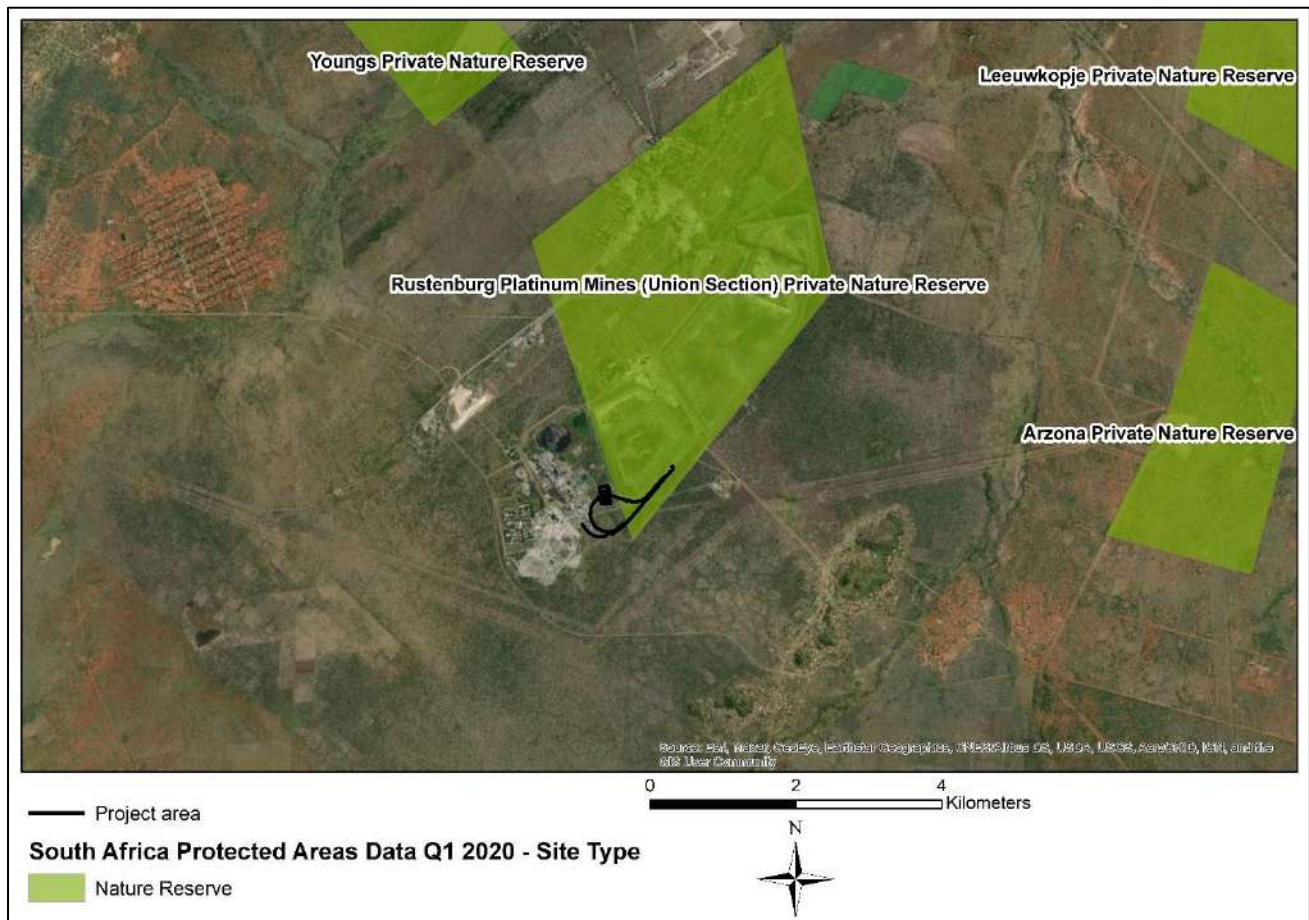


Figure 9: Protected areas in the vicinity of the proposed site

5.6 Aquatic biodiversity

The Environmental Screening Report identified two small wetlands close to the site proposed for development. However, upon inspection it is confirmed that these areas are water storage facilities associated with the processing plant / smelter complex (Figure 10). Apart from an excavated drainage channel and constructed water storage facilities, no natural aquatic habitat remains in or near the proposed project footprint.

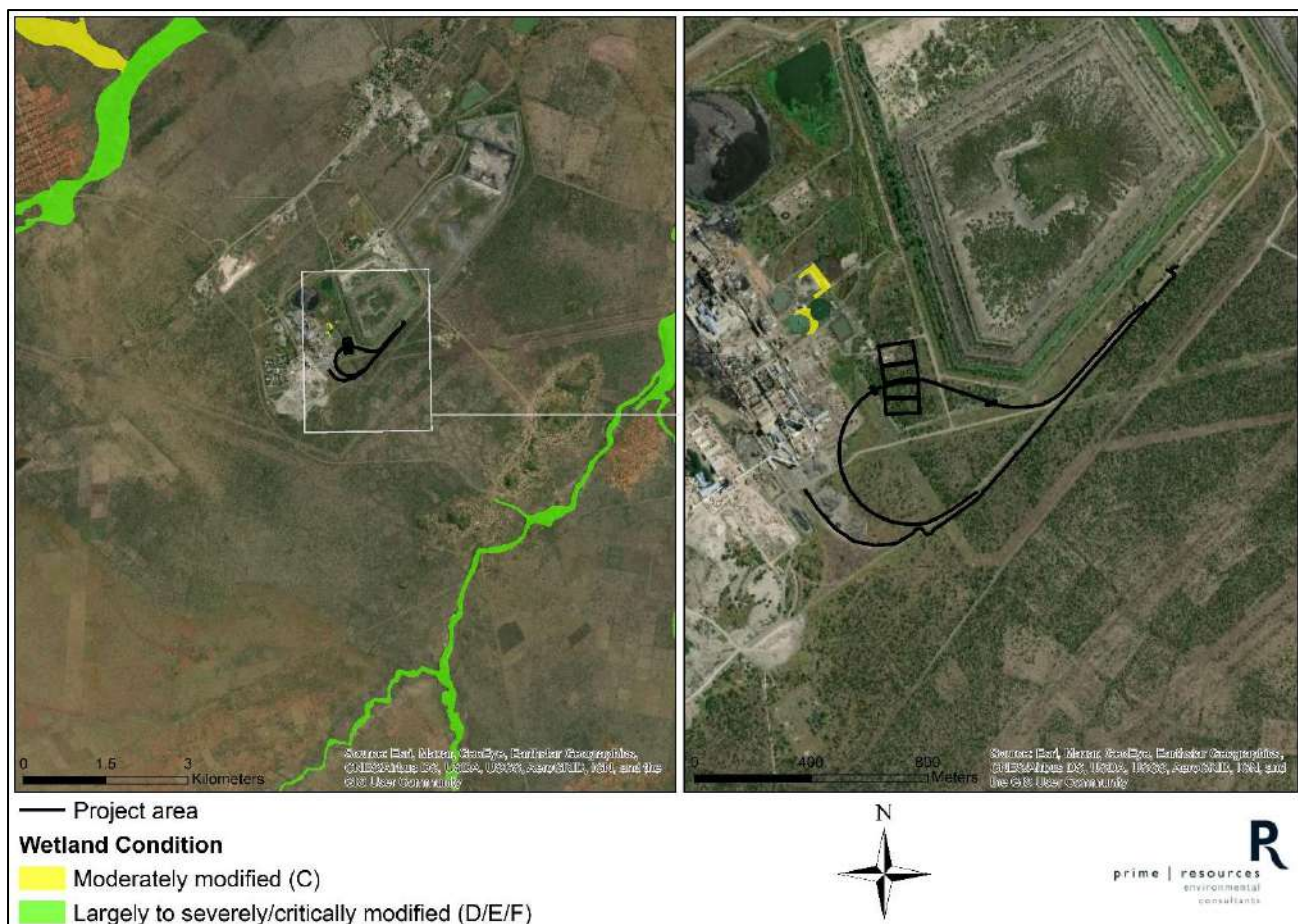


Figure 10: Aquatic habitat in the vicinity of the project area (note the two artificial wetland habitat areas identified in the screening process)

5.7 Geotechnical

A geotechnical investigation has been undertaken for the design phase of the project with the aim of confirming the conditions underlying the proposed site and identifying any problem soils or geotechnical constraints to the development of the site (Appendix 9.4). The investigation was undertaken by GaGE Consulting (Pty) Ltd and comprised of five trial pits, excavated to a maximum depth of 2.45 m below ground level (BGL). Soil samples from representative soil horizons were sent for laboratory analysis.

The geotechnical report found that the geology and ground conditions are relatively consistent throughout the site. The residual gabbro-norite, clayey soils were found to be highly expansive and together with the seasonal moisture fluctuations result in predictive heaves in excess of 100 mm. The bedrock was found to be generally shallow throughout the site, and it was recommended that the clay soils (or “black turf”) be removed up to the residual norite and replaced with suitable material.

5.8 Plant species

The Environmental Screening Report indicated that the plant species theme has low sensitivity. This was confirmed in the VegMap (SANBI, 2016) which states that the predominant vegetation type (Dwaalboom Thornveld) has low species diversity and low species endemism. The vegetation type is also considered to

be least threatened with only 14 % of it being transformed and moderately protected. The proposed project area is relatively disturbed by existing mining-related infrastructure and activities.

The Terrestrial Ecological Impact Statement (STS, 2020; Appendix 9.3) confirmed that proposed site has low sensitivity with regard to plant species and had been disturbed by previous mining activities and the proliferation of alien and invasive plant species results in further habitat disturbance and degradation.

5.9 Civil aviation

The Environmental Screening Report indicated that the civil aviation theme had medium sensitivity. However, the report does not take into account the height of the existing infrastructure in the proposed site, which would restrict the overhead movement of air traffic. Much of the existing infrastructure (including shaft headgear, TSF, smelter, power transmission lines, etc.) will all have a much higher elevation than any new infrastructure proposed in this project. Civil aviation sensitivity was therefore considered low for the specific project site because of its location within an area of tall mining-related infrastructure.

In accordance with South African Civil Aviation Technical Standards List of technical standards of 2011 (SA-CATS 139), none of the proposed structures are exceed 45 m above ground level, nor do the proposed structures exceed 150 m above the mean ground level.

6 REFERENCES

- Archætnos Culture & Cultural Resource Consultants, 2020. A Report on a Cultural Heritage Impact Assessment for the Proposed Expansion of the Masa Chrome Plants, Railway Track Extension and New Loading Pads at the Siyanda Bakgatla Platinum Mine Near Swartklip in the Limpopo And North West Provinces.
- Department of Environmental Affairs (DEA) Environmental Geographical Information Systems (E-GIS)
- GaGE Consulting, 2020. Report on the Geotechnical Investigation for a Railway Balloon Track Layout at Union Mine, Rustenburg
- Scientific Terrestrial Services (STS), 2020. Terrestrial Ecological Impact Statement Considering the Proposed Activities at the Masa Chrome Mine.

South African National Biodiversity Institute (SANBI), 2006-2018. The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors), Online, <http://bgis.sanbi.org/Projects/Detail/186>, Version 2018.

Appendix 8

**SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION OR
FOR A PART TWO AMENDMENT OF AN ENVIRONMENTAL AUTHORISATION
AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED DEVELOPMENT
FOOTPRINT ENVIRONMENTAL SENSITIVITY**

EIA Reference number:

Project name: MASA Chrome Rail Extension & Plant Expansion

Project title: Basic Assessment for MASA Plant & Rail Extension

Date screening report generated: 27/07/2020 16:33:18

Applicant: MASA Chrome Company (Pty) Ltd.

Compiler: Prime Resources (Pty) Ltd.

Compiler signature:

.....

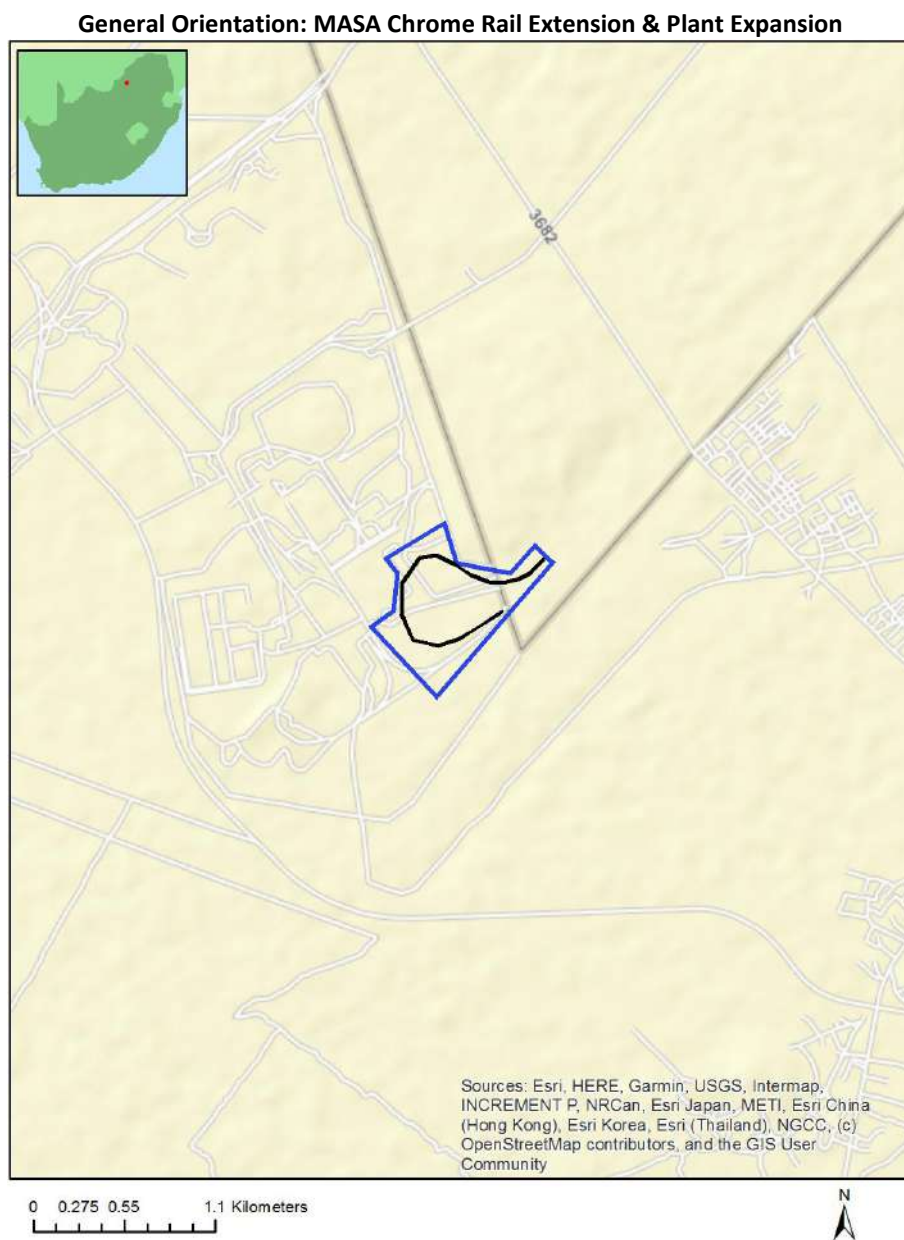


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Proposed Project Location

Orientation map 1: General location



Map of proposed site and relevant area(s)



Cadastral details of the proposed site

Property details:

No	Farm Name	Farm/ Erf No	Portion	Latitude	Longitude	Property Type
1	HAAKDOORN	6	0	25°0'37.72S	27°7'18.24E	Farm
2	TURFBULT	404	0	24°58'28.48S	27°7'37.31E	Farm
3	ZWARTKLIP	405	0	24°56'52.39S	27°9'45.91E	Farm
4	ZWARTKLIP	405	1	24°57'32.57S	27°9'8.16E	Farm Portion
5	HAAKDOORN	6	0	25°0'26.86S	27°7'18.23E	Farm Portion
6	TURFBULT	404	0	24°58'23.37S	27°7'37.22E	Farm Portion

Development footprint¹ vertices:

Footprint	Latitude	Longitude
1	24°58'45.67S	27°9'2.13E
1	24°58'45.67S	27°9'2.13E
1	24°58'45.67S	27°9'2.13E
1	24°58'44.69S	27°8'57.18E
1	24°58'44.68S	27°8'57.17E
1	24°58'44.68S	27°8'57.16E
1	24°58'44.67S	27°8'57.15E
1	24°58'44.65S	27°8'57.14E
1	24°58'44.65S	27°8'57.14E
1	24°58'40.1S	27°8'54.89E
1	24°58'40.1S	27°8'54.89E
1	24°58'40.08S	27°8'54.88E
1	24°58'40.07S	27°8'54.88E

¹ “development footprint”, means the area within the site on which the development will take place and includes all ancillary developments for example roads, power lines, boundary walls, paving etc. which require vegetation clearance or which will be disturbed and for which the application has been submitted.

1	24°58'40.07S	27°8'54.88E
1	24°58'37.68S	27°8'55.04E
1	24°58'34.47S	27°8'55.04E
1	24°58'34.46S	27°8'55.04E
1	24°58'34.44S	27°8'55.05E
1	24°58'34.44S	27°8'55.05E
1	24°58'34.44S	27°8'55.05E
1	24°58'30.02S	27°8'58.38E
1	24°58'30.02S	27°8'58.39E
1	24°58'30S	27°8'58.39E
1	24°58'30S	27°8'58.4E
1	24°58'29.99S	27°8'58.42E
1	24°58'29.99S	27°8'58.42E
1	24°58'29.44S	27°9'1.67E
1	24°58'29.43S	27°9'1.67E
1	24°58'29.44S	27°9'1.69E
1	24°58'29.44S	27°9'1.71E
1	24°58'29.44S	27°9'1.71E
1	24°58'30.98S	27°9'5.11E
1	24°58'30.98S	27°9'5.11E
1	24°58'31.75S	27°9'6.43E
1	24°58'33.08S	27°9'8.59E
1	24°58'34.27S	27°9'12.04E
1	24°58'34.47S	27°9'14.96E
1	24°58'33.71S	27°9'18.02E
1	24°58'32.6S	27°9'20.25E
1	24°58'30.36S	27°9'22.64E
1	24°58'30.36S	27°9'22.64E
1	24°58'30.35S	27°9'22.65E
1	24°58'30.34S	27°9'22.66E
1	24°58'30.34S	27°9'22.67E
1	24°58'30.34S	27°9'22.69E
1	24°58'30.34S	27°9'22.71E
1	24°58'30.34S	27°9'22.71E
1	24°58'30.35S	27°9'22.73E
1	24°58'30.36S	27°9'22.74E
1	24°58'30.37S	27°9'22.75E
1	24°58'30.38S	27°9'22.75E
1	24°58'30.39S	27°9'22.76E
1	24°58'30.41S	27°9'22.76E
1	24°58'30.42S	27°9'22.76E
1	24°58'30.43S	27°9'22.75E
1	24°58'30.44S	27°9'22.75E
1	24°58'30.45S	27°9'22.74E
1	24°58'32.69S	27°9'20.34E
1	24°58'32.7S	27°9'20.34E
1	24°58'32.71S	27°9'20.34E
1	24°58'32.71S	27°9'20.33E
1	24°58'33.83S	27°9'18.08E
1	24°58'33.83S	27°9'18.08E
1	24°58'33.83S	27°9'18.07E
1	24°58'34.6S	27°9'14.98E
1	24°58'34.6S	27°9'14.97E
1	24°58'34.6S	27°9'14.97E
1	24°58'34.6S	27°9'14.96E
1	24°58'34.39S	27°9'12.02E
1	24°58'34.39S	27°9'12.01E
1	24°58'34.39S	27°9'12E
1	24°58'33.19S	27°9'8.53E
1	24°58'33.19S	27°9'8.53E

1	24°58'33.19S	27°9'8.51E
1	24°58'33.19S	27°9'8.51E
1	24°58'31.86S	27°9'6.35E
1	24°58'31.09S	27°9'5.04E
1	24°58'29.57S	27°9'1.67E
1	24°58'30.12S	27°8'58.47E
1	24°58'34.49S	27°8'55.19E
1	24°58'37.69S	27°8'55.19E
1	24°58'40.05S	27°8'55.03E
1	24°58'44.57S	27°8'57.25E
1	24°58'45.54S	27°9'2.13E
1	24°58'44.35S	27°9'6.28E
1	24°58'42.11S	27°9'10.22E
1	24°58'40.16S	27°9'13.61E
1	24°58'39.53S	27°9'14.61E
1	24°58'39.53S	27°9'14.61E
1	24°58'39.52S	27°9'14.63E
1	24°58'39.52S	27°9'14.64E
1	24°58'39.51S	27°9'14.65E
1	24°58'39.52S	27°9'14.67E
1	24°58'39.52S	27°9'14.69E
1	24°58'39.53S	27°9'14.69E
1	24°58'39.53S	27°9'14.71E
1	24°58'39.54S	27°9'14.71E
1	24°58'39.56S	27°9'14.71E
1	24°58'39.57S	27°9'14.73E
1	24°58'39.58S	27°9'14.73E
1	24°58'39.59S	27°9'14.73E
1	24°58'39.61S	27°9'14.71E
1	24°58'39.61S	27°9'14.71E
1	24°58'39.62S	27°9'14.71E
1	24°58'39.64S	27°9'14.69E
1	24°58'40.27S	27°9'13.69E
1	24°58'42.22S	27°9'10.28E
1	24°58'44.47S	27°9'6.35E
1	24°58'44.48S	27°9'6.34E
1	24°58'44.48S	27°9'6.33E
1	24°58'45.66S	27°9'2.16E
1	24°58'45.67S	27°9'2.15E
1	24°58'45.67S	27°9'2.13E

Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

No	EIA Reference No	Classification	Status of application	Distance from proposed area (km)
1	12/12/20/2129	Solar PV	Approved	8

Environmental Management Frameworks relevant to the application



Environmental Management Framework	LINK
Waterberg District Municipality EMF	https://screening.environment.gov.za/ScreeningDownloads/EMF/WDEMF_Final_EMF_Report.pdf

Environmental screening results and assessment outcomes

The following sections contain a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmental sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected. The application classification selected for this report is:

Infrastructure | Transport Services | Rail | Private | Rail - Private.

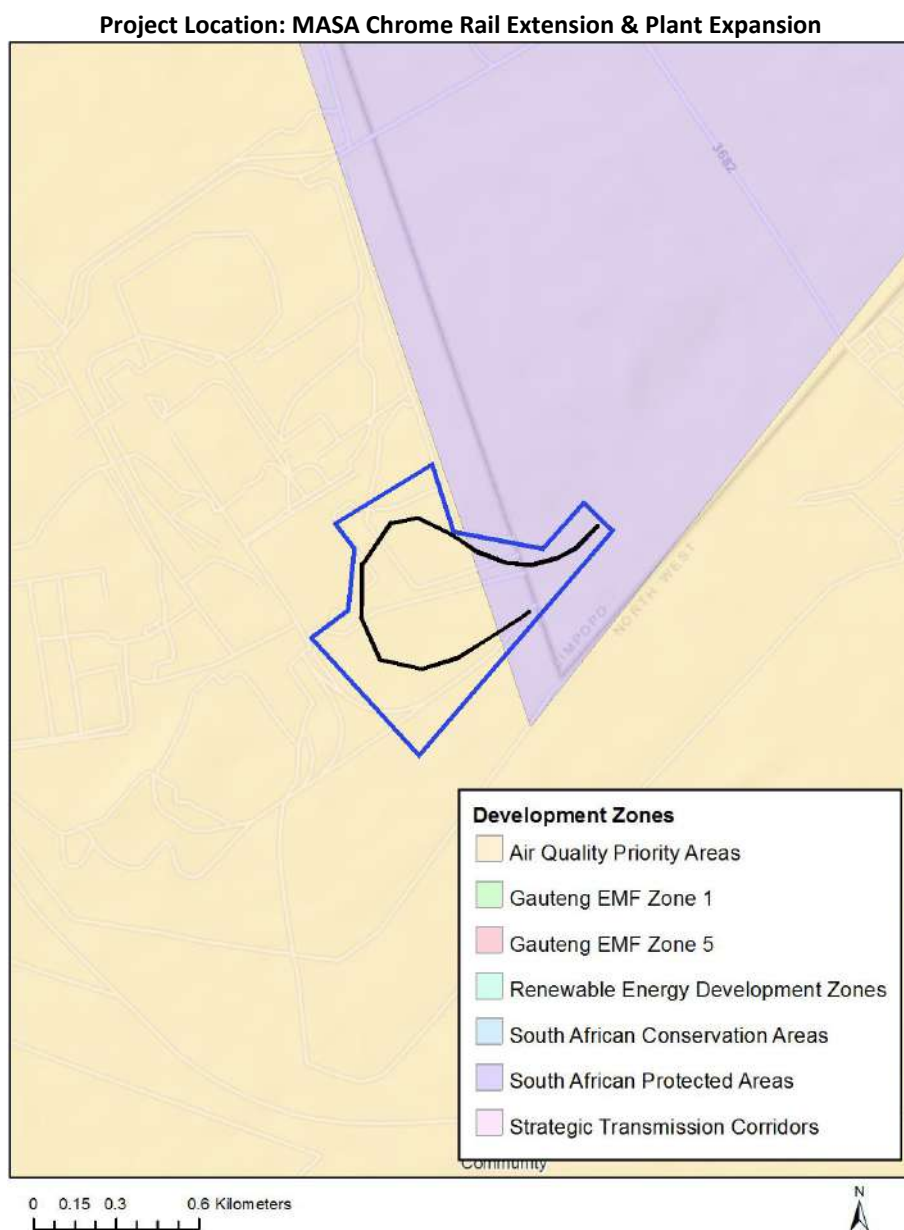
Relevant development incentives, restrictions, exclusions or prohibitions

The following development incentives, restrictions, exclusions or prohibitions and their implications that apply to this footprint are indicated below.

Incentive, restriction or prohibition	Implication
---------------------------------------	-------------

tion	
Air Quality-Waterberg-Bojanala Priority Area	https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/gg39489_nn1207a.pdf
South African Protected Areas	https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/SAPAD_IR_2019_Q4_01_Metadata.pdf

Map indicating proposed development footprint within applicable development incentive, restriction, exclusion or prohibition zones



Proposed Development Area Environmental Sensitivity

The following summary of the development footprint environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme			X	
Animal Species Theme			X	
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme			X	
Plant Species Theme				X
Defence Theme				X
Terrestrial Biodiversity Theme	X			

Specialist assessments identified

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the footprint situation.

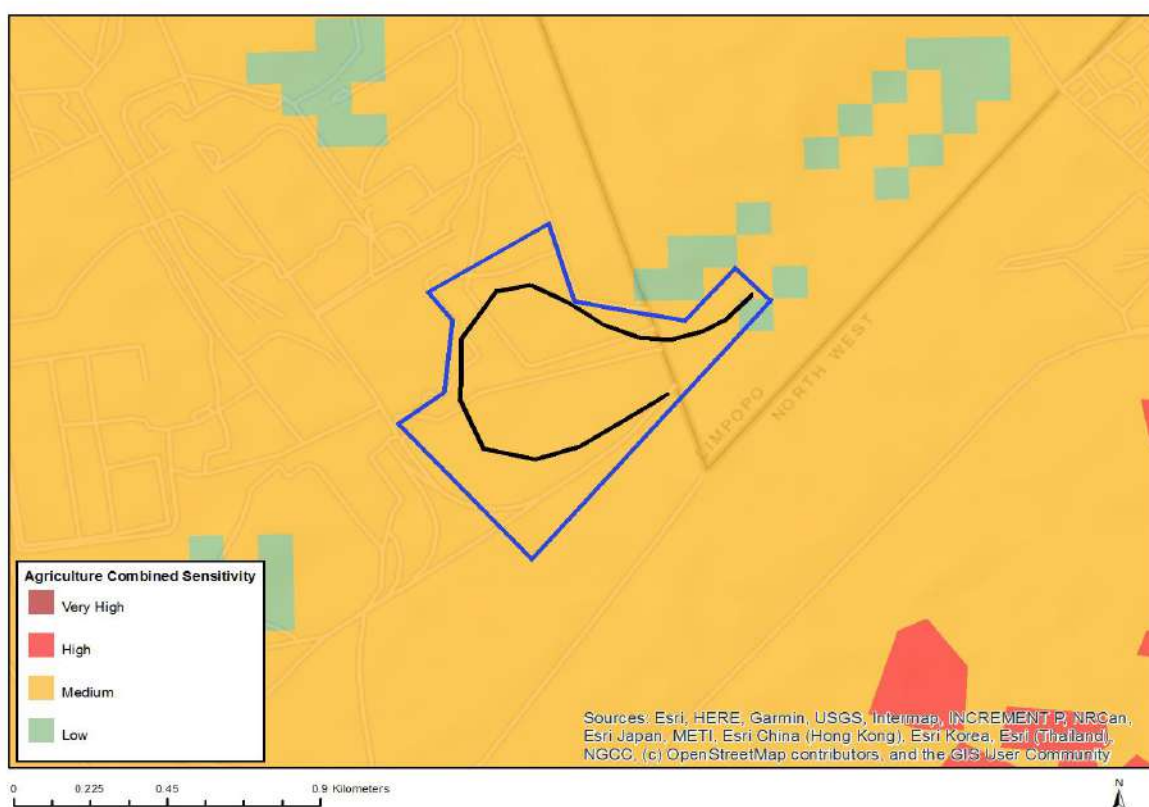
N o	Specialist assessment	Assessment Protocol
1	Agricultural Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Agriculture_Assessment_Protocols.pdf
2	Landscape/Visual Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
3	Archaeological and Cultural Heritage Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
4	Palaeontology Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf

5	Terrestrial Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf
6	Aquatic Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Aquatic_Biodiversity_Assessment.pdf
7	Geotechnical Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
8	Plant Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
9	Animal Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf

Results of the environmental sensitivity of the proposed area.

The following section represents the results of the screening for environmental sensitivity of the proposed footprint for relevant environmental themes associated with the project classification. It is the duty of the EAP to ensure that the environmental themes provided by the screening tool are comprehensive and complete for the project. Refer to the disclaimer.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

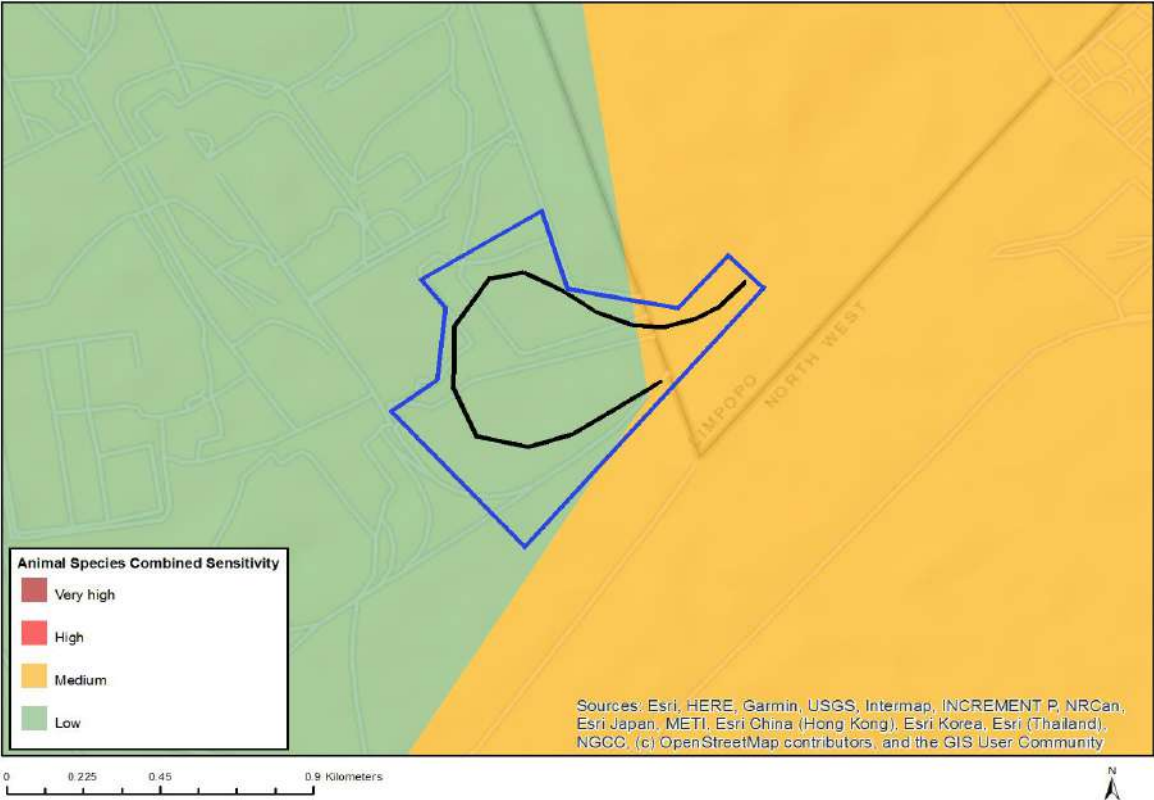


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Medium	Sensitive species 13

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY

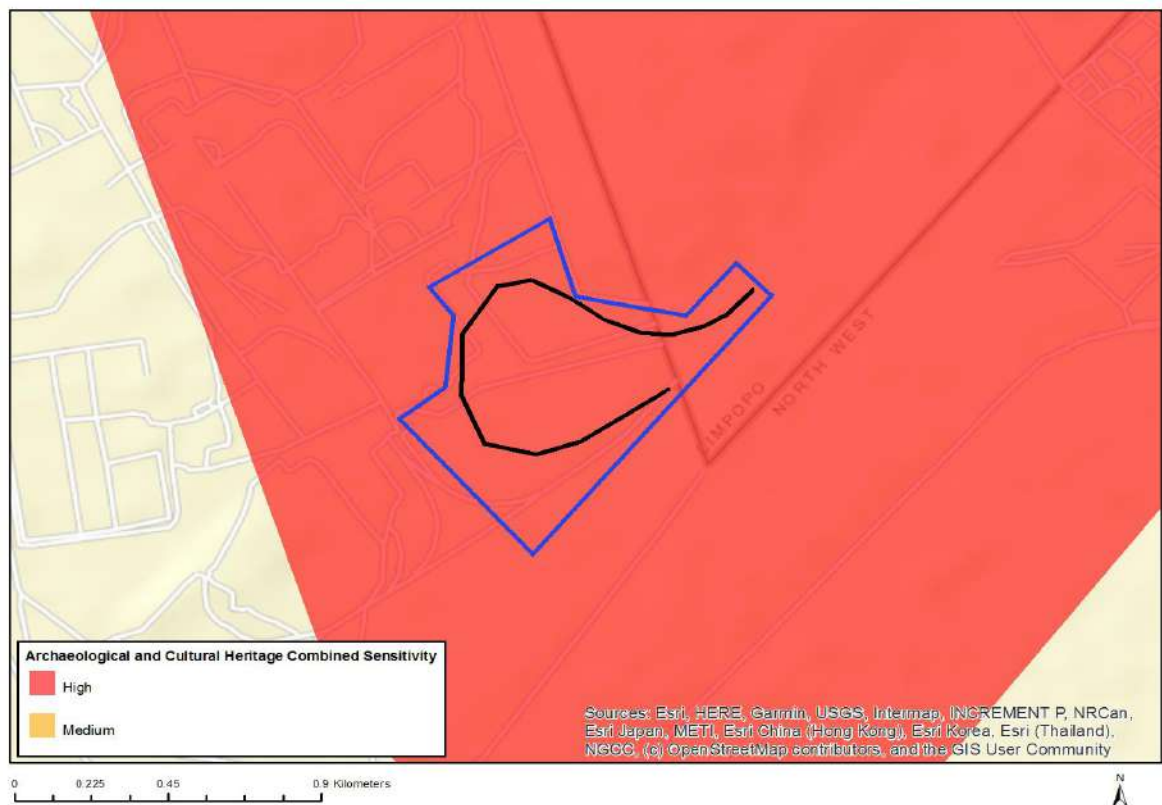


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

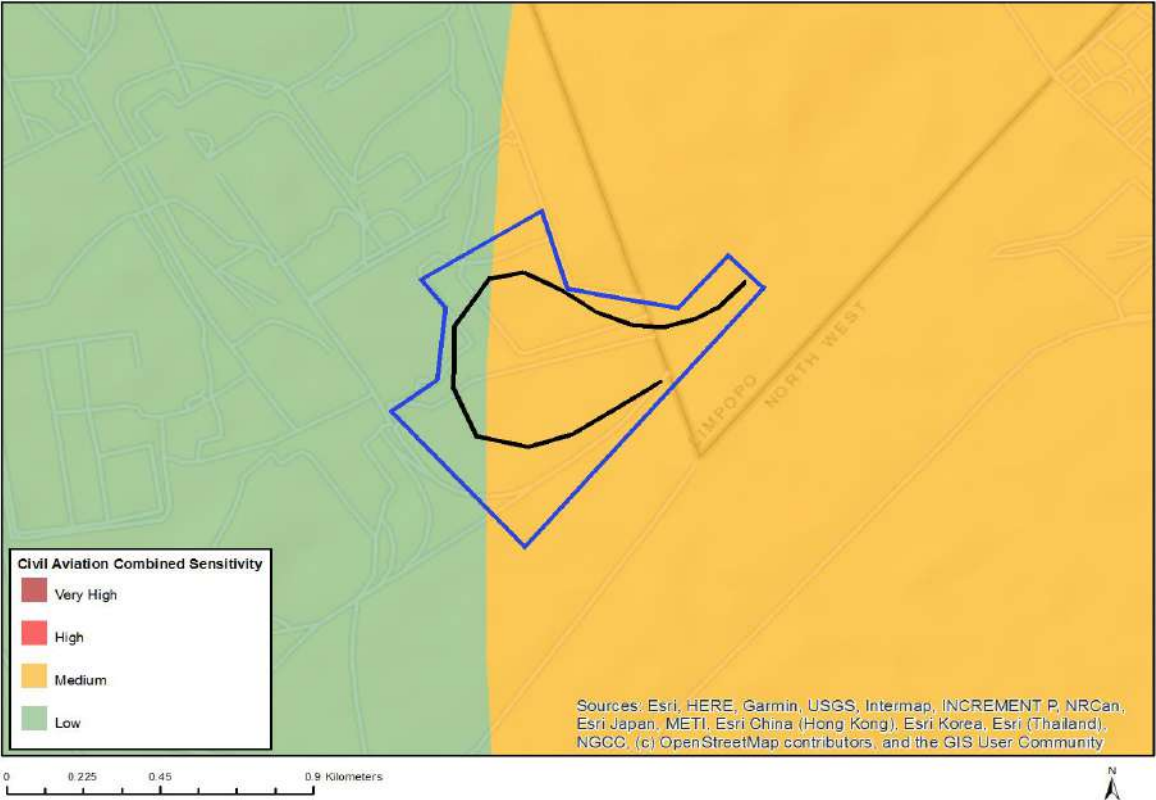


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Within protected area
High	Within 1 km of a protected area

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Medium	Between 8 and 15 km of other civil aviation aerodrome

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE DEFENCE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Rustenburg Platinum Mines (Union Section) Private Nature Reserve