63 Wessel Road Rivonia 2128 PO Box 2597 Rivonia 2128 South Africa

Telephone: +27 (0)11 803 5726 Facsimile: +27 (0)11 803 5745
Web: www.gcs-sa.biz

Proposed UG2 and Merensky Mine Expansion incorporating Waste Water Treatment Works

Environmental Impact Assessment and Environmental Management Programme (EIA/EMP)

in terms of the

National Environmental Management Act (Act No. 107 of 1998) and National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)

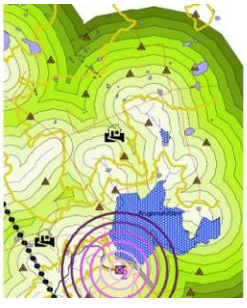
Final Report for Public Review

2 November 2013

Two Rivers Platinum

GCS Project Number: 11-639
LDEDET Reference Number: 12/1/9/2-GS26
DEA Reference Number: 12/9/11/L946/5

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	Megan Wuite		
Document Reviewer	Tanja Bekker		2 November 2013
Director	Ferdi Pieterse		2 November 2013

DISCLAIMER

Information contained in this report relating to the project description is based on information supplied by the client and other client appointed sources. It is assumed that the information provided to GCS is correct.

Environmental and Social data, as well as environmental impact assessment provided in this report is based on information supplied by specialists in their respective fields, as well as existing information pertaining to the area in question (including previous site investigation data). It has been assumed that the information provided to GCS to perform the outcomes of this report is correct.

No responsibility is accepted by GCS for incomplete or inaccurate data supplied by others (the client and external sources). Where gaps have been identified these are listed for consideration by the responsible decision-makers.

GCS's opinions, conclusions and recommendations are based upon information that existed at the time of the start of the production of this Document.

EXECUTIVE SUMMARY

Project Background

Two Rivers Platinum Mine (hereafter referred to as "TRP") is situated on the farm Dwarsrivier 372 KT, 60km north-east of Lydenburg within the Sekhukhune District Municipality of the Limpopo Province. TRP, which commenced operations in 2005, is a Joint Venture (JV) between African Rainbow Minerals (ARM) and Impala Platinum Holdings Limited (Implats).

It is the intention of TRP to extend their mining operations in order to sustain their UG2 production and grow Merensky production, by applying for environmental authorisation for the UG2 and Merensky Expansion

Environmental Authorisation Process

TRP is currently in the process of expanding its mining operations. The expansion of the mining activities has resulted in the need for various environmental authorisations, listed in the Table below:

APPLICABLE LEGISLATION	APPLICATION TITLE	LEAD AUTHORITY	REF. NUMBER	DATE OF ACCEPTANCE OF APPLICATION	CURRENT PROGRESS
[1]NEMA	Proposed New TSF	[2]LDEDET	12/1/9/2-GC22	30 August 2012	Final ESR accepted by LDEDET on 10 June 2013
NEMA	Proposed UG2 and Merensky Mine	LDEDET	12/1/9/2-GS26	30 August 2012	Final ESR accepted by LDEDET on 10 June 2013
NEMA	Application to rectify unlawful commencement of listed activities.	LDEDET	12/1/9-S24G-GS2	28 November 2012	Introduced at the EIA Phase authorities and public consultation.
[3]NEM:WA	Proposed Sewage Treatment Plants	[4]DEA, Pretoria	12/9/11/L946/5	18 June 2012	Final ESR accepted by DEA on 17 May 2013.
[5]MPRDA	Two Rivers EMP Amendment in terms of Section 102 of the MPRDA to include the entire required infrastructure in one holistic application.	[6]DMR Polokwane	N/A	Meeting held on 30 July 2012 to discuss requirements	A consolidated EMP will be presented to the DMR at the end of the EIA phase.
[7]NWA	Two Rivers WUL amendment to include new proposed water uses.	[8]DWA, Nelspruit	N/A	Meeting held on 6 Feb 2013 to discuss requirements.	A Water Use Licence Amendment Application will be submitted after the EIA phase.

[1] *National Environmental Management Act, 1998 (Act No. 107 of 1998).*

[2] *Limpopo Department of Economic Development, Environment and Tourism.*

[3] *National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).*

[4] *Department of Environmental Affairs.*
[5] *Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)*
[6] *Department of Mineral Resources.*
[7] *National Water Act, 1998 (Act No. 36 of 1998).*
[8] *Department of Water Affairs.*

The EIA authorisation processes are being run in parallel as far as practically possible to streamline the process and reduce stakeholder fatigue in terms of the required stakeholder consultation associated with each authorisation process.

Baseline Environmental Conditions

Geology: The geology comprises igneous rocks of the Bushveld Complex, mainly anorthosite and norite with thin localized layers of chromite and pyroxenite. The Kalkfontein/Tweefontein area is mainly underlain by norite and anorthosite as revealed by the drilling of the monitoring boreholes.

Topography: The confluence of the Klein and Groot Dwars River is just to the north of the Two Rivers north decline on the property. The topography to the east of the Klein Dwars River is gently sloping and then rises suddenly in the south east of the property

Soils: The site falls within the Dc31 and Ib192 land types, which are dominated by basic igneous rocks (norite and gabbro) with the occurrence of high clay content and structured soils, often with free lime or distinct lime accumulations in the profiles in lower lying areas, as well as rock outcrops in higher lying areas. The soil forms Oakleaf, Valsrivier and Mispah dominate the existing mine infrastructure areas.

Climate: The climate can generally be defined as sub-humid, and can be locally described as normally hot and dry. The area falls within the summer rainfall zone and receives most of its annual rainfall during the period October to March.

Land-Use: The site is currently part of the TRP Mining operations. The land-use will not change.

Terrestrial Biodiversity (Fauna and Flora): The Dwars River area comprises two vegetation types, namely Sekhukhune Plains Bushveld and Sekhukhune Mountain Bushveld (Mucina & Rutherford, 2006). Sekhukhune Plains Bushveld is confined to the level plains of major river valleys in northern Mpumalanga and southern Limpopo Provinces. It has a conservation status of Vulnerable and is considered poorly protected. Almost 50% of the project area is covered by transformed and untransformed portions of Sekhukhune Pains Bushveld.

Sekhukhune Mountain Bushveld dominates the mountainous western half of the project area. Twenty-eight mammal species were confirmed to occur on Dwars Rivier 372 KT during fieldwork in 2008, four of which have Red Data status and seven of which are protected. The highest species diversity was reported in Plains Woodland with 23 species, followed by Closed Woodland on Rocky Mountain Slopes with 22 species. *Pycna Sylvia* (a protected cicada) were confirmed in several of the sites during the November 2008 survey.

Hydrology: TRP is located within the B41G quaternary catchment of the Olifants Water Management Area (WMA), also referred to as WMA 4. The Olifants River originates near Bethal in the Highveld of Mpumalanga, initially flowing northwards before curving eastwards and reaching Mozambique via the Kruger National Park. In Mozambique, the Olifants River joins the Limpopo River before discharging into the Indian Ocean. The main tributaries of this WMA are the Wilge, Elands and Ga-Selati Rivers on the left bank, and the Steelpoort, Blyde and Klaserie Rivers.

Hydrogeology: Groundwater occurrence in the shallow aquifer is controlled by proximity to the floodplain of the Klein Dwars and Groot Dwars rivers. Groundwater occurrence in the deep aquifer is controlled by the lateral and vertical distribution of fracture zones. Groundwater in the site area (Kalkfontein and Tweefontein farms, to the north of the existing site) is controlled by shallow weathered and deep fractured aquifers. Some alluvium primary aquifers are associated with the floodplain of the Dwars River, but this does not play a role at the site proposed for the underground mining. The groundwater occurrence in the deep aquifer is controlled by the lateral and vertical distribution of fracture zones.

Air Quality: The local wind field is characterised by: South-easterly and north-easterly winds with a very low frequency of winds from the western sector (due to the mountainous terrain to the west). The north-easterly wind flow increases during day-time conditions with south-easterly wind flow increasing during the night. Low to moderate wind speeds with an average wind speed of 3.3m/s. Local source contributors to ambient PM10 concentrations in the vicinity of the study site are: domestic fuel burning and vehicle activity in residential areas close to the mine; surrounding chrome and platinum mining activities; cattle ranching in the Steelpoort Valley; agricultural activities and limited cultivation in fertile areas adjacent to the Steelpoort River.

Noise: The existing noise levels in the vicinity of the TRP site include traffic on the R555 road and mining activities. Environments which are recognized as being noise sensitive

include residential areas, offices, educational facilities and health and church buildings. None of these sensitive environments are in close proximity to the TRP mining area.

Heritage: A heritage assessment looking specifically at the UG2 and Merensky expansion project area was conducted in 2012. The results showed that large areas of this proposed project area are already under mining operations. The areas covered, from the existing mine, indicated both Iron age and historical occupation, as well as graves. **These graves have since been relocated.** A historical adit exists on the TRP property. It was established in the 1920's and is thus considered a structure relating to early mining in South African history. Although the adit is not situated within the UG2 and Merensky Expansion footprint area, it is recommended in the SHASA (2012) report that further a further study be conducted on this adit, should the UG2 & Merensky Expansion be authorized.

Sensitive Landscapes: The proposed Merensky Main Decline, Concentrator Plant and Inyoni Pipeline are all located in areas 'of least concern' or 'no habitat remaining'. The proposed Merensky North Decline is located in an area classified as 'highly significant'.

Socio-Economic: Within the Greater Tubatse LM, the IDP reports that the northern section of the LM has the most marginalised economy of the region and has no economic base. However, with the development of mines in the LM, the area has started to benefit economically mines in many ways (2012/3). The IDP, however, also highlights that although there are several mines in the area, the existing resources remain unexploited. The LM views investment in this sector as very important as it brings with it investment in infrastructure, results in creation of job opportunities.

Project Description

A scoping study was completed in June 2011 in which several extraction scenarios were developed and tested on both the UG2 and Merensky reefs. It was found that the most economically viable option for the future of the mine is to continue mining the North decline without change and to establish a sub-decline system at the Main decline of both UG2 and Merensky so as to access the southern mining area. At full production, both the Merensky declines will operate at 100ktpm capacity.

Since the UG2 infrastructure is currently in place, the project will involve development of infrastructure for the Merensky portion of the project, namely the Merensky Main decline and North decline infrastructure as well as a new Concentrator Plant. Both Merensky declines require substantial infrastructural development as the design of the existing UG2 infrastructure did not make provision for any expansion projects of this scale. Part of the new infrastructure will include three sewage treatment plants in addition to the existing treatments plants on the site. Since the existing sewage treatments plants are not licensed, application has been made to the Department of Environmental Affairs for a waste license for both the proposed new and existing plants.

Modification of the power and water supply systems will be required as the current capacity will not be able to support the proposed UG2 and Merensky expansion.

Components of the surface infrastructure will include the following:

- Storm water dams, drying beds, settling dams & a treatment facility. A flocculating agent is added to the dirty return water before it enters the dams to accelerate the settling time, it is then treated for re-use underground.
- Overland ore conveyance.
- Waste material stockpiles, cleared as necessary by a front loader to existing stockpiles on site.
- High mast lighting. 10-15 high mast lights at each new decline, in high traffic and security critical areas.
- Ore silo to provide surge capacity for the overland conveyor system. A single Merensky silo will be located adjacent to the existing UG2 silo.
- Office blocks on both Merensky declines – prefabricated containerized units set on concrete slabs with furniture and air-conditioning.
- Change houses – change facilities, ablution and storage lockers for 350 – 400 people at each decline.
- Lamp and crush facility at each Merensky decline for cap-lamp monitoring, gas detection equipment etc.
- Roads – the Merensky Main decline requires upgrading of the access road, as well as upgrading of the haul road to the portal. The Merensky North decline requires a new access road and a new haul road.
- Bus stop and parking for personnel and visitors
- Security and access control.
- Cable storage and salvage yard – a concrete slab with 2.1m high electric fence for cable storage.

- Sewage – Treatment plants included as vendor supplied units, sized according to personnel complement. There are 3 existing sewage treatment plants (not licensed) at Two Rivers, but an additional 3 plants will be required for the UG2 and Merensky project. All of the sewage plants on site will be licensed in one application under the National Environmental Management: Waste Act, 1998 (Act No. 59 of 1998) (NEMWA), as agreed with the Department of Environmental Affairs.
- Fire fighting and prevention – fire hydrants and hose reels, electric and diesel pumps to operate the deluge systems in the main substations of both declines
- Storm water Management - cut off drains and berms at the Merensky Main and North declines
- General stores at each decline for rock drills, rotary equipment, batteries and gas cylinders.
- Explosive stores – a local explosives magazine to cater for daily usage, filled daily from the primary storage.
- Bulk fuel and lubricant storage – to receive store and dispense a week's consumption of each product.
- The Inyoni Pipeline for additional water supply.
- Miscellaneous facilities: portal rainwater sump and drain, dirty water sump and drain, covered walkways, brake test ramp, refuse disposal facilities, electrified fencing around the perimeter of the infrastructure.

Underground infrastructure will consist of refuge bays, workshops, offices and diesel and lubricant storage for a week's consumption of each product. Fuel delivery will be performed using an Aard UV80 equipped with a 5000l diesel cassette.

The new Merensky Concentrator Plant and associated infrastructure allows for a 200ktpm Milling-Milling-Float (MMF) circuit option. Two plant trials were completed using the existing UG2 plant which furnished valuable results in predicting the required process circuit to be adopted. The entire plant is divided into five major sections in terms of structures and activities:

- Run of Mine (ROM) circuit – A stockpile, silo, stormwater management, roads and fencing.
- Crushing/Screening circuit – Crushers and screens, stormwater management, roads, various buildings (offices, store, workshop, ablutions, sub-station), potable water and sewage treatment, fencing and parking.
- Overland Conveyor Circuit – Conveyors (river and road crossings), associated storm water control and waste rock dump.

- Plant Circuit – All plant infrastructure as well as workshops, stores, lube room, offices, generator room, transformer bays, roads, sewage and water treatment.
- Outside Main Merensky Complex – the New TSF and associated pipeline (the subject of a separate EIA application with LDEDET).

Three (3) sewage plants are located at the existing UG2 Main Decline, North Decline and the Concentrator plant. The plants at the Main Decline and Concentrator plant are traditional sewage treatment facilities. The UG2 North decline plant is a Bio-filter RBC Package Plant. There are additional three (3) proposed sewage treatment plants for TRPs new Merensky seam mining operation areas. The proposed sewage plants will be developed on the TRP existing mining right area on the farm Dwars river 372KT (Figure 3.13). All the plants at the Merensky operations will vendor-supplied Package units.

Project Alternatives

The only alternative to the UG2 underground mine expansion is to not expand the life of the mine into (underground) Kalkfontein Portions 4, 5, and 6. By not proceeding with this option, the current LOM will be 10 years instead of 16 years. There were no other alternatives considered as there were none.

The Merensky expansion is seen as a growth opportunity. By not going ahead, TRP output and potential for additional employment of approximately 1500 people would not take place (positive NPV of R457 Million). There were no other alternatives considered as there were none.

Sewage Package plants were selected rather than a traditional sewage treatment facility. This is due to the topography in the area, and the distance between the infrastructure areas.

Stakeholder Consultation

A comprehensive public participation process (PPP) was initiated during the Scoping Phase in and is an on-going process undertaken throughout the EIA/EMP. The process followed complies with the NEMA regulations and the NEMA PPP guideline:

- *Identification of Interested and Affected Parties (I&APs):* The existing TRP stakeholder database was updated with the latest contact details of the relevant local, regional and national authorities;

- *Notification of I&APs:* Background Information Documents (BIDs) were sent to I&APs listed on the TRP stakeholder database. Site notices were placed at six (6) locations at and around the proposed TSF and two newspaper advertisements was placed in the Steelburger newspaper on Friday, 11 January 2013. Further site notices were placed on 4 July as a reminder of the New TSF process (as part of the notification for other TRP environmental applications), as well as an additional newspaper advertisement placed in the Steelburger on Friday 5 July 2013 at the start of the EIA phase.
- *Public meetings:* Four public/stakeholder focus group meetings have been conducted. A Scoping phase meeting was held at the Kalkfontein Community Hall on 7 February 2013 in order to present the proposed applications and Scoping report. A second public open day was held on 21 August 2013, at the Malekane Community Hall. A focus group meeting was held at Didingwe lodge for surrounding landowners and mines on 22 August 2013. A final meeting with Bokomoso and Mr La Grange was held at the offices of GCS on 22 October 2013, in order to discuss and address objections raised to the proposed New TSF.
- *Authorities meetings*: The local, regional and national authorities identified were invited to attend an introductory authorities meeting held on 6 February 2013. The meeting was held at Two Rivers Platinum where the applications and Scoping Reports were presented. The meeting was followed by a site visit to familiarize the authorities with the proposed project sites. A second authorities meeting was scheduled on 21 August 2013, at Didingwe Lodge, in order to present the Draft EIA reports. The meeting was not attended by any authorities, as most were satisfied with the information presented and site visit conducted during the Scoping phase.

The issues raised during the consultation process are summarised in the Table below:

ISSUE/CONCERN	RAISED BY	RESPONSE BY GCS AND TRP	REFERENCE
The public meeting was not planned well enough. The community was not notified properly and most of the information presented did not address the current issues at Kalkfontein.	Isaac Masha	GCS: GCS as the Environmental Assessment Practitioner (EAP) is required to advertise the public meeting two (2) weeks prior to the date of the public meeting. In this case, an advert was placed in the Steelburger newspaper on Friday, 11 January 2013; site notices were placed on site and at the entrance to the TRP mine, Background Information Documents (BIDs) and Scoping Reports, were placed at the Tribal Offices, including Kalkfontein. The last minute change of venue was not planned and GCS apologised in that regard. The topic of the public meeting was to specifically introduce TRP's current environmental authorisation applications. This is possibly not relevant to the current issues at Kalkfontein which should be addressed via a different forum.	The notification methodology 6.2.1 and the proof of notifications presented under Appendix H.
Team work, punctuality, safe work, care, respect, integrity, commitment. Would like more information on the mining sector.	Johannes Ratshotshi	GCS acknowledged receipt of the comments and added Mr. Ratshotshi's details to the database.	The required worker behavior with regards to environmental best practice and emergency response is discussed in the Environmental Awareness and Emergency Response Plan attached under Appendix The information regarding the mining sector within the Limpopo Province is discussed briefly in section 5.14 of this document.
In favour of the proposed project. The project will assist employees in obtaining clarified water and it will also address the situation of un-purified water, as has been raised before.	Intshame Sipho Ngoane	GCS acknowledged receipt of the comments and added Mr. Ngoane's details to the database.	This application relates to mining expansion and does not specifically address water purification

Lebalelo Water User Association (LWUA) does not supply water to TRP. However, the Association has a pipeline crossing the farms Tweefontein 360 and Dwars Rivier 372 with a pump station and appurtenant works on the farm Dwars Rivier 372. The servitude is not registered yet but is in the process. From the map shown, it cannot be seen that the new mining activities would have any influence on the infrastructure mentioned. Keep I&AP informed and updated of the EIA progress.	Ossie Rossouw (CEO of the Lebalelo Water User Association)	GCS noted the pipeline information and added Mr Rossouw to the database. He will be kept informed.	Comment noted. This application does not address any mining activities. The issues related to mining will be addressed in the report for the UG2/Merensky expansion
The Waste Licence Application process for the existing and proposed sewage plants is not correct. The reference number of the Waste Licence Application is Required.	Bokomoso Environmental, on behalf of an objector.	It is important to note that the Waste Management License Application is a process which is run parallel to the NEMA processes. The DEA reference number for the Waste Management License Application was provided on all public participation correspondence. Reference number – 12/9/11/L946/5 (as listed on the cover page of Bokomoso's comment letter). The existing sewage plants are covered under the Section 24G and WULA, the new sewage plants are covered under the UG2 and Merensky EIA application and the Waste Management License Application. The Waste Management License Application covers both existing and new sewage plants.	Refer to Appendix B of this report which contains a record of the Waste Licence Application, and correspondence with the DEA as to how the application should be undertaken for both the existing and new sewage plants (it was agreed that all the sewage plants will be included in one application)

Impact Assessment and Statement

After mitigation, high impacts were identified to geological resources only. Expansion of the underground mine at TRP will lead to removal of additional rock. This is a permanent impact that cannot be mitigated so remains high.

Medium impacts (after mitigation) were identified to soil resources, visual aspects, terrestrial biodiversity (fauna and flora) and riparian zones. The medium impacts will occur during the life of the mine, and will be rehabilitated at closure.

Low impacts are likely to occur to surface water, ground water, heritage resources, air quality, topography and noise, largely since the additional activities will form part of the existing mine.

Positive impacts are likely on socio-economic aspects, since expansion of the existing mine will increase the life of mine, thereby retaining employment and economic stability of the population in the area.

Cumulative impacts were assessed as being low to medium, since the proposed activities will form part of an existing mine.

Environmental Impact Statement

The overall environmental impact of the UG2 and Merensky Expansion is deemed to be low for the following reasons:

- TRP is already in the operational phase, the proposed project will form an expansion to existing infrastructure (ie major disturbance to the area has already occurred).
- The medium impacts identified are not permanent and will be rehabilitated at mine closure.
- No surface infrastructure is planned beyond the existing mining right area.

It is recommended that the UG2 and Merensky Expansion be authorised to proceed, provided the following recommendations are taken into account:

- The more sensitive North decline areas be surveyed for protected species prior to vegetation clearing.
- The historical adit be studied further and protected from mining activities, as per recommendation of a Heritage Specialist.

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1 INTRODUCTION

1.1 Background

Two Rivers Platinum (hereinafter referred to as "*TRP*") is situated on the farm Dwarsrivier 372 KT, located 60km north-east of Lydenburg in the Sekhukune District Municipal area of the Limpopo Province. TRP is a Joint Venture between African Rainbow Minerals (hereinafter referred to as "*ARM*") and Impala Platinum Holdings Limited (hereinafter referred to as "*Implats*").

TRP has a New Order Mining Right (LP 178 MC) to explore and mine the Platinum Group Metals (PGM's), other precious metals (gold and silver), and associated base metals (nickel, copper and cobalt) and ores thereof on portions of the farm Dwarsrivier 373 KT.

During 2003, bulk sampling for a feasibility study was undertaken and trial mining, to determine the most appropriate mining method, began in January 2004. In June 2005, development of the TRP project commenced. Currently, the Upper Group 2 (UG2) is being mined from the underground via two portals, namely the Main decline and the North decline.

It is the intention of TRP to extend their mining operations in order to sustain their UG2 production and grow Merensky production, by applying for environmental authorization for the UG2 and Merensky Expansion.

1.2 Brief Project Description

TRP currently exploits only the UG2 mineral reef, and consists of two underground mines namely the Main decline and North decline, and a UG2 concentrator plant with associated infrastructure and existing Tailings Storage Facility (TSF). TRP wishes to expand the current underground mining operations to mine additional areas of the UG2 reef, as well as to establish declines to extract ore from the overlying Merensky reef.

A scoping study was completed in June 2011 in which several extraction scenarios were developed and tested on both the UG2 and Merensky reefs. It was found that the most economically viable option for the future of the mine is to continue mining the North decline without change and to establish a sub-decline system at the Main decline of both UG2 and Merensky so as to access the southern mining area. At full production, both the Merensky declines will operate at 100ktpm capacity.

Since the UG2 infrastructure is currently in place, the project will involve development of infrastructure for the Merensky portion of the project, namely the Merensky Main decline and North decline infrastructure as well as a new Concentrator Plant. Both Merensky declines require substantial infrastructural development as the design of the existing UG2 infrastructure did not make provision for any expansion projects of this scale. Part of the new infrastructure will include three sewage treatment plants in addition to the existing treatments plants on the site. Since the existing sewage treatments plants are not licensed, application has been made to the Department of Environmental Affairs for a waste license for both the proposed new and existing plants.

Modification of the power and water supply systems will be required as the current capacity will not be able to support the proposed UG2 and Merensky expansion.

Components of the surface infrastructure will include the following:

- Storm water dams, drying beds, settling dams & a treatment facility. A flocculating agent is added to the dirty return water before it enters the dams to accelerate the settling time; it is then treated for re-use underground.
- Overland ore conveyance.
- Waste material stockpiles, cleared as necessary by a front loader to existing stockpiles on site.
- High mast lighting. 10-15 high mast lights at each new decline, in high traffic and security critical areas.
- Ore silo to provide surge capacity for the overland conveyor system. A single Merensky silo will be located adjacent to the existing UG2 silo.
- Office blocks on both Merensky declines – prefabricated containerized units set on concrete slabs with furniture and air-conditioning.
- Change houses – change facilities, ablution and storage lockers for 350 – 400 people at each decline.
- Lamp and crush facility at each Merensky decline for cap-lamp monitoring, gas detection equipment etc.
- Roads – the Merensky Main decline requires upgrading of the access road, as well as upgrading of the haul road to the portal. The Merensky North decline requires a new access road and a new haul road.
- Bus stop and parking for personnel and visitors
- Security and access control.
- Cable storage and salvage yard – a concrete slab with 2.1m high electric fence for cable storage.

- Sewage – Treatment plants included as vendor supplied units, sized according to personnel complement. There are 3 existing sewage treatment plants (not licensed) at Two Rivers, but an additional 3 plants will be required for the UG2 and Merensky project. All of the sewage plants on site will be licensed in one application under the National Environmental Management: Waste Act, 1998 (Act No. 59 of 1998) (NEMWA), as agreed with the Department of Environmental Affairs.
- Fire fighting and prevention – fire hydrants and hose reels, electric and diesel pumps to operate the deluge systems in the main substations of both declines
- Storm water Management - cut off drains and berms at the Merensky Main and North declines
- General stores at each decline for rock drills, rotary equipment, batteries and gas cylinders.
- Explosive stores – a local explosives magazine to cater for daily usage, filled daily from the primary storage.
- Bulk fuel and lubricant storage – to receive store and dispense a week's consumption of each product.
- Miscellaneous facilities: portal rainwater sump and drain, dirty water sump and drain, covered walkways, brake test ramp, refuse disposal facilities, electrified fencing around the perimeter of the infrastructure.

Underground infrastructure will consist of refuge bays, workshops, offices and diesel and lubricant storage for a week's consumption of each product. Fuel delivery will be performed using an Aard UV80 equipped with a 5000l diesel cassette.

The new Merensky Concentrator Plant and associated infrastructure allows for a 200ktpm Milling-Milling-Float (MMF) circuit option. Two plant trials were completed using the existing UG2 plant which furnished valuable results in predicting the required process circuit to be adopted. The entire plant is divided into five major sections in terms of structures and activities:

- Run of Mine (ROM) circuit – A stockpile, silo, stormwater management, roads and fencing.
- Crushing/Screening circuit – Crushers and screens, stormwater management, roads, various buildings (offices, store, workshop, ablutions, sub-station), potable water and sewage treatment, fencing and parking.
- Overland Conveyor Circuit – Conveyors (river and road crossings), associated storm water control and waste rock dump.
- Plant Circuit – All plant infrastructure as well as workshops, stores, lube room, offices, generator room, transformer bays, roads, sewage and water treatment.

- Outside Main Merensky Complex – the New TSF and associated pipeline (the subject of a separate EIA application with LDEDET).

1.3 Land Holdings

This section of the Report relates to the content of an EIA Report as regulated by Regulation 31 of the NEMA Regulations.

Regulation 31(2)	*An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 35, and must include -*
	(c) a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is…

Refer to Figure 1.2 for the locality of the existing mine and proposed UG2 and Merensky expansion activities. A detailed layout of the existing and proposed infrastructure is included in Section 2 of this report.

The Dwarsrivier property is owned by TRP and Assmang. The Mining Area constitutes Portion 6 and 7, but Mining Rights are in respect of Portion 6 only. The Kalkfontein property is wholly and solely owned by the Bakoni Ba Masha Ba Makapole Communal Property Association. The Tweefontein property surface rights are held by Samancor (Ptn's RE, 3,4,5,6 and 9). Portions 13 and 14 of Portions 4 and 3, respectively are held by Kadoma Investments cc.

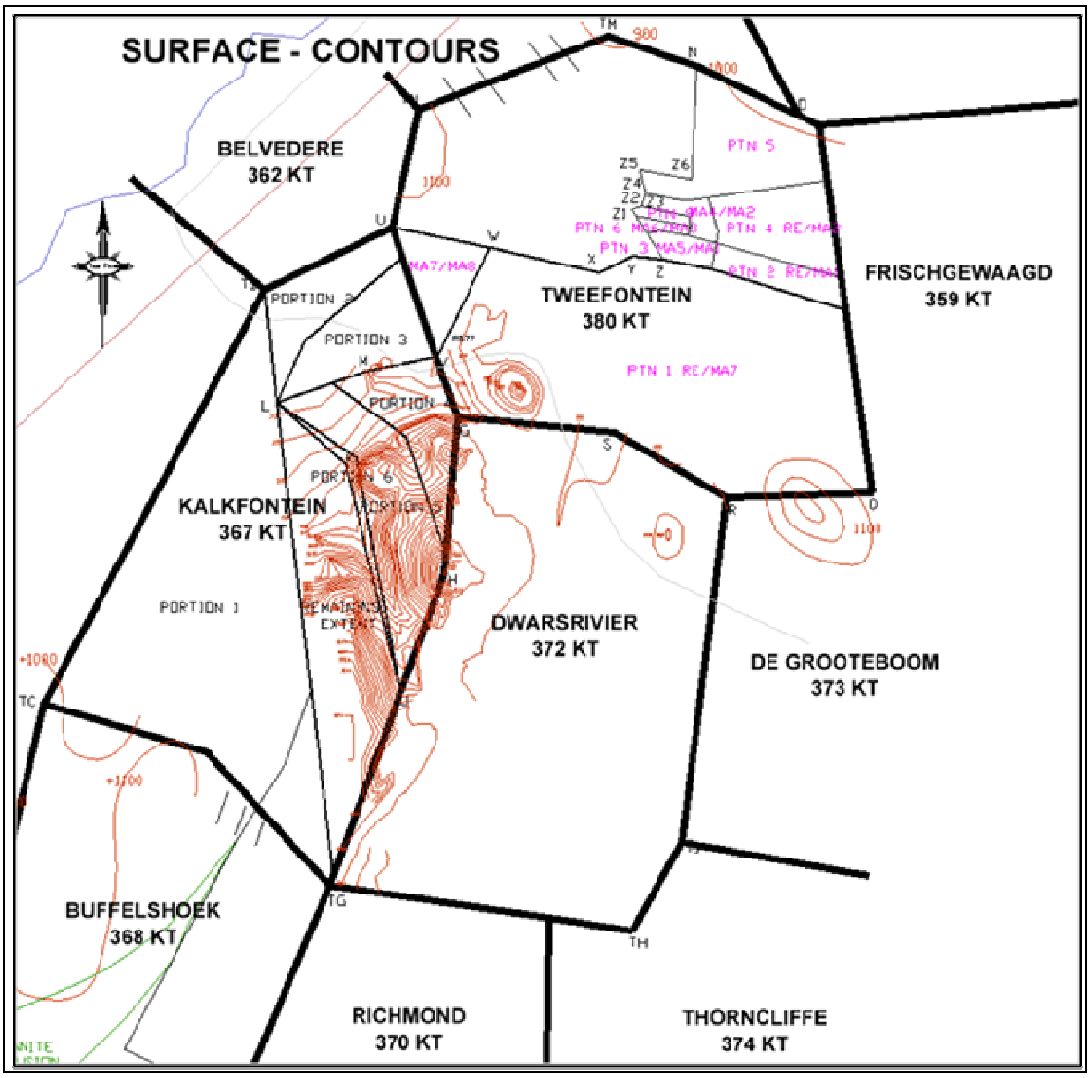
Two Rivers has been granted a New Order Mining Right over Portions 6 and 7 of the Farm Dwarsrivier 372 KT in terms of Item 7 of Schedule II of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

Impala Platinum is in possession of a New Order Prospecting Right (PR No. PR80/2006) over Portions 4, 5 and 6 of the Kalkfontein property and certain Portions of the Tweefontein property and will be ceded to Two Rivers Platinum, following the consent of the Minister to transfer said right under an application made in terms of Section 11 of the Act, 2002. Refer to Figure 1.1 and Table 1.1 below indicating the prospecting right areas to be converted.

An application is in process with the DMR to convert the above-mentioned prospecting rights to a mining right, forming part of the TRP mining area. Table 1.1 below indicates a summary of the proposed UG2 & Merensky Expansion activities. Figure 1.3 and Table 1.2 below indicate the extent of the prospecting rights to be converted to mining rights.

Table 1.1 Summary of the proposed UG2 & Merensky Expansion Activities

APPLICATION	MINING ACTIVITY	FARM PORTIONS INVOLVED	MINING RIGHTS
UG2 and Merensky Expansion	Construction of additional Main and North declines to access the Merensky reef	Dwarsrivier (existing site)	TRP's existing mining right area.
	Underground mining of the Merensky reef	Dwarsrivier & Kalkfontein via new Merensky North decline on Dwarsrivier (no new surface infrastructure on Kalkfontein)	TRP's existing mining right area as well as transferred prospecting rights from Kalkfontein. Application in progress to convert the prospecting to mining rights.
	Expansion of underground mining of the UG2 reef	Dwarsrivier, Kalkfontein and Tweefontein via existing declines (no new infrastructure on Kalkfontein & Tweefontein)	TRP's existing mining right area as well as transferred prospecting rights from Kalkfontein & Tweefontein. Application in progress to convert the prospecting to mining rights.
	Construction of a new plant for processing of Merensky ore.	Dwarsrivier (existing property)	TRP's existing mining right area.
Waste Licence Application	Installation of 3 existing and 3 new wastewater treatment (sewage) plants	Dwarsrivier (existing site)	TRP's existing mining right area



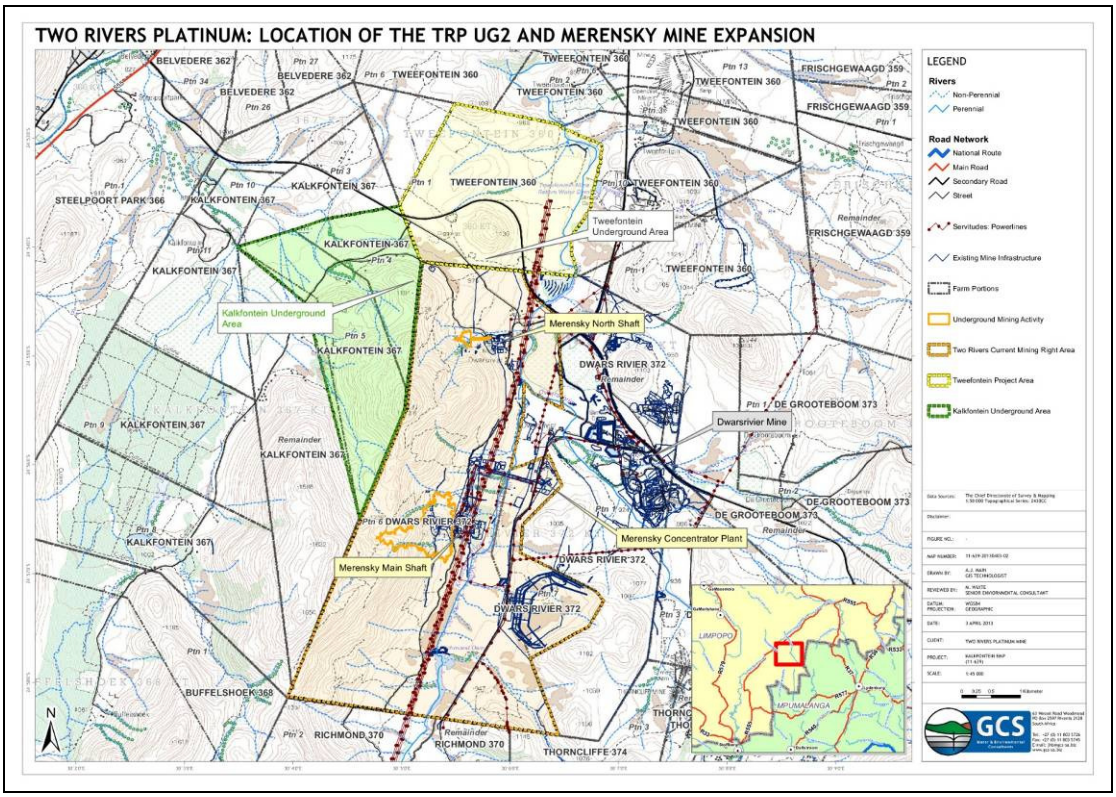
(Figure not to scale)

Figure 1.1 Prospecting Right Areas (Kalkfontein & Tweefontein)

Table 1.2 Prospecting Right Areas Co-ordinates

System: WGS 31°		
Kalkfontein		
Ref	Y	X
V	92 619.87	2 754 581.23
G	92 291.03	2 755 534.03
H	92 514.52	2 758 022.28
J	93 201.01	2 759 879.54
K	94 075.94	2 756 239.36
L	95 138.00	2 755 285.15
M	93 750.53	2 754 811.32

Tweefontein		
Ref	Y	X
N	88 503.75	2 749 950.18
O	86 906.10	2 750 726.32
P	86 675.52	2 750 809.87
Q	86 125.33	2 756 743.17
R	88 096.75	2 756 764.67
S	89 833.62	2 755 762.81
G	92 291.03	2 755 543.03
U	93 337.62	2 752 501.57
V	92 619.87	2 754 581.23
W	91 793.09	2 752 834.05
X	90 060.48	2 753 207.03
Y	89 542.85	2 752 964.49
Z	89 043.99	2 753 021.94
Z1	89 546.85	2 752 218.85
Z2	89 529.59	2 752 208.22
Z3	89 397.83	2 752 164.25
Z4	89 334.85	2 751 967.84
Z5	89 433.80	2 751 591.67
Z6	88 603.50	2 751 742.14



(Figure not to scale- refer to map on the adjacent page)

Figure 1.2 Locality of TRP Existing Mine and proposed UG2 & Merensky Expansion

1.4 Contact Details of Applicant

The applicant and mineral rights' holder details are presented in Table 1.3 and Table 1.4.

Table 1.3 Name and Address of Mine

MINING RIGHT HOLDER	Two Rivers Platinum (Pty) Ltd
PHYSICAL ADDRESS	Dwarsriver Farm KT372, Lydenburg, 1120
TELEPHONE	013 230 2650
FACSIMILE	013 230 2660
EMAIL	Johannes.senyane@trp.co.za
CONTACT PERSON	Johannes Senyane

Table 1.4 Name and Address of Mineral Rights' Holder

MINING RIGHT HOLDER	Two Rivers Platinum (Pty) Ltd
PHYSICAL ADDRESS	Dwarsriver Farm KT372, Lydenburg, 1120
TELEPHONE	013 230 2650
FACSIMILE	013 230 2660
EMAIL	Johannes.senyane@trp.co.za
CONTACT PERSON	Johannes Senyane

2 LEGAL REQUIREMENTS

2.1 Legislative Background

For most of its history, the mining industry in South Africa has not been subjected to comprehensive environmental regulation. However, in recent years, this has changed significantly and the industry is now required to comply with a multifaceted network of mining and environmental legislation. There are no shortages of policy and legal frameworks to ensure "responsible" mining in South Africa. The *Minerals and Mining Policy for South Africa*, 1998 affirmed that the State, as custodian of the nation's natural resources will support mining development while maintaining and enhancing environmental awareness of the mining industry in accordance with national environmental policies, norms and standards. To this end, 10 principles on sustainable mining were adopted. These include the adoption of the precautionary approach as well as the polluter pays principle; assertion that a consistent standard of environmental impact management would be adopted, irrespective of the scale of mining concerned; encouraging the mining industry to reduce problems of pollution by promoting a culture of waste minimisation through re-cycling, and re-use of waste products; and ensuring the effective implementation of environmental management measures and monitoring of occurrences of pollution, amongst others.

For the purposes of this application, authorization in terms of the *National Environmental Management Act*, Act 107 of 1998 (hereinafter referred to as "*NEMA*"), the *Minerals and Petroleum Resources Development Act*, Act 28 of 2002 (hereinafter referred to as the "*MPRDA*") and the *National Water Act*, Act 36 of 1998 (hereinafter referred to as the "*NWA*") will be undertaken.

2.1.1 The Constitution

The Constitution reigns supreme and the advancement of human rights is one of the foundations of South Africa's democracy. Furthermore, the Bill of Rights plays a central role in the democratic regime because it embodies a set of fundamental values which should be promoted at all times. One of the fundamental values is contained in Section 24 and is, arguably, the cornerstone for environmental governance in South Africa which includes the mining industry. Section 24(a) proclaims the right of everyone ***"to an environment that is not harmful to their health or well-being"***. Mining companies, including TRP, are thus duty-bound to constitutional, legislative, and other measures to prevent pollution and ecological degradation, promote conservation and to develop in a sustainable manner.

Two particular judgments deserve consideration in that they contain a comprehensive analysis of the nature and content of the environmental right within the sustainability context. Firstly, the court in *BP Southern Africa (Pty) Ltd v MEC for Agriculture, Conservation and Land Affairs* 2004 5 SA 124 (WLD) confirmed that environmental interests should be balanced with justifiable economic and social development well beyond the interests of the present living generation. The court justified the latter with Section 24(b), since this Section requires the environment to be protected for the benefit of present and future generations. The court confirmed the importance of sustainable development and predicted that it will ***"…play a major role in determining important environmental disputes in the future"***. Furthermore, the court emphasised the importance of progressively realising the protected environmental right by stating that:

"Pure economic principles will no longer determine, in an unbridled fashion, whether a development is acceptable. Development, which may be regarded as economically and financially sound, will, in future, be balanced by its environmental impact, taking coherent cognisance of the principle of intergenerational equity and sustainable use of resources in order to arrive at an integrated management of the environment, sustainable development and socio-economic concerns. By elevating the environment to a fundamental justiciable human right, South Africa has irreversibly embarked on a road, which will lead to the goal of attaining a protected environment by an integrated approach, which takes into consideration, inter alia, socio-economic concerns and principles."

Within this context, the mining industry (and the accompanied social and economic development it should bring with it) is constitutionally bound to uphold the environmental right. The court in *Fuel Retailers Association of Southern Africa v Director General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province* 2007 6 SA 4 (CC) attempted to balance these social, environmental and economic concerns by recognising the importance of economic and social development for the well-being of human beings. However, the court emphasised that development and the environment are inexorably linked and development cannot exist upon a weakening environmental base. Consequently, the promotion of development requires the protection of the environment.

The constitutional environmental right elevates the importance of environmental protection and conservation, and emphasises the significance that South Africans attach to a sound and healthy environment. In addition, the environmental right applies horizontally and this implies that the mining industry has to exercise a duty of care if liability, on the

basis of the constitutional environmental right, is to be avoided. The constitutional environmental right is given effect to by means of detailed statutory provisions ranging from framework to sectoral legislation which relate to mining.

2.1.2 Environmental principles

Section 2(1)(c) of of the NEMA provides that:

"***The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and… serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment…***"

Any decision taken in respect of the proposed application for environmental authorization should take into account the principles as set out in Section 2 of NEMA. GCS acknowledges that these principles serve as guiding principles because they are binding, enforceable and justiciable. By adhering to these principles, GCS promotes a cautious approach when advising on the activities, processes and daily operations of TRP's mining operation and advocates compliance with environmental regulatory measures.

The principles contained in Section 2 of NEMA are the corner stone of environmental governance and liability in South Africa and is based on the foundation of sustainable development. These principles all apply directly to mines by virtue of Section 37(1) of the MPRDA which provides that regard must be had to the NEMA principles by stipulating that the principles set out in Section 2 of NEMA:

"***a) apply to all prospecting and mining operations, as the case may be, and any matter or activity relating to such operation; and***
b) serve as a guideline for the interpretation, administration and implementation of the environmental requirements of this Act."

Section 37(2) of the MPRDA further provides that:

"***Any prospecting or mining operation must be conducted in accordance with generally accepted principles of sustainable development by integrating social, economic and environmental factors into the planning and implementation of prospecting and mining projects in order to ensure that exploitation of mineral resources serves present and future generations.***" (own emphasis).

By virtue of Section 37(1) of the MPRDA, these principles apply to the mining sector and therefore the mining industry must adopt a risk-averse and cautious approach; prevent negative impacts or effects of their activities on the health and well-being of people and the environment; and pay for all their pollution since they remain liable for the effects of their policies, projects, programmes, products, processes, services or activities throughout their life cycles. When a competent authority takes a decision in terms of NEMA or any other law concerned with environmental protection, the principles must serve as guidelines. More specifically, the principles should guide the interpretation and implementation of the liability regime of NEMA and any other law concerned with environmental protection including mining related legislation. The following principles are particularly important and are discussed below.

2.1.2.1 Polluter pays principle

The polluter pays principle (PPP) is reflected in the provision that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

In essence, the PPP means that "***polluters and users of natural resources (should) bear the full environmental and social costs of their activities***". The PPP can also be described as an economic principle that requires the polluter (the mining industry in this instance) to be held liable to compensate or pay for pollution prevention, minimisation and remediation. Therefore, the crux of the principle is to impose economic obligations when environmental damage is caused by a polluter and this is achieved by setting minimum rules on liability for environmental damage.

2.1.2.2 Precautionary principle

The precautionary principle provides guidance during development or when anything occurs which might harm the environment and where there is scientific uncertainty. NEMA stipulates and requires "a risk averse and cautious approach" to be applied and that decision-makers should take "***into account the limits of current knowledge about the consequences of decisions and actions***". This approach is also acknowledged in the *White Paper on a Minerals and Mining Policy for South Africa* in that:

"***…during decision-making a risk averse and cautious approach that recognises the limits of current environmental management expertise will be adopted and where there is uncertainty, action is required to limit the risk.***"

The precautionary principle requires the mining industry to take adequate precautionary measures to safeguard against contamination, pollution or degradation of the environment and where there is uncertainty, the action taken should be to limit the risk to the environment.

2.1.2.3 Preventive principle

The preventive principle is reflected in the concept that the disturbance of ecosystems and loss of biological diversity are to be "***…avoided, or…minimised and remedied***." Furthermore, the principle prescribes that the disturbance of the landscape and the nation's cultural heritage is to be avoided, and where it cannot be altogether avoided, must be minimised and remedied. Any negative impacts on the environment and on people's environmental rights should also be anticipated and prevented, and where they cannot be altogether prevented they should minimised and remedied.

The principle aims to minimise environmental damage by requiring that action be taken at an early stage of the process, and if possible, before such damage actually occurs. Broadly stated, it prohibits any activity which causes or may cause damage to the environment in violation of the duty of care established under environmental law. The preventive principle bestows on the mining industry an obligation to take steps to avoid causing certain types of damage to the environment, including the environment beyond their own territory or property.

2.1.2.4 Cradle-to-grave

A cradle-to-grave stewardship perspective indicates the adoption of a comprehensive ecological view of the impacts of a process on the environment, commencing with research, development and design through the extraction and use of raw materials, production and processing, storage, distribution and use, to the final disposal of the product and the waste generated as a by-product. The integrated consideration of all the environmental impacts forms part of this cycle. The "cradle-to-grave" principle advocates liability as a result of, or caused by, policies, programmes, projects, products, processes, services and activities. Given the general purpose of NEMA, together with the other sustainability principles, this legal liability may include to rectify, remedy or compensate for environmental damage or degradation. The principle also recognises that environmental impacts, pollution or degradation may be associated with the entire life cycle of a mine, that is, from the identification, exploration phase through project planning, implementation, operations and post-operational closure, decommissioning and rehabilitation. Thus, the mining industry will remain liable for the damage or degradation caused by its activities throughout the life cycle of the mining operations until decommissioning and rehabilitation.

2.1.3 The National Environmental Management Act

As stated above, NEMA provides for a comprehensive array of principles which cumulatively aim to create among others, corporate socially responsible behaviour by establishing legal liability for environmental damage as well as damage to human health and well-being. Apart from these principles, NEMA also contains mechanisms, procedures and structures to facilitate pollution prevention, minimisation and remediation.

Chapter 7 of NEMA contains essential provisions dealing with liability for environmental damage in South Africa and two key elements form part thereof; namely: pollution prevention and remediation. A duty of care is contained in Section 28, which encompasses the main liability provision which applies retrospectively and therefore also to historical pollution. Section 28(1) applies to all forms of pollution, including mining pollution, and is formulated generally by providing a duty of care to avoid, minimise and/or remedy pollution or environmental degradation. In terms of this subsection, the duty imposes liability on an almost non-exhaustive category of persons, because it refers to "every person". Section 28(2) goes even further and imposes the duty on a range of people including owners or people in control of land or premises and people who have the right to use the land or premises on which, or in which, an activity or process is, or was, performed or undertaken, or any other situation exists which causes, or is likely to cause, significant pollution or degradation to the environment.

The duty of care imposes strict liability since Section 28(1) requires reasonable persons to take reasonable measures. Subsection (3) provides an indicative range of measures that can be considered as “reasonable measures” and these may include measures to investigate, assess and evaluate the impact on the environment; inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation, contain or prevent the movement of pollutants or the causing of degradation, eliminate any source of the pollution or degradation and remedy the effects of the pollution or degradation. One can identify from the wording an obligation to prevent and minimise pollution or degradation and the list indicates that remediation is clearly part of South African law. Where a mine fails to take reasonable measures to prevent or minimise pollution, it can be directed to do so by the relevant authority and if it does not comply with the directive, measures will be taken by government on its behalf, but at the mine’s expense.

Under Section 34(7), liability is specifically extended to the directors of the mining company concerned in his or her personal capacity, in other words, the directors is

personally liable. Furthermore, Section 43 provides that if directors failed to take all reasonable steps to prevent the offence being committed, and monetary advantage was gained, they may be personally liable for damages or compensation, have to pay a fine, or have to comply with remedial measures determined by the Court, and may even have to pay the State's investigative costs. The latter was confirmed in *Minister of Water Affairs and Forestry v Stilfontein Gold Mining Co Ltd and Others* 2006 5 SA 333 (W) where the court held, in a telling statement that:

"To permit mining companies and their directors to flout environmental obligations is contrary to the Constitution, the Mineral Petroleum Development Act and to the National Environmental Management Act. Unless courts are prepared to assist the State by providing suitable mechanisms for the enforcement of statutory obligations an impression will be created that mining companies [and their directors] are free to exploit the mineral resources of the country for profit over the lifetime of the mine, thereafter they may simply walk away from their environmental obligations. This simply cannot be permitted in a constitutional democracy which recognises the right of all of its citizens to be protected from the effects of pollution and degradation."

2.1.4 The Mineral and Petroleum Resources Development Act

Section 38 provides a key insight into the MPRDA's environmental liability approach. In terms of this Section, mining companies are required to familiarize themselves of potential environmental impacts; manage any environmental impacts; and rehabilitate the environment in so far as is reasonably possible. Furthermore, Section 38(1)(e) states that such holders, whose mining causes or results in ecological degradation, pollution, or environmental damage that may be harmful to the health or well-being of anyone:

"***…is responsible for any environmental damage, pollution or ecological degradation as a result of his or her operations and which may occur inside and outside the boundaries of the area to which such right, permit or permission relates***."

These holders will "***…remain responsible for any environmental liability, pollution or ecological degradation and the management thereof until a closure certificate has been issued***". Similar to NEMA, the MPRDA specifically extends the widely-framed liability of mines to the director of the mining company concerned in his or her personal capacity, by stating in Section 38(2) the following:

"***...the directors of a company or members of a close corporation are jointly and severally liable; for any unacceptable negative impact on the environment, including***

damage, degradation or pollution; advertently or inadvertently caused by the company or close corporation which they represent or represented."

In general, this provides for a comprehensive liability net which must also be considered in light of NEMA's provisions. According to Section 39, a mine must indicate how it will contain or remedy the cause of pollution or degradation and migration of pollutants and comply with any prescribed waste standards or management practices. Granting of permission to mine or prospect, among others, is conditional on an environmental management programme and plan being submitted and accepted by the relevant government authority.

Section 43 is one of the most important provisions as it deals with the responsibility for any environmental liability, pollution or ecological degradation until the issue of the closure certificate. It is important to note that environmental liability will not necessarily cease or fall away by the issuing of a closure certificate. In addition to the broader liability provisions above, Section 45 provides that the relevant authority may direct a mine to undertake remedial measures where:

"*...any prospecting, mining, reconnaissance or production operations cause or results in ecological degradation, pollution or environmental damage which may be harmful to the health or well-being of anyone and requires urgent remedial measures.*"

Where the mine fails to take these measures, the relevant authority will act on its behalf and then recover costs incurred from the mine. If the mine fails to compensate the authority, the latter is empowered to seize and sell the mine's property to recover the costs. The mine will thus remain financially liable for the rehabilitation, even if it chooses to ignore the government directive.

2.1.5 The National Water Act

One of the main and ever-continuing concerns in South Africa is the sustainability of water management, and the costs associated with the prevention and remediation of pollution in a country with an average rainfall far below international standards. The NWA is one of the government's answers to some of these challenges and functions as sectoral legislation within the framework of NEMA.

Section 19 of the NWA mirrors the provision of Section 28 of NEMA and addresses the prevention and remediation of the effects of pollution. The NWA provides a wide duty of care in that:

"(1) an owner of land, a person in control of land or a person who occupies or uses the land on which-
(a) any activity or process is or was performed or undertaken; or
(b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring."

The words "likely to cause pollution" broadens the scope of the duty, which enables an activity, or situation that is land-based, to trigger the application of the duty. The "reasonable measures" are not prescribed, but may include measures intended to:

"***cease, modify or control any act or process causing the pollution; comply with any prescribed waste standard or management practice; contain or prevent the movement of pollutants; eliminate any source of pollution; remedy the effects of pollution; and remedy the effects of any disturbance to the bed and banks of a watercourse."***

The NWA, furthermore, provides for water use authorisations which a mine will have to apply for, before commencing with its primary activity of mining. Various conditions may be attached to these licenses and a breach thereof will result in criminal and civil liability. The conditions attached to water use authorisations will function alongside the additional protective measures, duty of care and statutory liability provisions provided by the NWA and other legislation to regulate a whole array of water issues.

The detrimental impact of mining on water resources is further regulated by the NWA in a comprehensive set of regulations titled: "*Regulations on the Use of Water for Mining and Related Activities Aimed at the Protection of Water Resources*". In terms of these regulations:

"No person in control of a mine or [mining] activity may place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation."

Regulation 7 provides for a whole array of provisions which specifically aim to protect water resources from mining. These provisions state that every person in control of a mine or mining activity must take all reasonable measures to, inter alia: prevent water containing waste or any substance which causes or is likely to cause pollution from entering any water resource; design, modify, locate, construct and maintain all water systems

including residue deposits, to prevent the pollution of any water resource through the operation or use thereof; cause effective measures to be taken to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns; prevent the erosion or leaching of materials from any residue deposit or stockpile from any area; and ensure that water used in any process at a mine or activity is recycled as far as practicable. These provisions specifically relate to the protection of water resources and they clearly set out further additional liabilities for mines as far as their water resource protection activities are concerned.

2.2 Roles and responsibilities in terms of the *National Environmental Management Act*

This section sets out the roles and responsibilities of the Applicant, Environmental Assessment Practitioner (EAP) and affected parties.

2.2.1 The Applicant

An applicant is a person (including a juristic person) who has submitted an application for, *inter alia*, environmental authorisation. For the purpose of this application, Two Rivers Platinum (Pty) Ltd submitted an application for authorisation on 8 November 2012.

The NEMA Regulations require the applicant to appoint an EAP who will comply with the requisite statutory provisions and regulations on behalf of the Applicant (kindly refer to paragraph 1.9 below for a detailed discussion on GCS, the appointed environmental practitioners on the project). Further, the Applicant must:

- Provide the EAP with a detailed and precise statement of the purpose and need for the proposed activities;
- Take all necessary steps to verify whether the EAP complies with Sections 17(a) and (b) of NEMA; and
- Provide the EAP with access to all information regarding the application, whether or not such information is favourable to the Applicant.

2.2.2 The Environmental Assessment Practitioner

An EAP is responsible for the planning, management and coordination of environmental impact assessments (EIAs), strategic environmental assessments, environmental management programmes or any other appropriate environmental management instruments introduced through regulations. The EAP must be independent, objective and have expertise in conducting EIAs. Such expertise should include knowledge of all relevant legislation and of any guidelines that have relevance to the proposed activity.

An EAP must perform the work relating to the application in an objective manner, even if it results in views and findings that are not favourable to the Applicant, and disclose to the Applicant and competent authority all material information in the possession of the EAP.

2.2.3 Interested and affected parties

An interested and affected party (I&AP) is defined as any person, group of persons or organisation interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

The NEMA Regulations distinguish between I&APs and registered I&APs. Registered I&APs refer to an I&AP whose name is recorded in the register opened for the environmental authorisation application. Accordingly, only registered I&APs will be notified of:

- The availability of reports and other written submissions made (or to be made) to the competent authority (I&APs are entitled to comment on these reports and submissions); and
- The outcome of the application, the reasons for the decision and that an appeal may be lodged against a decision.

For the purpose of an application, the EAP must open and maintain a register which contains the names, contact details and addresses of:

- All persons who have submitted written comments or attended meetings with the Applicant or EAP;
- All persons who have requested the Applicant or EAP, in writing, to be entered on the register; and
- All organs of state which have jurisdiction in respect of the activity to which the application relates.

2.3 Environmental Process

2.3.1 Summary of all Environmental Authorisation Processes

TRP is currently in the process of expanding its mining operations. The expansion of the mining activities has resulted in the need for various environmental authorisations, listed in Table 2.1 below:

Table 2.1 TRP's current environmental authorisation applications

APPLICABLE LEGISLATION	APPLICATION TITLE	LEAD AUTHORITY	REF. NUMBER	DATE OF ACCEPTANCE OF APPLICATION	CURRENT PROGRESS
[1]NEMA	Proposed New TSF	[2]LDEDET	12/1/9/2-GC22	30 August 2012	Final ESR accepted by LDEDET on 10 June 2013
NEMA	Proposed UG2 and Merensky Mine	LDEDET	12/1/9/2-GS26	30 August 2012	Final ESR accepted by LDEDET on 10 June 2013
NEMA	Application to rectify unlawful commencement of listed activities.	LDEDET	12/1/9-S24G-GS2	28 November 2012	To be introduced at the EIA Phase authorities and public consultation.
[3]NEM:WA	Proposed Sewage Treatment Plants	[4]DEA, Pretoria	12/9/11/L946/5	18 June 2012	Final ESR accepted by DEA on 17 May 2013.
[5]MPRDA	Two Rivers EMP Amendment in terms of Section 102 of the MPRDA to include all the required infrastructure in one holistic application.	[6]DMR Polokwane	N/A	Meeting held on 30 July 2012 to discuss requirements	A consolidated EMP will be presented to the DMR at the end of the EIA phase.
[7]NWA	Two Rivers WUL amendment to include new proposed water uses.	[8]DWA, Nelspruit	N/A	Meeting held on 6 Feb 2013 to discuss requirements.	A Water Use Licence Amendment Application will be submitted after the EIA phase.

[1] *National Environmental Management Act, 1998 (Act No. 107 of 1998).*

[2] *Limpopo Department of Economic Development, Environment and Tourism.*

[3] *National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).*

[4] *Department of Environmental Affairs.*

[5] *Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)*

[6] *Department of Mineral Resources.*

[7] *National Water Act, 1998 (Act No. 36 of 1998).*

[8] *Department of Water Affairs.*

The EIA authorisation processes are being run in parallel as far as practically possible to streamline the process and reduce stakeholder fatigue in terms of the required stakeholder consultation associated with each authorisation process.

The UG2 and Merensky Expansion requires authorisation in terms of four (4) sets of environmental legislation. TRP appointed GCS (Pty) Ltd (GCS), to conduct the required authorization application processes in terms of the NWA, the NEMA, the NEM:WA and the MPRDA.

2.3.2 The Process in terms of the National Environmental Management Act, Act No. 107 of 1998 (NEMA)

Scoping and environmental impact reporting (S&EIR) entail a comprehensive environmental impact assessment (EIA) which includes a scoping phase and an EIA phase. In the scoping phase, issues are identified and it includes a plan of study for the EIA. The EIA phase assesses issues identified during the scoping phase and includes an environmental management programme (EMP). The EMP provides information on the proposed activity and the manner in which potential impacts will be minimised or mitigated. This process is required for all listed activities.

The competent authority for this application is the Limpopo Department of Economic Development, Environment and Tourism (hereinafter referred to as "*LDEDET*").

Table 2.2 provides a description of the S&EIR process followed in respect of the proposed TRP mining operations and Table 2.3 indicates the potential listed activities which will be undertaken by TRP.

Table 2.2 Description of the S&EIR process in terms of GN R543 in GG 33306 of 18 June 2010

REGULATION	PROVISION	PROGRESS	DATE
Regulation 26	The Applicant or the EAP must complete the application form for environmental authorisation and submit to the competent authority.	The EIA application form was submitted to LDEDET.	8 November 2012
Regulation 13(2)	The competent authority must acknowledge receipt of the application within 14 days of receipt of the application.	LDEDET acknowledged receipt of the application and granted permission to proceed with the Scoping Phase.	28 November 2012
Regulation 27	After having submitted an application, the EAP managing the application must: • conduct a public participation process; • give notice of the proposed application to any organ of state which has jurisdiction in respect of any aspect of the activity; • open and maintain a register of all interested and affected parties; • consider all comments and representations received from interested and affected parties following the public participation process; • subject the application to scoping • prepare a scoping report; • give all registered interested and affected parties an opportunity to comment on the scoping report; • submit at least five copies of the scoping report to the competent authority.	<u>List of authorities consulted</u> The authorities as listed below have been invited to become involved in the process by written and telephonic invitation. • Department of Minerals and Resources (DMR)- Regional Office- Polokwane; • Limpopo Department of Economic Development, Environment and Tourism (LDEDET); • Department of Water Affairs (DWA)- Regional Office Lydenburg; • South African Heritage Resources Agency (SAHRA); • Limpopo- Department of Agriculture; • Greater Tubatse Local Municipality; and • Ward Councillor, All I&APs on the existing Two Rivers database were contacted at the start of the project. During the consultation with I&APs, as well as with the mine, additional parties will be identified and included within the existing database to provide an updated database. Numerous I&APs will be notified by word of mouth. Parties who respond to the advertisements and notifications will be included in the database. GCS has developed and will maintain an electronic database for the duration of the project where stakeholder details are captured and automatically updated as and when information is received from I&APs.	

REGULATION	PROVISION	PROGRESS	DATE
		A site notice was placed at the entrance to the mine.	18 January 2013
		One advertisement was placed as per the NEMA requirements. An advertisement regarding the project background, the process being followed, and the details and purpose of the PPP were placed in the Steelburger newspaper.	Published on Friday 11 January 2013
		Background Information Documents (BID) were sent to all I&APs/Stakeholders as per the existing database for Two Rivers. All I&APs were notified by way of fax, email or letter, depending on their preferred method of contact.	22 to 25 January 2013
		Public meeting	7 February 2013
		The Scoping Report was made available for review by I&APs for a minimum 30 day period and all registered I&APs were informed of the report's availability, CD's were provided to I&APs who required copies, the Scoping Report was also submitted to authorities for comment.	21 January 2013 until 1 March 2013
Draft Scoping Report	The EAP managing an application must submit 5 copies of the Draft Scoping Report to the competent authority	LDEDET requested 3 hard copies of the draft Scoping Report as well as 2 CDs of the said report.	Submitted – 18 January 2013 Acknowledgement of receipt – 11 February 2013
Regulation 29	The EAP managing an application must submit 5 copies of the Final Scoping Report to the competent authority.	LDEDET requested 3 hard copies of the draft Scoping Report as well as 2 CDs of the said report.	22 April 2013
Regulation 30	The competent authority must, within 30 days of acknowledging receipt of a Scoping Report, or receipt of the required information,	LDEDET accepted the Scoping report, with some requirements for additional information to be included in the EIA report. Refer to	10 June 2013 (Refer to

REGULATION	PROVISION	PROGRESS	DATE
	reports, or comments or the amended scoping report, consider it, and in writing: • accept the report and advise the EAP to proceed with the tasks contemplated in the plan of study for EIA; • request the EAP to make such amendments to the report as the competent authority may require; or • reject the scoping report.	Table 2.4 below which addresses the comments.	Appendix H-8)
Regulation 31	If a competent authority accepts a Scoping Report and advises the EAP to proceed with the tasks contemplated In the plan of study for environmental impact assessment, the EAP must proceed with those tasks, including the public participation process for EIA and prepare an EIA report in respect of the proposed activities.	The draft EIA/EMP report will be available for public review from 31 July 2013 for a minimum 30 day period.	30 July 2013 to 9 September 2013
Regulation 34(1)	The EAP managing an application must submit the draft EIA report to the competent authority.	The draft EIA/EMP Report will be submitted to LDEDET on 31 July 2013	31 July 2013
Regulation 34(2)	The competent authority must, within 60 days of receipt of a final EIA report: • accept the report; or • reject the report.	The final EIA report should be submitted in December 2013.	Submission in December 2013
Regulation 34(4)	An EIA report that is rejected in terms of Regulation 34(2) may be amended and resubmitted by the EAP.	This will be addressed if the EIA report is rejected by the LDEDET	N/A

Table 2.3 Listed Activities in terms of NEMA

NUMBER AND DATE OF THE RELEVANT NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	ACTIVITY DESCRIPTION
GN R 544 in GG 33306 of 18 June 2010	22[1]	The construction of a road, outside urban areas – (ii) where no reserve exists where the road is wider than 8 meters.	The haul roads to the Merensky Main decline will be widened to 10m, which exceeds the listed maximum of 8m.
GN R 544 in GG 33306 of 18 June 2010	9[2]	The construction of facilities or infrastructure exceeding' 1000metres in length for the bulk transportation of water, sewage or storm water.	The Merensky project will require a raw water supply pipeline from the Inyoni Dam (Klein Dwars River) to the new pump station. The pipeline will be 3.4km long and will have an internal diameter of 0.4m
GN R 544 in GG 33306 of 18 June 2010	13[3]	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	The UG2 & Merensky expansion requires additional dangerous goods to be stored and handled on site. The combined capacity of the additional requirements is 189m^3, for diesel, hydraulic oil, engine oil, transmission oil, explosive emulsion and pumpable explosive product.
GN R 544 in GG 33306 of 18 June 2010	28	The expansion of existing facilities for any process or activity where such expansion will result in the need for a new, or amendment of, an existing permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	Expansion of the existing UG2 mine, will require additional removal and storage of underground water. This is listed under Section 21 (j) of the National Water Act, 1998 (Act No.36 of 1998) and will require amendment in the existing WUL.
GN R 545 in GG 33306 of 18 June 2010	5[4]	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	Construction of the new Merensky declines, will require the removal of underground water. This is listed under Section 21 (j) of the National Water Act, 1998 (Act No.36 of 1998). Additional water supply will also be required for the expansion which is listed under Section 21(a). Section 21(g) of the NWA is applicable to the proposed return water and storm water dams. Section 21(g) is also applicable to the waste material stockpile associated with the new Merensky conveyor and stockpile within the ROM circuit of the new Merensky Plant. Section 21 (c) and (i) are applicable to the Merensky conveyor river crossings. TRP has an existing approved Water Use Licence which will require amendment to include the new mining activities.

GN R 545 in GG 33306 of 18 June 2010	8	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.	TRP currently receives power from the Eskom Uchoba substation via a single overhead line with a capacity of 30 MVA (30 000 kilovolts). An additional 25 MVA (25 000 kilovolts) is required to ramp the total production for Merensky to 450ktpm. This additional requirement is in negotiation with Eskom and is planned to be delivered to the portal, crushing, conveyor and other installations by means of a conventional overhead line reticulation system.
GN R 545 in GG 33306 of 18 June 2010	15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more.	The total area of the surface infrastructure to be transformed by the Merensky mine will exceed the listed maximum of 20Ha. The land is currently vacant and forms part of the TRP property. It will be transformed for industrial use as part of the existing Two Rivers mining operations.

[1]During application and Scoping additional roads were included in this listing. Feasibility designs available at Draft EIA phase indicate that only the haul roads to the Merensky Main and North shafts will exceed 8m in width. Refer to the amended Application form in Appendix A.

[2]During application and Scoping this activity was listed for the purposes of domestic water supply and sewage. It has since been determined that this piping will not exceed 200mm in diameter, and the activity is therefore not triggered. However, the proposed Inyoni water supply pipeline that was excluded from the Merensky plant previously, has now been included, and triggers activity 9 of GN R544. Refer to the amended application form in Appendix A.

[3]This was initially listed as activity 3 of GN R 545, but it has been determined since that the combined volume of dangerous goods to be stored and handled on site for the UG2 and Merensky expansion, will not exceed 500m^3. Refer to the amended application form in Appendix A.

[4]Section 21 (c) and (i) were added to the listed activities under the NWA in the Draft EIA phase, for the proposed Merensky conveyor river crossing. Refer to the amended application form in Appendix A.

2.3.2.1 Comments received from LDEDET

Refer to Appendix H-8 which contains the comments and letter of acceptance of the Final Scoping report, as well as the Draft EIA Report, from LDEDET. Refer to Table 2.4 below which addresses the comments received.

Table 2.4 Addressing of comments received from LDEDET

Comment	How it has been addressed
1. The Department requests an amended application form which stipulates clearly the capacities/threshold of the proposed development (Final Scoping).	Refer to Appendix A containing the updated application form. Table 2.3 above also lists the correct listed activities, with notes where there have been changes since initial application.
2. A layout plan should be overlain on the sensitivity map (Final Scoping)	Refer to Section 5.13 of this report which contains the required sensitivity map.
3. Declaration forms are required for all specialists conducting studies for the application (Draft EIA)	Refer to Appendix B-G containing the specialist studies. The signed declarations are included with each report.

2.3.3 The Process in terms of the Mineral and Petroleum Resources Development Act, Act No. 28 of 2002 (MPRDA)

Mines and mining related activities are regulated by the MPRDA, therefore in terms of Section 102 of the MPRDA, TRP requires authorisation for the proposed activities in the form of an amendment to the existing EMP, which must be approved by the Department of Mineral Resources (hereinafter referred to as the "*DMR*") in Polokwane, before construction may begin.

The EMP to be submitted to DMR will comply with the requirements stipulated in Section 51 of GN R527, dated 23 April 2004, in terms of Section 107(1) of the MPRDA. As such, the EIR will contain the following:

- An assessment of the environment likely to be affected by the proposed operations;
- An assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed operation, including cumulative impacts;
- A comparative assessment of the potential operation, as well as a comparison of other potential land uses for those sites;
- Identification of appropriate mitigatory measures for each significant potential impact of the proposed operation;
- Description of the stakeholder engagement process undertaken during the course of the assessment, issues that were raised and questions asked by I&APs and authorities, and how these issues and questions were addressed;
- Identification of gaps in knowledge, report on the adequacy of predictive methods, underlying assumptions and uncertainties encountered in compiling the required information;

- Description of the arrangements for monitoring and management of environmental impacts;
- A description of the environmental objectives and specific goals for the management of the identified environmental and socio-economic impacts during all phases of the development(construction, operation, decommissioning and post-closure);
- A description of the appropriate technical and management options chosen for each environmental, socio-economic, cultural and historical impact for all project phases;
- Action plans to achieve the specific goals set out, as well as timeframes for the implementation of mitigatory measures;
- Procedures for environmental related emergencies and remediation;
- Planned monitoring and environmental management programme performance assessment;
- An environmental awareness plan; and
- An undertaking by the applicant to comply with the provisions of the MPRDA and regulations thereto.

2.3.4 The Process in terms of the National Water Act, Act No. 36 1998 (NWA)

In addition to the NEMA and MPRDA authorisations, activities which have the potential to impact on a water resource require that a water use licence (WUL) issued by the Department of Water Affairs (DWA), under the NWA. Section 21 of the NWA identifies certain water uses which have to be authorised. The existing WUL will be amended to include the New TSF and submitted to the Department of Water Affairs (DWA) in Lydenburg for the following Section 21 water uses:

- 21 (a): Taking water from a water resource.
- 21 (c): Impeding or diverting the flow of water in a watercourse.
- 21 (i): Altering the bed, banks, course or characteristics of a watercourse.
- 21 (g): Disposing of waste in a manner which may detrimentally impact on a water resource.
- 21 (j): Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

In addition, an Integrated Waste and Water Management Plan (IWWMP) will also be amended and submitted as a supporting technical document to the WULA. The IWWMP is used as a management tool by TRP to manage water emanating from the New TSF as a result of runoff or seepage, using best practices in the interest of protecting the water resources which may be affected.

A WUL may be issued for a maximum period of 40 years with a specified review period. The WUL also prescribes a set of conditions to protect water resources, and gauge the impact of the water use. These have to be strictly adhered to for as long as the water use continues. This may extend beyond the life of the New TSF and other uses, as TRP will be responsible for impacts caused by the TSF after decommissioning and closure.

Furthermore, Section 27 of the NWA specifies that the following factors, regarding water use authorization, must be taken into consideration:

- The efficient and beneficial use of water in the public interest;
- The socio-economic impact of the decision whether or not to issue a license;
- Alignment with the catchment management strategy;
- The impact of the water use and possible resource directed measures; and
- Investments made by the applicant in respect of the water use in question.

Section 27 considerations will be included in the WULA and IWWMP. This will assist TRP in ensuring that the water uses applied for, are undertaken in a manner that does not negatively impact on the public, water resources, or downstream water users or compromise any of the country's international obligations with regards to shared water resources.

2.3.5 The Process in terms of the National Environmental Management: Waste Act, Act No. 59 of 1998 (NEMWA)

According to Section 44 of the NEMWA, the application and decision-making process regarding the licensing of waste management activities must be in line with the decision-making process in NEMA. The interpretation and application of the NEMWA must be guided by the principles set out in Section 2 of NEMA (as addressed in paragraph 1.2 of this document).

The proposed development triggers listed activities under Category B in Schedule 1 of the NEMWA. In terms of section 19(1) of the NEMWA, TRP is required to conduct the necessary environmental application process and submit a Scoping Report and EIA/EMP reports to the LDEDET, in respect of the listed activities described in Category B in Schedule 1 of the NEMWA.

The activities listed under Category B are equivalent to those that require an environmental impact assessment process as stipulated in the EIA Regulations promulgated under the NEMA. Activity 4(7) requires investigation and subsequent authorization:
"***The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic meters or more***."

TRP currently has three (3) existing sewage plants on the site, and the proposed Merensky project will involve the construction of two additional new sewage plants. It was agreed with the Department of Environmental Affairs (hereinafter referred to as the "*DEA*") that the Waste License Application for the existing sewage plants should be amended to include the proposed new plants. The Waste Licence Application and associated correspondence with the Department is contained in Appendix B.

The process followed for the Waste Licence Application was as per Table 2.2 above, as the application is being run in parallel with the TRP NEMA Applications.

The Final Scoping Report was submitted to DEA on 22 April 2013, and a letter of acceptance was received from DEA on 17 May 2013 (Refer to Appendix H-7). The Scoping report was accepted as being complete and no further information was required by DEA.

2.4 Environmental Process Objectives

In order to mitigate potentially negative impacts and to identify any potential fatal flaws which may render the project environmentally unacceptable, GCS has adopted an integrated, step-by-step process to identify issues of concern and to thoroughly investigate these issues.

The proposed environmental investigations undertaken will address all phases related to the proposed project. These phases will include the:

- Construction phase;
- Operation phase; and
- Closure and Decommissioning phase.

To ensure that the negative impacts are identified and mitigated in the early stages of the project, and that the positive impacts are maximised, it will be necessary for the environmental study to meet the following aims:

- Follow the guideline process as outlined by the NEMA and the MPRDA;
- Provide input in the feasibility phases to ensure that the most technically feasible, and environmentally sound options are selected;
- Ensure that impacts are identified early through investigations to minimize environmental damage and maximise benefits;
- Conduct thorough special investigations that will allow the project team to develop an adequate understanding of the issues to be dealt with;
- Compile an EIA that will identify, evaluate and address the potential impacts;
- Provide on-going environmental input into the project planning and development;

- Compile an EMP that will limit the significance of the negative impacts and maximise the positive aspects;
- Ensure that all relevant I&APs/ stakeholders are consulted and involved throughout the project; and
- Ensure that an open and transparent communication structure is in place during the life of the mine.

Strong emphasis will be placed on the NEMA, MPRDA, NWA and NEMWA processes to ensure that the four (4) processes will be able to run concurrently, and will easily be comparable with no confusion between the different processes.

2.5 Environmental Assessment Practitioner

This section of the Report relates to the content of an EIA Report as regulated by Regulation 31 of the NEMA Regulations.

Regulation 31(2)	*An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 35, and must include -*
	(a) details of - *(i) the EAP who compiled the report; and* *(ii) the expertise of the EAP to carry out an environmental impact assessment;…*

In terms of Section 17 of NEMA, TRP has to appoint environmental assessment practitioners (EAPs) before applying for an environmental authorisation of any activity listed in terms of GN R544; R545 and R546. For this purpose TRP has appointed GCS to undertake the necessary environmental assessments and to ensure that all legislative requirements are adhered to as part of the environmental authorisation process.

GCS provides a professional, independent consulting service in the fields of water, environmental, engineering and earth sciences. The GCS team consists of highly trained staff that has extensive experience in the fields of hydrogeology, hydrology, pedology, engineering geology, engineering and environmental science.

GCS undertakes hydrogeological investigations for water supply projects, groundwater pollution studies, mining hydrogeology, mathematical modelling and hydrogeological aspects of waste disposal throughout sub-Saharan Africa. GCS also provides expertise in environmental management services.

GCS was founded in 1987 and the broad GCS client base ranges from individuals, engineers, municipalities and mines, to Independent States and Governments. GCS is an independent practice, which is wholly owned by the partners of the company. GCS is an independent environmental consulting firm and will undertake the EIA and co-ordinate the specialist investigations which form part of the EIA. GCS will also be responsible for the relevant public participation process related to the proposed project.

Table 2.5 EAPs from GCS (Pty) Ltd

NAME	POSITION	GENERAL QUALIFICATIONS	YEARS OF EXPERIENCE IN EIAS AND EMPS
Tanja Bekker	Environmental Unit Manager	• MSc. Environmental Management • Pr.Sci.Nat (Reg No: 400198/09) • Member of the Environmental Law Association • Member of the International Association for Impact Assessment • Technical and Quality Control	10
Megan Wuite	Senior Environmental Consultant	• BSc Agriculture • M Environment and Development • Pr.Sci.Nat (Reg No:400400/13) • Member of the International Association for Impact Assessment	5

2.6 Reporting

Based on the outcome of the Environmental Scoping Phase, an EIA and an EMP Report must be submitted to the Ministers of LDEDET and the DMR for consideration and approval.

2.6.1 Environmental Impact Assessment

The EIA Report must determine the nature, extent, duration, probability and significance of the environmental, social and cultural impacts of the project, the reasonable alternatives and the required mitigation measures for each impact during the life of the mine. It is the role of the relevant environmental authorities to make a decision on whether the project should proceed or not, based on the information provided in the EIA and this report therefore does not make a recommendation on whether the project should proceed or not.

Regulation 31(2) of Government Notice R543 of the NEMA Regulation stipulates that an EIA Report must contain all necessary information to enable the competent authority to consider the application and to reach a decision. The EIA Report must contain, *inter alia*, the following:

- A description and comparative assessment of all alternatives identified;
- A description of all environmental issues identified as well as the significance of each issue and an indication if the extent to which the issue could be addressed by the adoption of mitigating measures;
- An Environmental Impact Statement; and
- An EMP.

Furthermore, the criteria which the competent authority will apply, when considering applications in terms of the provisions of NEMA, is enunciated in Regulation 8 of Government Notice R543 of the NEMA Regulations. The latter regulation states that consideration must be had for Section 24O, Section 24(4) as well as the need and desirability of the activity. The activities identified in the provisions of NEMA and the Regulations thereto pertain to activities which may have a detrimental impact on the environment.

The criteria to be taken into account by the competent authority when considering applications as set out in Section 24O and 24(4) of NEMA includes, inter alia, the following relevant factors:

- Any pollution, environmental impacts or environmental degradation likely to be caused if the application is approved or refused;
- Measures taken to protect the environment from harm as a result of the activity which is the subject of the application;
- Measures taken to prevent, control, abate or mitigate any pollution, substantially detrimental environmental impacts or environmental degradation;
- The ability of the applicant to implement mitigation measures and to comply with any conditions subject to which the application may be granted;
- Where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment; and
- Any comments received from organs of state that have jurisdiction over any aspect of the activity which is the subject of the application.

2.6.2 Environmental Management Programme (EMP)

Each specialist was required to identify means of avoiding, mitigating and/or managing the negative impacts in his/her particular aspect of the investigation. The recommended management strategies are synthesised in this report by GCS to formulate the EMP for the proposed listed activities and the operation as a whole.

Management strategies are based on the recommendations by specialists in their specific field of study. The management measures will be incorporated into the mine systems to avoid, or appropriately manage, impacts from the outset.

A draft EMP must include details of the person who prepared the EMP and the expertise of that person to prepare an EMP. The draft EMP must, furthermore, include:

- Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified, including environmental impacts or objectives in respect of –
    - planning and design;
    - pre-construction and construction activities;
    - operation or undertaking of the activity;
    - rehabilitation of the environment; and
    - closure, where relevant.
- A detailed description of the aspects of the activity that are covered by the draft EMP;
- An identification of the persons who will be responsible for the implementation of the mitigating measures;
- Where appropriate, time periods within which the measures contemplated in the draft EMP must be implemented; and
- Proposed mechanisms for monitoring compliance with the environmental management plan and reporting thereon.

The EIA ensures that the needs of the environment (biophysical and socio-economic) are identified. The EMP in turn provides a tool for meeting the objective to reduce or avoid negative environmental impacts associated with a project within a certain environment by providing detailed mitigation measures and management commitments. All of these sections will become legally binding on the approval of this report.

2.6.3 Reporting Structure (EIA/EMP)

The EIA/EMP Report has been compiled to identify the impacts associated with the mining activities and to determine the management measures that need to be implemented.

Chapter 1: Background and Introduction

- This chapter provides a description of the location and the land ownership of the mine, as well as the purpose, approach and methodology followed for the completion of this project.

Chapter 2: Detailed Project Description

- This chapter provides a detailed description of the proposed project and how it is planned to be initiated and operated should the environmental investigations be sufficient and approved.

Chapter 3: Project Alternatives

- This chapter details the project alternatives considered for the project and conducts a comparative assessment to indicate why the final option was selected, if required.

Chapter 4: Detailed Environmental Description

- This chapter provides a description of the current environment (which includes the biophysical and socio-economic components) prior to the commencing of the proposed project.

Chapter 5: Public Participation Process

- This chapter details the process undertaken for stakeholder engagement and provides a discussion on the issues raised and how these will be addressed.

Chapter 6: Activities and Environmental Management Objectives

- This chapter outlines the activities of the proposed project and according to the activities the environmental objectives for each stage were identified.

Chapter 7: Environmental Impact Assessment and Management Plan

- This chapter assesses and rates the potential impacts on the environment, prior to the consideration of mitigation measures, as well as the potential impacts after the implementation of the proposed mitigation measures.

Chapter 8: Monitoring Management Programme

- This chapter indicates the monitoring and management measures of environmental impacts (i.e. surface water monitoring, groundwater monitoring, air quality monitoring etc.) for the way forward should this project be approved.

Chapter 9: Environmental Awareness and Emergency Response Plan

- This chapter details procedures for environmental related emergencies and remediation measures.

Chapter 10: Gap Analysis

- This chapter serves to indicate which gaps have been identified and how these should be addressed.

Chapter 11: Undertaking by Client

- This chapter contains the signatures of the mine manager and the director from the DME to make all information contained in EMP legally binding.

Chapter 12: Conclusion

- The conclusion provides a brief discussion on the findings in the report.

Chapter 13: References

3 DETAILED PROJECT DESCRIPTION

This section of the Report relates to the content of an EIA Report as regulated by Regulation 31 of the NEMA Regulations.

Regulation 31(2)	*An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 35, and must include -*
	(b) A detailed description of the proposed activity

3.1 Description & need for the UG2 and Merensky Project, incorporating the installation of new wastewater treatment (sewage) plants.

This section of the report relates to the content of an EIA Report as regulated by Regulation 31 of the NEMA Regulations.

Regulation 31(2)	*An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 35, and must include -*
	(f) A description of the need and desirability of the proposed activity

The existing infrastructure at TRP consists of two underground mines namely the Main decline and North decline, a UG2 concentrator plant and a Tailings Storage Facility (TSF). To ensure optimal mining operations, sustain current mining production and to grow the Merensky production; TRP proposes an expansion to the current underground mining operations to mine additional areas of the UG2 reef, as well as to develop declines to extract ore from the overlying Merensky reef. Furthermore, to enable the said expansion of TRP's mining operations, it was established that the preferred and most economically viable option will be to continue mining the North decline and to establish a sub-decline system at the Main decline of both UG2 and Merensky so as to access the southern mining area.

During the initial scoping and feasibility phase it was determined that the current infrastructure is not sufficient for the purposes of the proposed expansion of TRP's mining operations; due to the fact that the design of the existing UG2 infrastructure did not make provision for any expansion projects of this scale. Accordingly, the Merensky declines require substantial infrastructural development.

The project will entail the development of additional infrastructure, in addition to the already established UG2 infrastructure, which will include infrastructure for the Merensky Main decline and North decline as well as a new Concentrator Plant. Identical to the North decline, the Merensky declines are designed to each support a 100ktpm production profile. Therefore, and to ensure simplicity and consistency, the infrastructural designs, as developed for the North decline, are used as a basis for the design of the proposed Merensky declines. Table 3.1 provides a summary of activities and locations.

Table 3.1 Summary of the activities forming part of the UG2 & Merensky Expansion

APPLICATION	MINING ACTIVITY	FARM PORTIONS INVOLVED	MINING RIGHTS
UG2 and Merensky Expansion	Construction of additional Main and North declines and associated infrastructure to access the Merensky reef	Dwarsrivier (existing site)	TRP's existing mining right area
	Underground mining of the Merensky reef	Dwarsrivier & Kalkfontein via new Merensky North decline on Dwarsrivier (no new surface infrastructure on Kalkfontein)	TRP's existing mining right area as well as transferred prospecting rights from Kalkfontein. Section 102 application submitted to convert the prospecting to mining rights.
	Upgrading of existing infrastructure for expansion of UG2 mining	Dwarsrivier (existing site)	TRP's existing mining right area
	Expansion of underground mining of the UG2 reef	Dwarsrivier, Kalkfontein and Tweefontein via existing declines (no new infrastructure on Kalkfontein & Tweefontein)	TRP's existing mining right area as well as transferred prospecting rights from Kalkfontein & Tweefontein. Section 102 application submitted to convert the prospecting to mining rights.
UG2 and Merensky Expansion	Construction of a new plant for processing of Merensky ore.	Dwarsrivier (existing property)	TRP's existing mining right area
Waste Licence Application	Installation of 3 existing and 3 new wastewater treatment (sewage) plants	Dwarsrivier (existing site)	TRP's existing mining right area

3.1.1 Timeframes and Scheduling

TRP will remain in production until 2027, that is, for a period of 23 years since its inception in 2004. The future planned mine production plan for reef extraction from 2013 until closure will be carried out under steady state conditions at 250kt/month for UG2 and 200kt/month for Merensky.

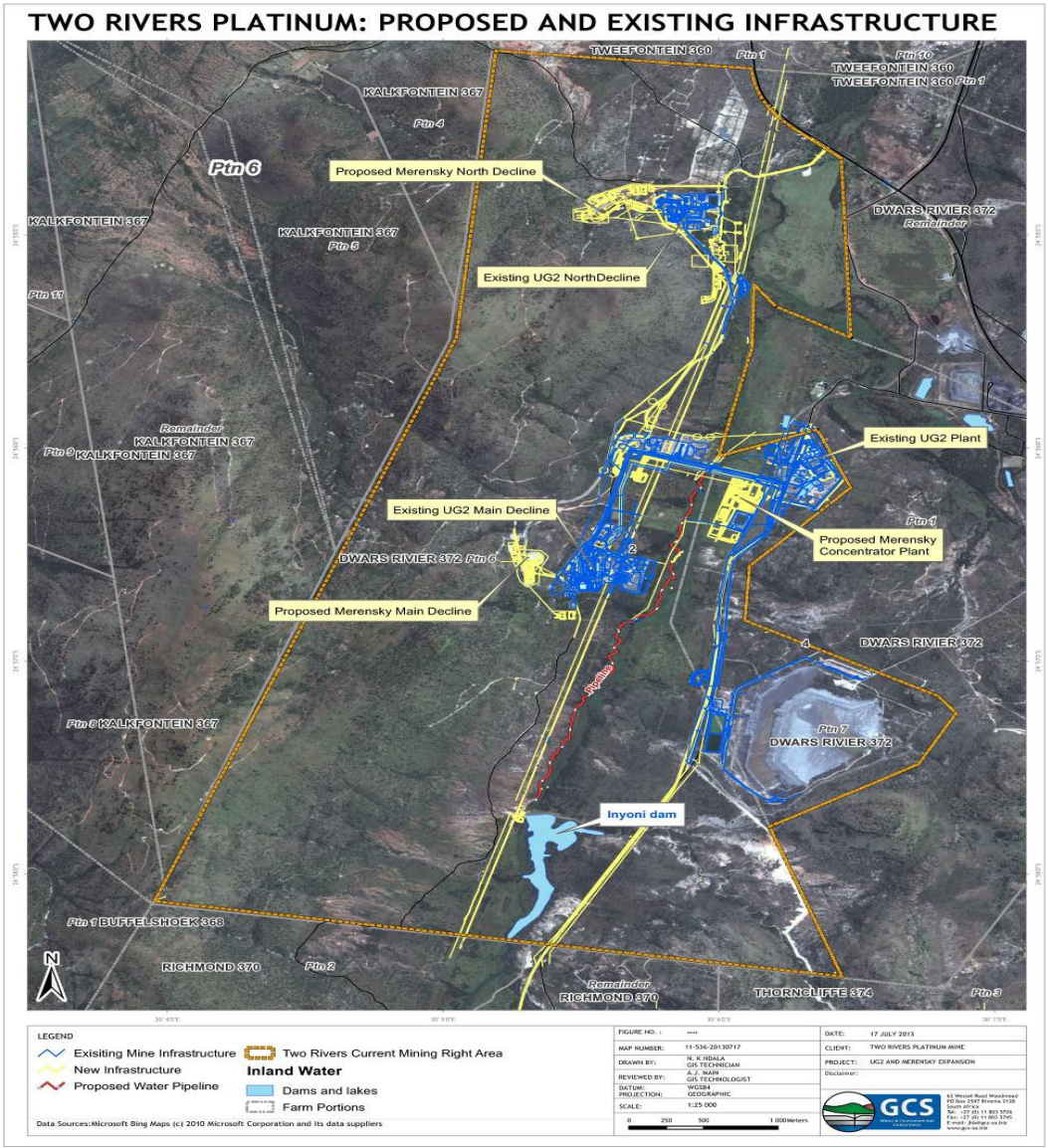
Production from the Kalkfontein and Tweefontein properties falls within, and therefore forms part of, the overall planned production. The summary timelines are shown in Table 3.2.

Table 3.2 Timeframes for production

PRODUCTION AREA	STARTING YEAR	ENDING YEAR	NO. OF YEARS
Main Decline (UG2)	2015	2021	7
North Decline (UG2)	2014	2027	14
Main Decline (Merensky)	2016	2022	7
North Decline (Merensky	2017	2027	11

3.2 Location of the proposed UG2 and Merensky Expansion

The proposed UG2 and Merensky Mine surface infrastructure is/will be located within the boundary of the current TRP mine boundary and mining right area. Refer to Figure 3.1 indicating the detailed layout of the proposed infrastructure together with the existing infrastructure.



(Figure not to scale- refer to map on adjacent page)

Figure 3.1 Location of the UG2 & Merensky expansion

3.3 Summary of triggered listed activities

The underground mine expansion, as well as the installation of additional surface infrastructure (including the proposed Merensky concentrator), triggers a number of listed activities in terms of the NEMA. Table 3.3 summarises the activities proposed by TRP and the associated listed activities. More detail regarding each activity is contained in Sections 3.4, 3.5 and 3.6 which follow.

Table 3.3 Summary of the proposed expansion at TRP, and the associated listed activities

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	LISTED ACTIVITY NO.
Expansion of the existing UG2 underground mine on Dwarsrivier, extending into Kalkfontein and Tweefontein, and the associated increase in dewatering water volumes and storage,	The expansion of existing facilities for any process or activity where such expansion will result in the need for a new, or amendment of, an existing permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	GN R544 Activity No. 28 NEMA
Construction of a new underground mine in order to access Merensky reef resources, and the associated dewatering and storage of underground water. New waste material and ore stockpiles are also required, associated with the new conveyor and concentrator.	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	GN R 545 Activity No. 5 NEMA
Upgrading of existing, and construction of new haul roads with a width of 10m	The construction of a road, outside urban areas – (ii) where no reserve exists where the road is wider than 8 meters	GN R544 Activity No. 22 NEMA
Upgrading and expansion of the power supply for the proposed Merensky Main and North Declines	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex	GN R545 Activity No. 8 NEMA
Expansion of the mine footprint by inclusion of the proposed Merensky Main and North Declines and associated infrastructure, as well as the proposed Merensky concentrator and proposed infrastructure.	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total are to be transformed is 20 hectares or more	GN R545 Activity No. 15 NEMA
Construction of additional facilities to store fuel, lubricants and plant reagents with a capacity of 189m^3	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	GN R544 Activity No. 13 NEMA
Construction of a water supply pipeline from the Inyoni Dam to the proposed new pump station. The pipeline will be 3.5km long with an internal diameter of 400mm	The construction of facilities or infrastructure exceeding' 1000metres in length for the bulk transportation of water, sewage or storm water- (i) With an internal diameter of 0.36 meters	GN R 544 Activity No. 9

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	LISTED ACTIVITY NO.
Installation of 3 new proposed sewage treatment plants, as well as licensing of the existing 3 sewage treatment plants currently in operation on site.	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic meters or more.	Schedule 1, Category B, NEM: WA

For ease of reference and to understand the proposed project, the project description has been subdivided in three sections:

1. Section 3.4: UG2 Expansion
2. Section 3.5: Merensky Expansion (including Concentrator); and
3. Section 3.6: Waste Water Treatment Works.

3.4 UG2 Expansion

3.4.1 UG2 Underground Mine Plan – expansion to existing operation

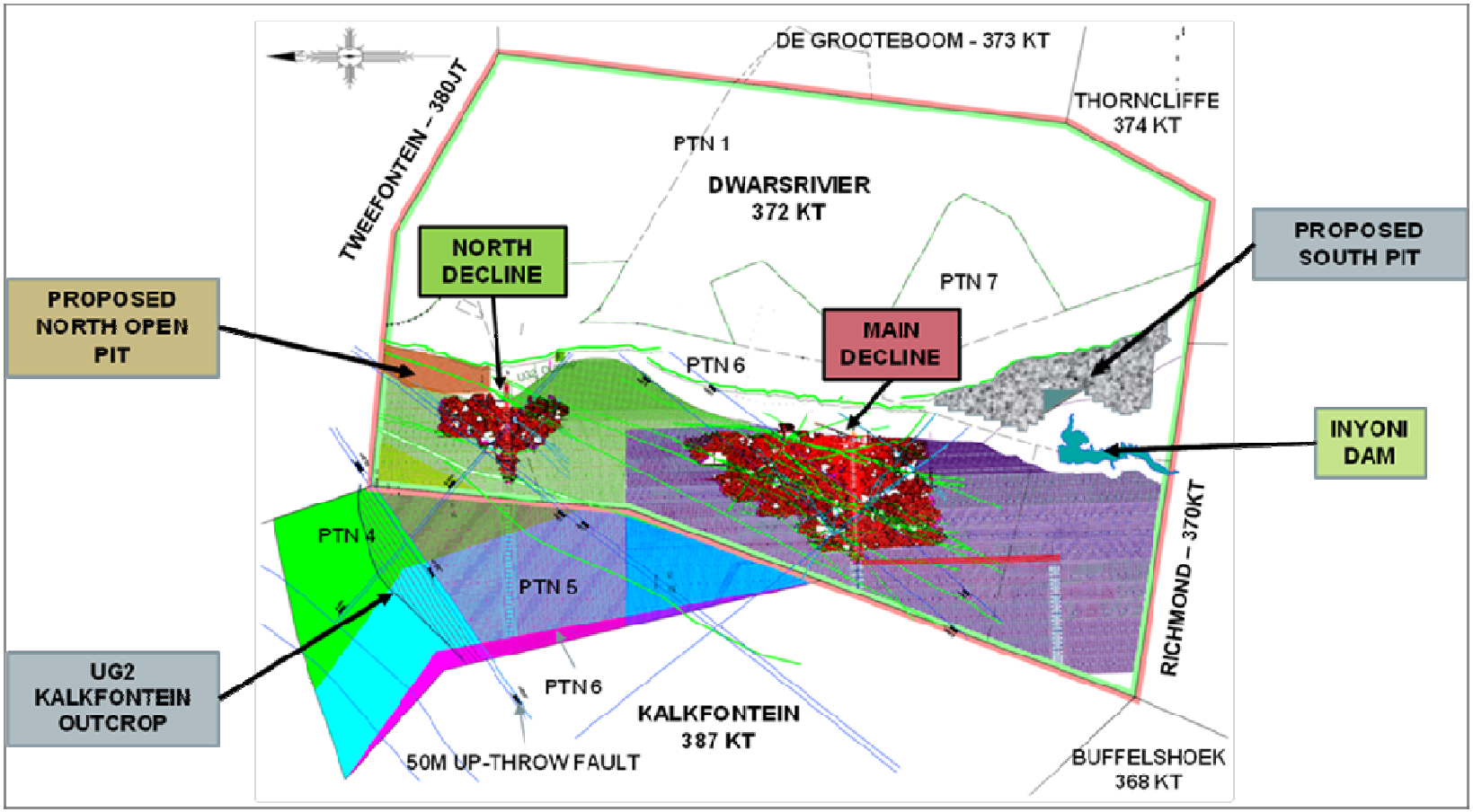
INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	NEMA LISTED ACTIVITY
Expansion of the existing UG2 underground mine on Dwarsrivier, extending into Kalkfontein and Tweefontein, and the associated increase in dewatering water volumes and storage,	The expansion of existing facilities for any process or activity where such expansion will result in the need for a new, or amendment of, an existing permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	GN R544 Activity No. 28 NEMA

The UG2 seam will continue to be mined on the Dwarsrivier farm, and will extend into both Kalkfontein and Tweefontein. Figure 3.2 (page 45) indicates the expansions to the existing underground mining areas at TRP.

Expansion of the existing UG2 declines will require additional removal of underground water which will be stored in existing dams for re-use. This is listed under Section 21 (j) of the NWA and as such will require amendment of the existing Water Use Licence (WUL).

Settling dams on surface are used to collect underground return water prior to reuse as service water. A flocculating agent is added to the dirty return water before it enters the dams to accelerate the settling time. Also, a treatment facility is included downstream of the settling dams to prepare the water for reuse underground.

Please note that the open pit areas indicated in Figure 3.2 are not part of this application. They will form part of future mining expansions at TRP.



(Figure not to scale)

Figure 3.2 UG2 Expansion - underground mine layout

3.4.2 Existing (UG2) Surface Infrastructure Expansion

The expansion of the existing UG2 surface infrastructure does not trigger any listed activities. A description of the proposed expansion is however included here to provide a more complete project description of the overall mine expansion since all existing operations are affected. Construction of the two new Merensky declines and plant triggers a number of listed activities. This is described in Section 3.3.

3.4.2.1 Power Supply

Both existing UG2 Main and North declines are fed from the two 30MVA, 33/11kV transformers (The two 30MVA transformers installed at the plant main substation are moved and installed at the underground main 3/11kV substation). For the sake of redundancy, one transformer is able to supply the entire underground operation in case of a failure of the other. *The overhead lines are designed such that one line/cable is able to supply both the Merensky and UG2 North portals. The same is true for the cabling which supplies the Merensky and UG2 Main portal substations. Refer to Section 3.4.2.3 for more information.*

3.4.2.2 Water Supply

TRP Dwarsrivier sources its water supply from the Klein and Groot Dwars Rivers. The majority of the water supply allocation, 1 500 000m^3 per annum, may be sourced from the Inyoni dam located within the Klein Dwars river catchment area on the 372KT Dwarsrivier farm in Portions 1 and 2. TRP is also allocated a total of 547 000m^3 per annum of water which can be sourced from underground sources. *No additional water supply is required for expansion of the existing UG2 mine*.

3.4.2.3 Roads

The road infrastructure for the existing UG2 Main shaft consists of a tarred access road which runs alongside the existing overland conveyor from the plant and General Mine Office to the shaft itself. *This road is able to cater for access to both UG2 and the proposed Merensky Main shafts without any modification.*

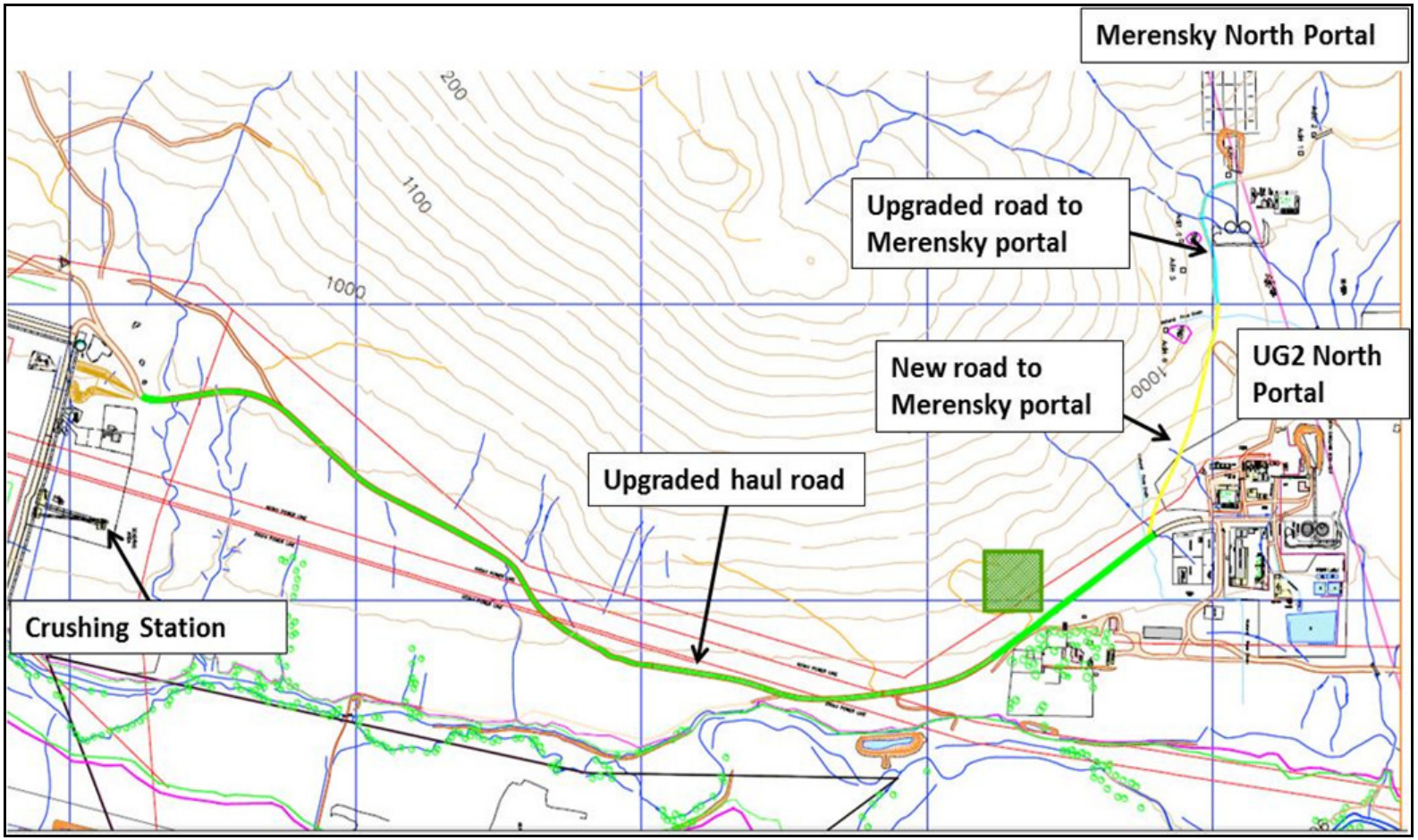
Road infrastructure for North shaft includes a haul road and access road. The haul road runs from the stockpiles at North shaft to the reclaim bins adjacent to the existing UG2 ROM silo. This is a dirt road which is utilised almost exclusively by haul trucks, but is occasionally used as an access route for service vehicles. *No changes to the haul road are required for UG2 North shaft however, due to the inclusion of the Merensky portal, the haul road would be upgraded and more maintenance would be expected. The routing of the upgraded road is shown in Figure 3.3 (page 48).*

3.4.2.4 Compressed Air

TRP standardises its compressor systems at all of its current installations with Ingersol-Rand ML250 compressor units. The number of compressors is selected based on the duty requirements, redundancy required and production output.

UG2 Main shaft has seven such air compressors installed. Four of these compressors are kept online to service the requirements of the mine, whilst the other three are left offline for the sake of redundancy. These, however, will now be used to service the Merensky Main shaft instead with the addition of the currently installed compressor unit at the Merensky Main shaft. *No further upgrade is required as the ramp down of production creates sufficient spare capacity within the system.*

UG2 North shaft has three installed compressor units. *As this shaft is designed for a 100ktpm production level, there is no need to upgrade this aspect of the existing infrastructure*. It has been confirmed, through the compressed air reticulation simulations, that three compressor units are capable of supplying sufficient compressed air at each of the 100ktpm shafts.



(Figure not to scale)

Figure 3.3 UG2 and Merensky North Shafts proposed road infrastructure

3.4.2.5 Settling Dams

Two 4000m^3 dams are used to process return water at the UG2 Main Shaft. The daily water requirement is 2400m^3 with a minimum dam size requirement of 540m^3 assuming a constant fill rate. *Consequently, it can be seen that the existing infrastructure is more than capable of supporting both the UG2 and Merensky shaft.* Two 800m^3 dams are used to process return water at the North Shaft. The existing dam system is capable of supporting a 100ktpm shaft operating at full capacity albeit with a marginal safety factor when assuming zero inflow. When this assumption is relaxed, the dam size is found to be more than sufficient.

3.4.2.6 Waste Stockpiles

A system of conveyors and temporary and permanent stockpiles is already in place at the existing UG2 Main and North Declines. *These existing stockpiles will be sufficient for the increased UG2 production.*

3.4.2.7 Lighting, Silo's and Office Blocks

The existing facilities at the UG2 Main and North Declines will be sufficient for the increased UG2 production.

3.4.2.8 Change Houses

The change house infrastructure at UG2 Main shaft has recently undergone an upgrade to accommodate the staff who will work in the Merensky shaft and thus does not require any further alteration. The existing infrastructure at North shaft does not require upgrading as it is designed to operate at 100ktpm even though it currently operates at 80ktpm.

3.4.2.9 Lamp and Crush rooms

The existing facilities are adequate and will not require upgrading.

3.4.2.10 Bus stop, parking, security and access control

The parking facilities at Main shaft are sufficient to cater for both UG2 and Merensky Main shafts as very few additional administrative staff members are required. The facilities at UG2 North shaft are suitable for use by both North shafts, excepting for the covered parking area, which will be duplicated at the Merensky shaft. The existing bus parking area at North shaft is merely a large, flat graded area which may be easily increased in size to cater for both shafts. The existing security and access control systems will not require upgrade.

3.4.2.11 Cable Storage and Salvage Yard

A cable and salvage yard area is required for at each mining area. A cable storage yard and salvage yard are already present at Main shaft and North shaft. *These will double-up for*

use by both UG2 and Merensky shafts as there is extensive duplication of equipment across the operations.

3.4.2.12 Sewage

Both UG2 Shafts have existing sewage treatment plants and will be used as-built without any additions or extensions. Naturally, since the UG2 and Merensky shafts share change house infrastructure, the treatment plant at this site services both shafts. North shaft, however, acts independently of the Merensky shaft. Refer to Section 3.6 for more details.

3.4.2.13 Storm Water Management

Cut-off drains and berms are provided at the existing UG2 Main and North Shafts to divert clean storm water runoff towards the existing natural watercourses. Additional infrastructure is not required.

3.4.2.14 Explosive and General Stores

Typical mine overseer stores are currently provided at both shafts. This also includes a Utility Vehicle (UV) cassette loading/handling area adjacent to the storeroom. The existing Main and North shaft stores will handle the bulk of the material supply. Explosive storage is in the existing TRP magazine, from where it is transported for daily consumption.

3.4.2.15 Bulk Fuel and Lubricant Storage

Existing facilities will not require upgrading.

3.4.2.16 UG2 Expansion – Underground Infrastructure

Refuge bays will not require upgrade, additional workshops will, however, be required. One such workshop exists on the primary decline of the Main Shaft and will be used to service all equipment operating on strikes off of the primary decline. A second workshop is planned to be installed immediately above the sub-decline system at the UG2 Main decline.

North shaft utilises a surface workshop for all repair work. This will change with the inclusion of an underground workshop at 6-Level is used to service the entire shaft. The workshop is placed adjacent the current lease boundary so as to be roughly central to the reserve which includes the Kalkfontein area.

3.5 Merensky Expansion

3.5.1 Merensky Underground Mine Plan – new underground mine

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	NEMA LISTED ACTIVITY
Construction of a new undergrounds mine in order to access Merensky reef resources, and the associated dewatering and storage of underground water. New waste material and ore stockpiles are also required, associated with the new conveyor and concentrator.	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	GN R 545, Activity 5

Construction of the new Merensky declines will require the removal of underground water which will be stored in dams for re-use. This is listed under Section 21 (j) of the NWA. TRP has an existing Water Use Licence (WUL); an additional application will be required to include the dewatering from the two new Merensky Declines.

Settling dams on surface are used to collect underground return water prior to reuse as service water. A flocculating agent is added to the dirty return water before it enters the dams to accelerate the settling time. Also, a treatment facility is included downstream of the settling dams to prepare the water for reuse underground.

Refer to Figure 3.4 indicating the proposed Merensky mine. The Merensky seam will be mined on the farms Dwarsrivier 372KT and Kalkfontein 387KT only.

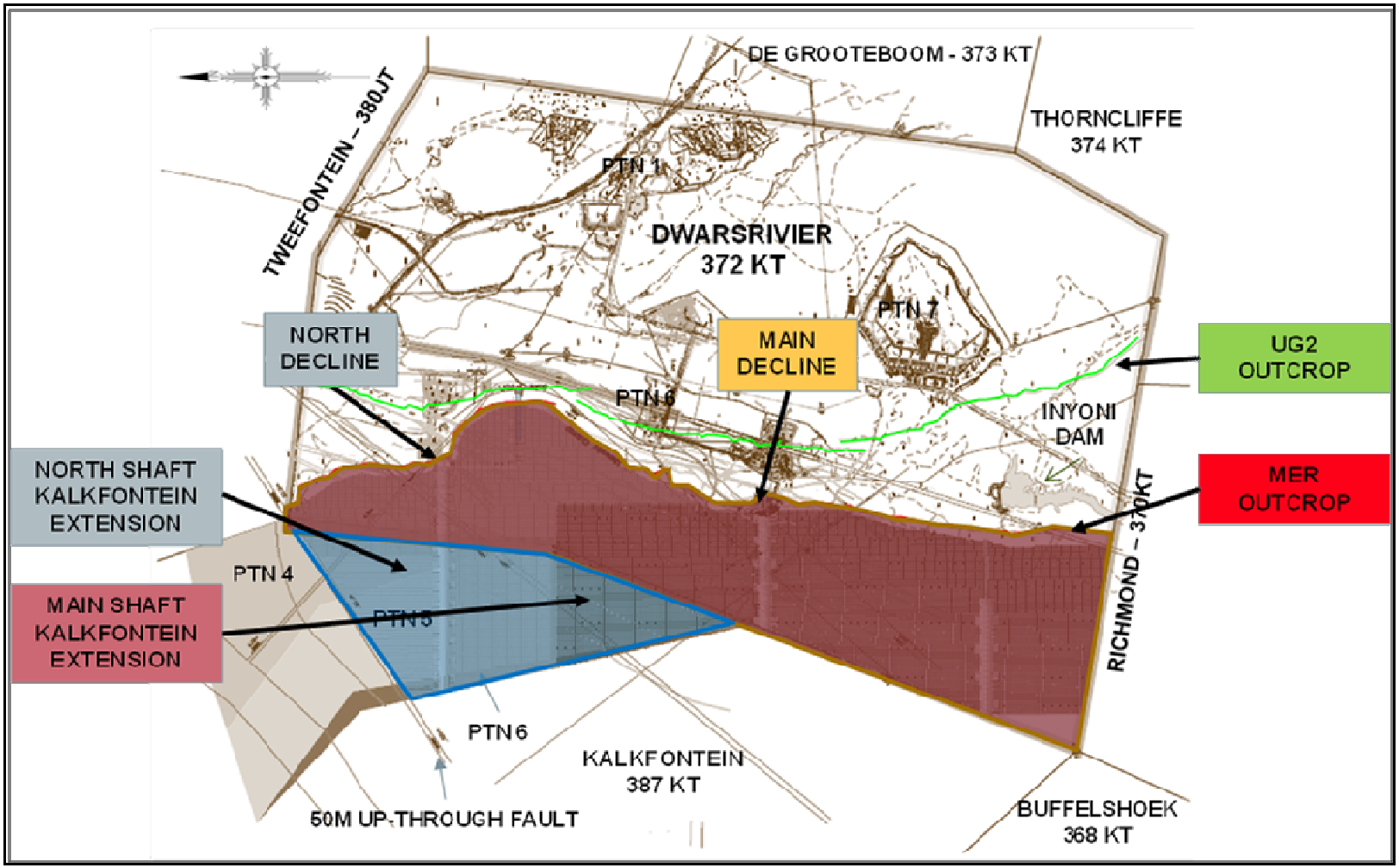
3.5.2 Mining method

Bord and Pillar type mining methods are utilised at shallow to intermediate depths where a sufficiently wide mining cut is indicated. Merensky trial mining at TRP successfully employed a fully mechanized Bord and Pillar stoping method.

A mining section consists of 8-12 metre bords, with pillar sizes increasing with depth below surface. These bords are mined principally in a strike direction, except when re-establishing sections with geological disturbances (faults, dykes, potholes etc.). The currently available reef information on Kalkfontein indicates that the Merensky Reef will also be mined via the same mining method.

Stoping sections exercise a multi-cycle operation during a shift. The full mining cycle in an eight bord section comprises two faces being drilled, two faces being cleaned, two faces being supported, with two faces standing idle. All of the various phases are decoupled from one another, which assists in productivity. The two faces standing idle are essential when geological discontinuities are encountered as this provides additional face flexibility.

A standard trackless Bord and Pillar section at TRP produces approximately 18,000 RoM tons of ore per month. This modular design allows production targets to be specified per shaft in terms of the number of Bord and Pillar sections required.



(Figure not to scale)

Figure 3.4 New Merensky underground mine layout

3.5.3 Mine access

3.5.3.1 Merensky Main Decline

Primary access development from surface has been established, consisting of a double decline day-lighting into a surface portal. This decline will be equipped with a chairlift which will extend from just below surface down to the last mining level. The double decline will expand into a six decline cluster from approximately 30m below surface (weathered zone limit) and will extend down to 4-level. This entails an Airway 1 decline, as well as an Airway 2 (Ledging - start of mining) decline on either side of the material and access declines.

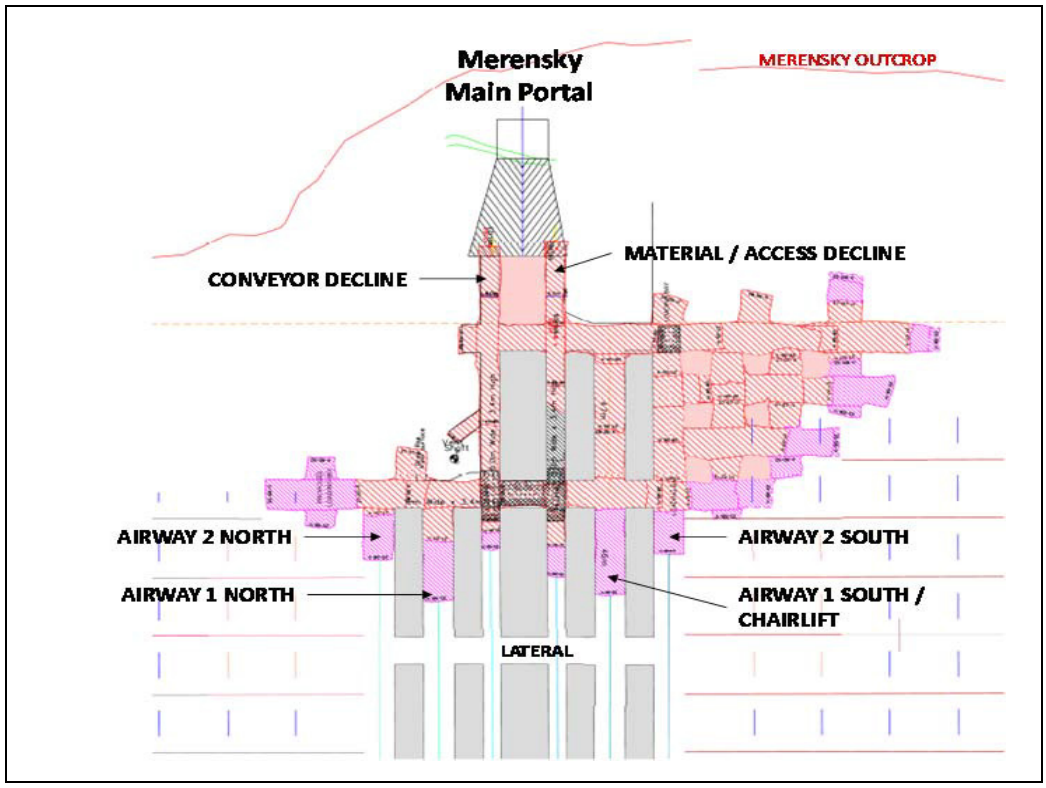


Figure 3.5 Primary access development from surface

Primary access capital development on Merensky Main Decline entails the extension of the on-reef declines cluster to Level 4 adjacent to the Kalkfontein boundary. A strike drive cluster analogous to the on-dip cluster will then be developed to the south to the position for the sub-decline cluster. The sub-decline cluster will then be developed on dip to the boundary with Kalkfontein.

3.5.3.2 Merensky North Decline

Primary access development from surface needs to be established. This will consist of a six-decline on-reef cluster connected to surface by means of a two decline cluster day-lighting in a surface portal. The two declines extending from surface will consist of an Access Decline as well as a Conveyer Decline. A chairlift is planned to be installed in Airway 1 South.

The six decline cluster initiates from approximately 60m below surface (weathered zone limit) and will extend through the Kalkfontein boundary on dip and will terminate in close proximity to the Kalkfontein Fault. This development will include an Airway 1 decline as well as an Airway 2 (Ledging - start of mining) decline on either side of the material and access declines.

Kindly refer to

Figure 3.6 for the North Decline Primary Access.

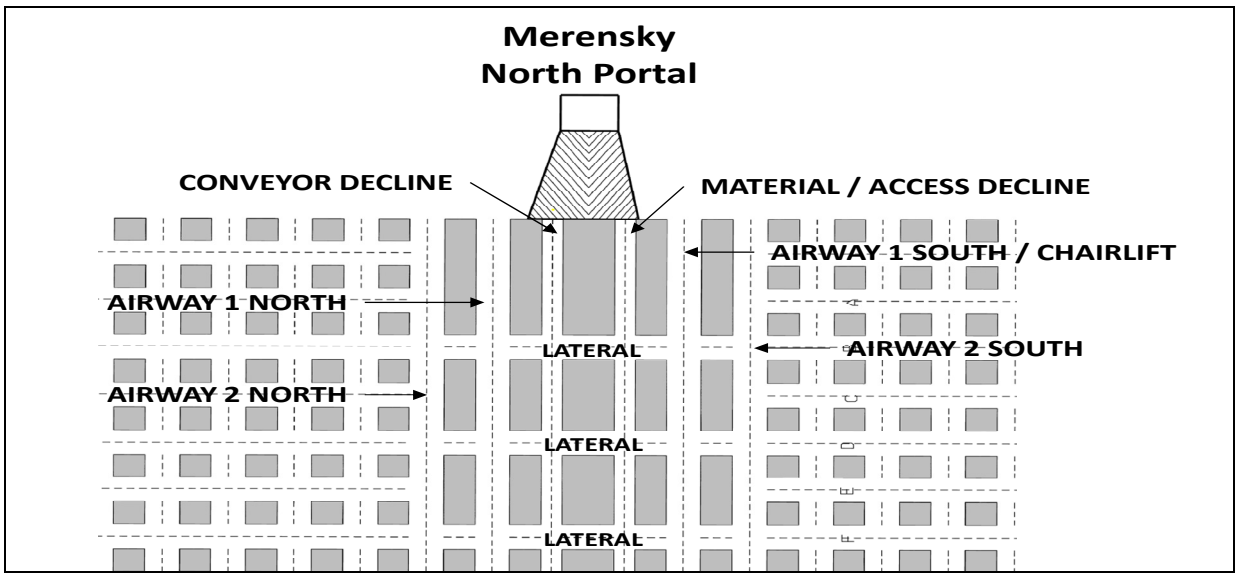


Figure 3.6 North Decline Primary Access

3.5.4 Merensky Surface Infrastructure

3.5.4.1 Introduction & Layout

Both Merensky shafts require substantial infrastructural development as the design of the existing UG2 infrastructure did not make provision for any expansion projects of this scale. Both Merensky shafts are designed to support a 100ktpm production profile, which is identical to that of the current UG2 North shaft. For the sake of simplicity and consistency, the infrastructural designs at North shaft have been used as a basis for the designs of the new Merensky shafts.

The surface infrastructure layouts for the Merensky Main Decline is shown in Figure 3.7 and Figure 3.8. The Merensky North Decline is shown in Figures 3.9 and 3.10. Figure 3.11 is a detailed Merensky plant layout.

The proposed infrastructure design is based on a conservative estimate by the civil engineer. The layouts, however, take into account traffic flow, access, logistical constraints, personnel and machinery separation, topography, drainage and existing infrastructure.

The TRP mining operation and surface infrastructure will, on approval of the project, consist of the following:

- Storm water dams, Drying Beds, Settling Dams & a treatment facility.
- Overland ore conveyance via continuous removal or batch removal via trucking.
- Waste material stockpiles, cleared as necessary by a front loader to existing stockpiles on site.
- High mast lighting. 10-15 high mast lights at each new shaft, in high traffic and security critical areas.
- Ore silo to provide surge capacity for the overland conveyor system. A single Merensky silo will be located adjacent to the existing UG2 silo.
- Office blocks on both Merensky shafts – prefabricated containerized units set on concrete slabs with furniture and air-conditioning.
- Change houses – change facilities, ablution and storage lockers for 350 – 400 people at each shaft.
- Lamp and crush facility at each Merensky shaft for cap-lamp monitoring, gas detection equipment etc.
- Roads – the Main shaft requires upgrading of the access road, as well as upgrading of the haul road to the portal. The North shaft requires a new access road and a new haul road.
- Bus stop and parking for personnel and visitors.
- Security and access control.
- Cable storage and salvage yard (a concrete slab with 2.1m high electric fence for cable storage).
- Sewage (treatment plants included as vendor supplied units, sized according to personnel complement. There are three (3) existing sewage treatment plants (not licensed) at TRP, but an additional two (2) plants will be required for the UG2 and Merensky project. All of the sewage plants on site will be licensed in one application under the NEM: WA.

- Fire fighting and prevention (fire hydrants and hose reels, electric and diesel pumps to operate the deluge systems in the main substations of both shafts).
- Storm Water Management (cut off drains and berms at the Main and North shafts).
- General stores at each shaft for rock drills, rotary equipment, batteries and gas cylinders.
- Explosive stores (a local explosives magazine to cater for daily usage, filled daily from the primary storage).
- Bulk fuel and lubricant storage (to receive store and dispense a week's consumption of each product).
- Miscellaneous facilities: portal rainwater sump and drain, dirty water sump and drain, covered walkways, brake test ramp, refuse disposal facilities, electrified fencing around the perimeter of the infrastructure.

Underground infrastructure will consist of refuge bays, workshops, offices and diesel and lubricant storage for a week's consumption of each product. Fuel delivery will be performed using an Aard UV80 equipped with a 5000l diesel cassette.

The new Merensky Concentrator Plant and associated infrastructure allows for a 200ktpm Milling-Milling-Float (MMF) circuit option. Two plant trials were completed using the existing UG2 plant which furnished valuable results in predicting the required process circuit to be adopted. The entire plant is divided into five major sections in terms of structures and activities:

- RoM circuit – A stockpile, silo, stormwater management, roads and fencing.
- Crushing/Screening circuit – Crushers and screens, stormwater management, roads, various buildings (offices, store, workshop, ablutions, sub-station), potable water and sewage treatment, fencing and parking.
- Overland Conveyor Circuit – Conveyors (river and road crossings), associated storm water control and waste rock dump.
- Plant Circuit – All plant infrastructure as well as workshops, stores, lube room, offices, generator room, transformer bays, roads, and sewage and water treatment.
- Outside Main Merensky Complex – Activities requiring authorization include the New Tailings Storage Facility and associated pipeline. These activities have been included in a separate application, ref number 12/1/9/2-GS22

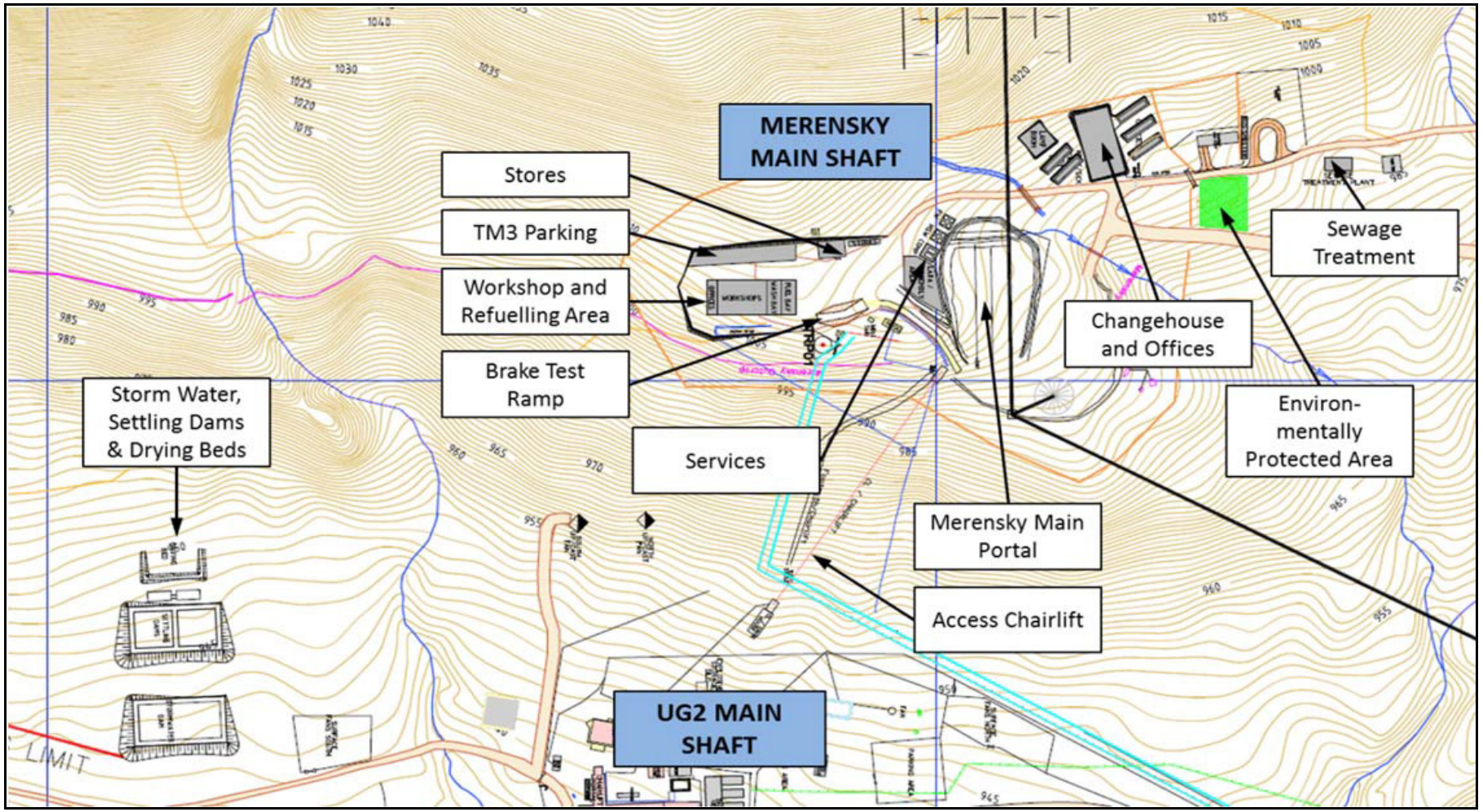


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Figure 3.7 Merensky Main Decline Surface Infrastructure

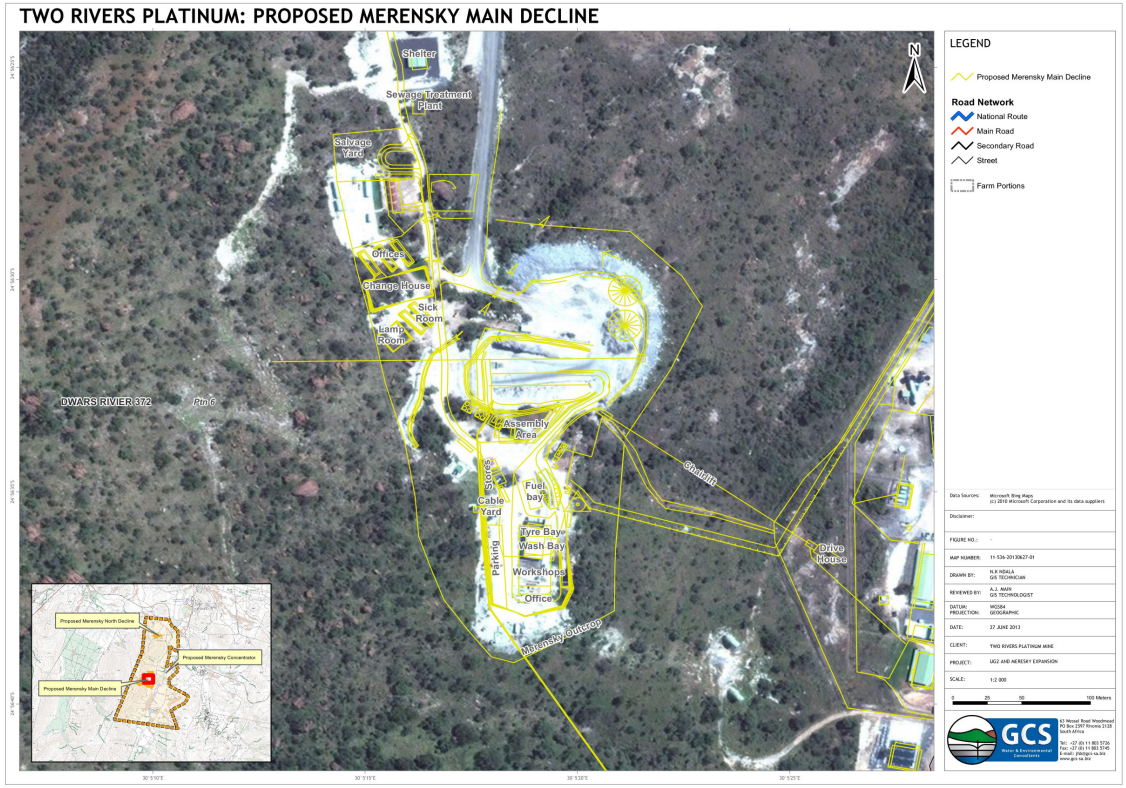

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Figure 3.8 Merensky Main Decline Detailed Design

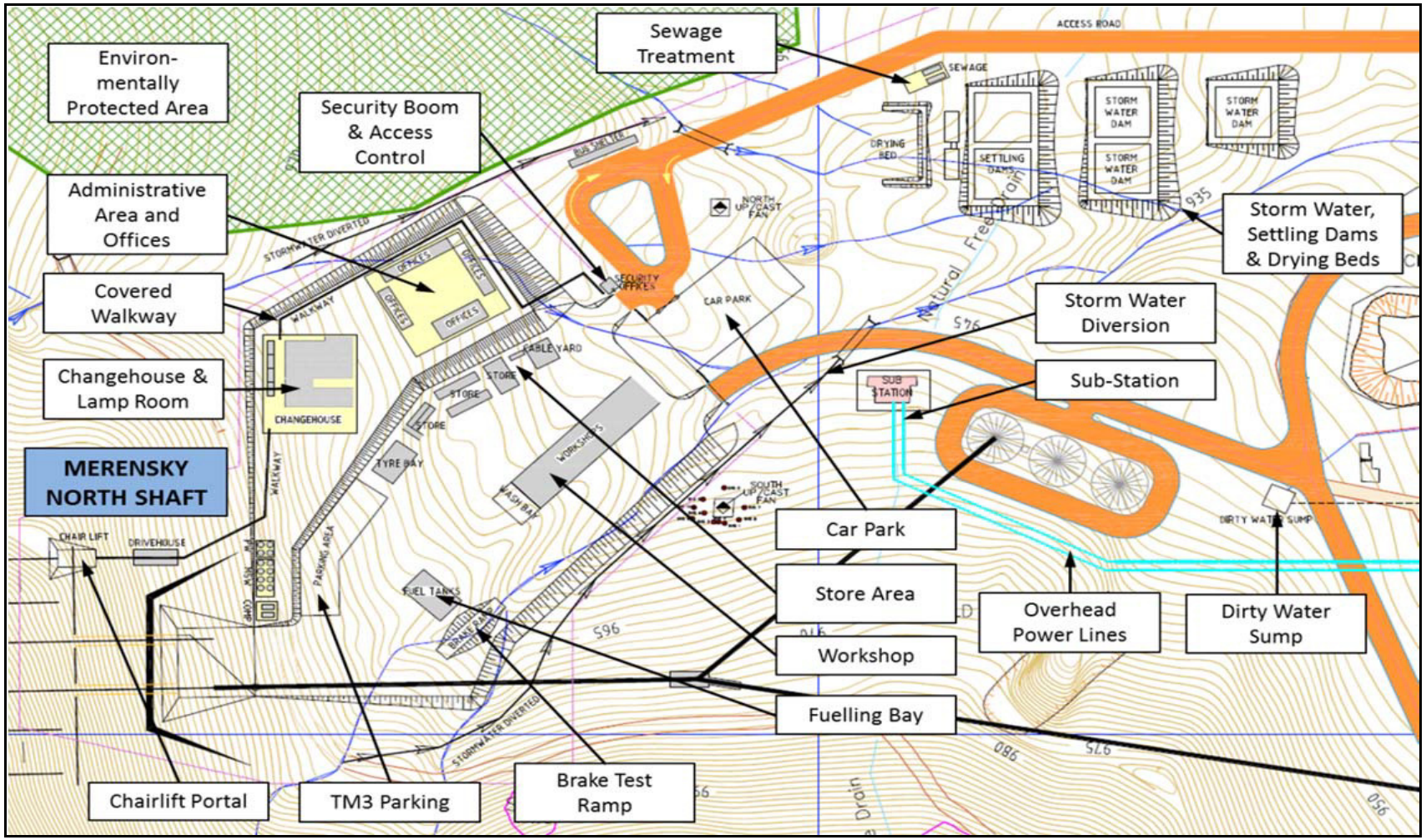

Figure 3.9 Merensky North Shaft Surface Infrastructure

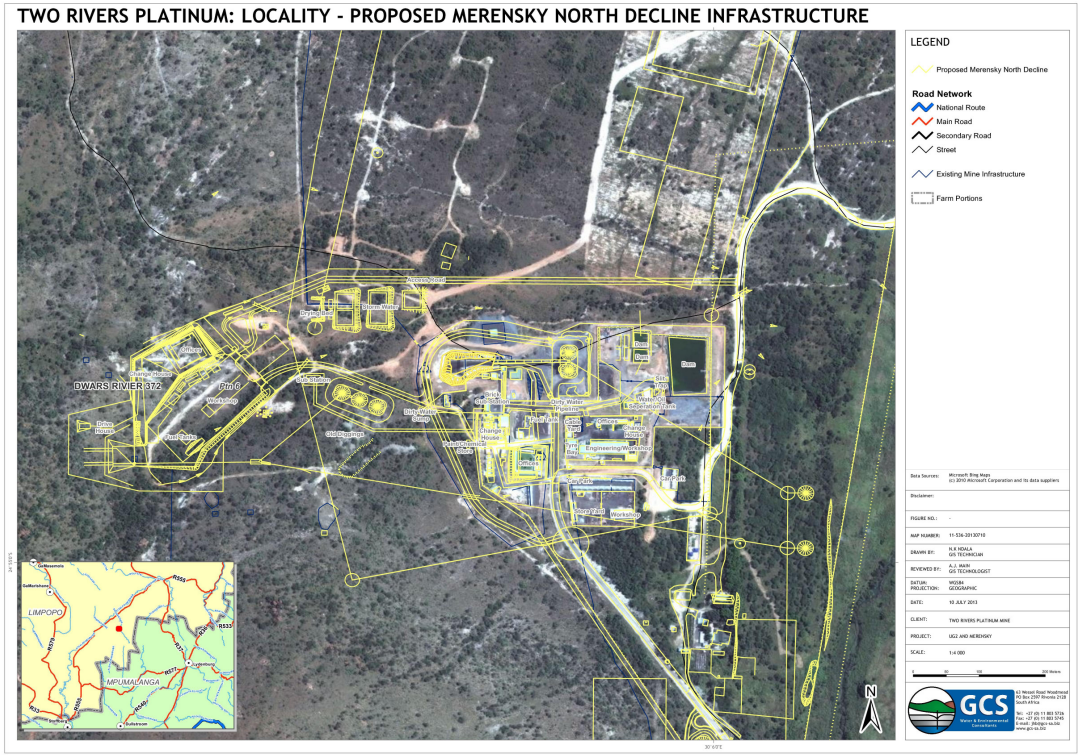

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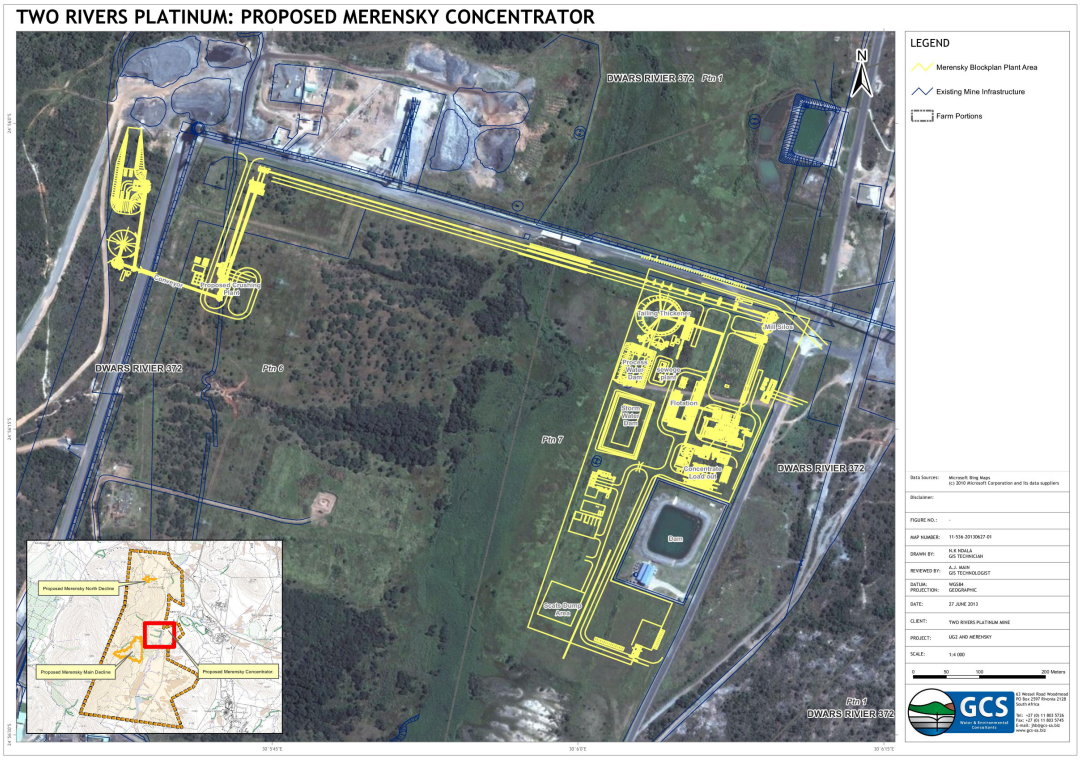
Figure 3.10 Merensky North Decline Detailed Design



(Figure not to scale - Refer to the map on the adjacent page).

Figure 3.11 Merensky Concentrator Plant Layout

3.5.4.2 Roads

INFRASTRUCTURE/ ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	NEMA LISTED ACTIVITY
Upgrading of existing, and construction of new haul roads with a width of 10m	The construction of a road, outside urban areas – (ii) where no reserve exists where the road is wider than 8 meters	GN R544, Activity No. 22

Access roads – Main Decline

The trial mining period for the Main decline necessitated the creation of a dirt access road. This road, however, is not adequate for the increased traffic associated with the proposed expansion of the mining operations. The access road will be widened and upgraded. The road will include “Armco” guard rails attached to gum poles set in concrete. Further, road signage, traffic markers, traffic islands and speed bumps will be included where applicable.

Haul roads – Main Decline

The haul roads to the portal will be widened to 10m to accommodate the increased traffic associated with the proposed expansion of the mining operations.

The Merensky North decline requires the construction of both an access road and haul road.

Access roads – North Decline

The proposed access road will run along the northern side of the UG2 North decline next to the natural drainage path. The road will join the existing UG2 access road before it reaches the main tar road, i.e. road R557 to Lydenburg.

Haul roads – North Decline

The Haul road will join a modified section of the UG2 haul road and thereafter share the haul road which links to the North declines and the stockpiles at the overland conveyor belts. The modification to the UG2 portion is proposed to reduce the number of road crossings at UG2 North decline and thereby mitigate potential hazards.

Refer to Figure 3.3 indicating the upgraded road layout.

3.5.4.3 Electricity and Power Lines

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	NEMA LISTED ACTIVITY
Upgrading and expansion of the power supply for the proposed Merensky Main and North Declines	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex	GN R545, Activity No. 8

Eskom's local Uchoba sub-station supplies TRP with electrical power, which steps supply voltage down from 132kV to 33kV before it is reticulated to the mine. The supply lines into the mine are rated from 30MVA. To sustainably enable any further expansion of the mining operations or an increase in power usage, both the overhead line and sub-station infrastructure should be upgraded.

Both the Merensky Main and North declines are fed from two 30MVA, 33/11kV transformers which will be moved from the plant main substation and installed at the underground main 33/11kV substation. One transformer is found to be able to supply the entire underground mining operation, should failure of the other transformer occur. The design of the overhead lines allows for the supply of electrical power to both the Merensky and UG2 North portals. Similarly, the design of the overhead lines in respect of the Main portal allows for the supply of electrical power to the Merensky and UG2 Main portal substations.

Merensky Main Decline

- The main substation at the portal feeds the 1-Level substation by way of two 150mm^2 cables.
- The underground substation supplies all the levels up to and including the 4-Level.
- Two 70mm^2 feeders reticulate power to the substation situated on 5-Level. The 5-Level substation is equipped to supply power up to and including 9-Level.
- The sub-decline is supplied by a substation situated at the start of the sub-decline at 9-Level. This substation feeds all the levels along the sub-decline from 9-Level to 14-Level and is fed by two 185mm^2 feeder cables using bye boxes.
- A 315/500kVA miniature substation feeds the strike conveyor(s), pumps, workshops and haulage lighting.
- A 630kVA miniature substation is located at each production face which feeds the drill Riggs, fans, pumps, vibrating feeder and lighting.

Merensky North Decline

- The main substation at the portal feeds directly to the various levels through Ring Main Units.
- No permanent substations are installed underground.
- Substations, similar to those installed at the Main decline, are installed at 4-Level on the North decline. The substation is supplied directly from the portal substation by way of two 150mm2 cables.
- A 315/500kVA miniature substation feeds the strike conveyor(s), pumps, workshops and haulage lighting.
- A 630kVA miniature substation is located at each production face which feeds the drill Riggs, fans, pumps, vibrating feeder and lighting.

3.5.4.4 Merensky Concentrator, Workshops, Administration and Other Buildings

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	NEMA LISTED ACTIVITY
Expansion of the mine footprint by inclusion of the proposed Merensky Main and North Declines and associated infrastructure, as well as the proposed Merensky concentrator and proposed infrastructure.	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total are to be transformed is 20 hectares or more	GN R545, Activity No. 15

The following infrastructure expansions will cover a combined area in excess of 20ha once completed:

Office blocks

Office blocks serve as administrative facilities and include reception areas, offices, boardrooms and emergency medical stations. Office infrastructure is included in the expansion of both the Merensky declines. The units are seized similarly to the office infrastructure at UG2 North decline and share similar design features. The offices will be constructed using pre-fabricated contained units, which are set on concrete slabs to provide a semi-permanent infrastructure.

Change houses

Each decline will be equipped with a change house to provide personnel with personal storage lockers, change rooms and ablution facilities. The existing change rooms situated at the UG2 North decline is not sufficient for the additional mining crew and accordingly, the lack of capacity will be incorporated in the seizing of the Merensky change houses to cater for the additional mining crew. Each facility, in its entirety, is to cater for 350 to 400 people which provide sufficient capacity for all underground staff.

Lamp and crush rooms

The lamp room is constructed as a self-service walk-through facility. Each Merensky decline will be provided with a lamp and crush facility which will be sized according the existing UG2 North decline designs.

Bus stop and parking

Parking infrastructure includes covered parking for permanent staff who drive their personal vehicles to work, a separate parking area for the buses which transport mine workers to the mine and a visitor's parking bay. All parking areas are fenced off for security reasons. The Main decline does not require a dedicated bus stop and bus parking area as the UG2 facility is sufficient to cater for both declines. However, covered staff parking and visitors parking will be catered for.

The North decline is too far displaced from the UG2 decline to share the parking infrastructure and accordingly requires the full suite of parking facilities including a bus turning circle, shelter and a covered walkway for the mine workers.

Cable storage yard

A concrete slab with a 2.1m high electric fence will be provided for the storage of cables and other salvaged equipment. A dedicated guardhouse and alarm system will be installed for adequate security.

General stores

The existing UG2 Main and North declines stores cater for the bulk of all non-essential items, however storage facilities at the Merensky declines will be provided to cater for the day-to-day running of the decline.

Explosive stores

A local explosives magazine will be provided at each Merensky decline to cater for the daily explosives usage. This magazine will be filled daily from the primary storage magazine to minimize explosives storage thereby minimize potential risk and damage. The local magazines will be secured by means of an electric fence and access controlled guardhouse.

New Merensky Concentrator Plant

Refer to Figures 1.2, 3.1 and 3.11 indicating the proposed Merensky plant location and layout.

Merensky ore will be mined from the Merensky Main and North Declines. Conveyor belts transport ROM from the Merensky Main Decline to the Concentrator Plant. Trucks are utilized to transport ROM from North Decline to the crusher plant which feeds the Concentrator Plant. The Plant will process 200,000 tons per month of ROM. The quantity of PGMs contained in ROM will be approximately 2.670 grams for every ton of ore mined.

The process plant was designed, where practical, to use similar equipment as the existing UG2 concentrator. This would reduce the capital spares holding requirement of the TRP Concentrators.

Plant Site Selection

The Lebalelo Pipeline site was the optimal selection and was essentially based on the following:

The Helipad Site:

- The site and available area was further from the UG2 Plant than was expected
- Using this site would mean relocating the existing UG2 Plant's storm water dam and this would warrant undue rework consequently having a significant financial impact on the project
- The 100 year flood line, of the adjacent Dwarsrivier, is wide and created a plateau of marsh land that infringes greatly on the available area

The Guest House Site:

- This site was furthest from the UG2 Plant
- Site is restricted for space
- Too close to natural, vertical earth drops. (steep cliffs, ridges etc.)
- Too close to the National Heritage site

The Lebalelo Pipeline Site:

- Site was closest to the UG2 Plant – ease of shared management and expertise with the UG2 Plant.
- Site is the closest to the Merensky Ore body and proposed portal.
- Sufficient space to incorporate the intended plant structures.
- The 100 year flood line, of the adjacent Dwarsrivier, is less wide and not far-extending enough to create a marsh plateau that would compromise plant space.
- Majority of the plant process requirements and overland structures could be duplicated seeing that the eventual plant layout is similar to the UG2 Plant.

Plant Stormwater and Waste Management

Polluted water will be controlled by means of sloped terraces diverting water to drains. These drains will channel the water through concrete silt traps into a lined earth pollution control dam. Water will be returned back into the system via pumps.

At the process plant, sewage will be reticulated from buildings by means of buried pipes to a local sewage pump station which will deliver to a sewage treatment plant as described in Section 3.5 below.

A waste management system will be implemented during the construction phase - waste will be taken to a reclaiming area from where it would be sorted into the various waste types. Once the waste was segregated it will be removed by external contractors.

Miscellaneous facilities

Additional infrastructure for both the Merensky Main and North Declines include the following:

- Portal rainwater sump and drain;
- Contaminated/ dirty water sump and drain;
- Covered walkways along high-traffic areas between the administrative offices, change houses and portal;
- Brake test ramp;
- Refuse disposal facilities; and
- Electrified fencing around the perimeter of the decline surface infrastructure.

3.5.4.5 Bulk Fuel and Lubricant Storage

INFRASTRUCTURE/ACTIVITY	DECRIPTION OF LISTED ACTIVITY	NEMA LISTED ACTIVITY
Construction of additional facilities to store fuel, lubricants and plant reagents with a capacity of 189m^3	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	GN R544, Activity No. 13

Facilities will be provided to receive, store and dispense fuel, lubricants as well as plant reagents. The combined capacity of the additional requirements is 189m^3, for diesel, hydraulic oil, engine oil, transmission oil, explosive emulsion and pumpable explosive product.

3.5.4.6 Mineral Processing – Conveyor

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	LISTED ACTIVITY
Construction of a new underground mine in order to access Merensky reef resources, and the associated dewatering and storage of underground water. New waste material and ore stockpiles are also required, associated with the new conveyor and concentrator.	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply	GN R 545, Activity No. 5

Section 21(g) of the National Water Act is applicable to the waste material stockpile associated with the new Merensky conveyor and stockpile within the ROM circuit of the new Merensky Plant. Section 21 (c) and (i) are applicable to the Merensky conveyor river crossings. TRP has an existing approved Water Use Licence which will require amendment to include the new mining activities.

The information following hereunder was extracted from the *TRP UG2 & Merensky Feasibility Project – Section 8: Engineering Report*.

Ore clearance – process flow

RoM ore is mined from the production sections and transported by means of Load Haul Dumpers (LHD's) to a tipping facility located at the tail end of the nearest strike conveyor. The ore is transported via the strike conveyor system, which typically consists of a number of conveyors operating in series, along the strike towards the primary decline. Ore is tipped onto the primary decline conveyor system. Ore handling on surface is performed by either an overland conveyor system (the new Merensky conveyor will be constructed in addition to the existing UG2 conveyor), or by trucking, as per current operations.

Under the trucking system, ore is transported to surface by the decline conveyor system after which, it is tipped onto a bi-directional conveyor which tips onto either a waste or ROM stockpile. Ore is transferred from the stockpiles by front-end loader onto trucks which transport to either the primary waste stockpile or to the crusher stockpile for further processing.

Under the conveyance system, ore is transported to surface, where it is split into waste and ROM ore. Waste is transported to load-out stockpile nearby, whilst ROM ore is transported via overland conveyor to a silo. These silos feed ore onto the mill feed conveyor, where it is crushed on route.

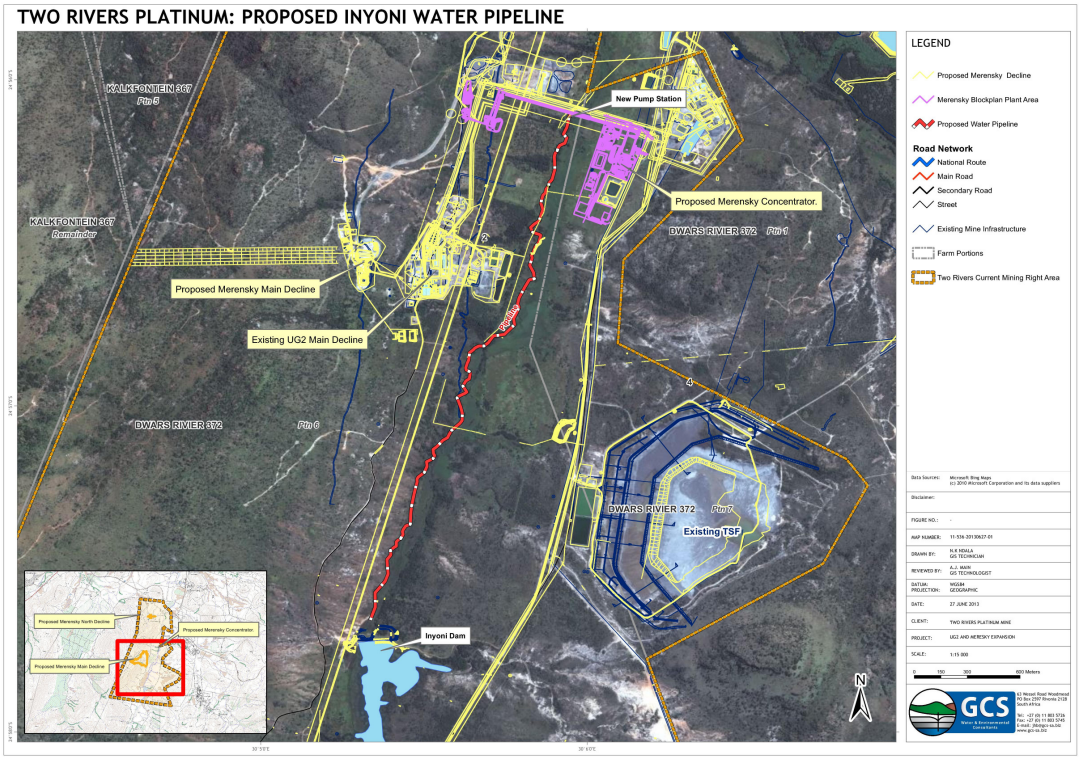
3.5.4.7 Water Management and Supply

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	LISTED ACTIVITY
Construction of a water supply pipeline from the Inyoni Dam to the proposed new pump station. The pipeline will be 3.5km long with an internal diameter of 400mm	The construction of facilities or infrastructure exceeding' 1000metres in length for the bulk transportation of water, sewage or storm water- (ii) With an internal diameter of 0.36 meters	GN R 544, Activity No. 9

A new above-ground water supply pipeline is required from the Inyoni Dam (Klein Dwars River) to the new pump station required as part of the proposed Merensky Infrastructure. The pipeline will be 3.5km long, with an internal diameter of 400mm.

The pipeline supports will consist of 1.2m deep unreinforced concrete plinths, at 6m intervals.

Refer to Figure 3.12 indicating the Inyoni pipeline layout.



(Figure not to scale- refer to map on adjacent page)

Figure 3.12 Proposed Inyoni Pipeline Layout

TRP sources its water supply from the Klein and Groot Dwars Rivers. The majority of the water supply, i.e. 1 500 000m^3 per annum, is sourced from the Inyoni dam located within the Klein Dwars River catchment area which is situated on Portions 1 and 2 of the Dwarsrivier Farm. In addition to the aforementioned quantities, an additional 879 880m^3 per annum may be obtained from the Der Brochen dam located on Groot Dwars River which is situated on Portion 1 of the Dwarsrivier Farm and Portions 14 and 27 of the Belvedere Farm. The aforesaid equates to a total allowance, from surface water, of 2 379 880m^3 per annum.

In addition to the abovementioned water supply, TRP is allocated a total of 547 000m^3 per annum of water obtained from underground sources. When water is sourced from dirty return water, it should be captured and processed prior to use as service water. The available borehole water is pumped to a filtration and chlorination plant to be treated for use as potable water.

It is foreseen that the current water allocation will be insufficient for the proposed expansion of the TRP's mining operations. Investigations will be undertaken to find potential water sources and any authorisations (e.g. in terms of the NWA) will be applied for.

3.5.5 Sewage facilities

Refer to Section 3.6.

3.5.6 Waste Handling

All waste generated by the mine (industrial and domestic) will be removed and separated by a licensed waste management company who responsibly disposes of all waste. The existing waste management programme will be expanded to include the new Merensky infrastructure.

3.5.7 Clean and dirty water separation infrastructure

Stormwater management for the UG2 and Merensky expansions is included in the engineering designs, as provided by the design engineers namely DRA (UG2 and Merensky mine and infrastructure) and Fox Projects (New Merensky Concentrator Plant):

UG2 and Merensky Expansion:

Cut-off drains and berms are provided at the Main and North Shafts to divert clean storm water runoff towards the existing natural watercourses. Refer to Figures 2.7 and 2.8 which indicate the stormwater structures.

Proposed Merensky Plant:

Rainfall run-off water in the plant will be contained and stored in a pollution control dam, or storm water dam, and will be recycled within the process plant circuit. Refer to Figure 2.10 indicating the layout of the proposed Merensky Plant.

3.5.8 Water balance

TRP has an existing water balance for the entire mine which is updated annually. GCS has recently undertaken a separate project to include the proposed UG2 and Merensky expansion into the existing water balance. The revised water balance will form the basis of the WUL Amendment application required under the NWA.

3.6 Wastewater (Sewage) Treatment Plants

INFRASTRUCTURE/ACTIVITY	DESCRIPTION OF LISTED ACTIVITY	NEM: WA LISTED ACTIVITY
Installation of 3 new proposed sewage treatment plants, as well as licensing of the existing 3 sewage treatment plants currently in operation on site.	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic meters or more.	Schedule 1 Category B

3.6.1 Description of the facilities

The project entails the licensing of six (6) sewage treatment plants. Three (3) sewage plants are located at the existing UG2 Main Decline, North Decline and the Concentrator plant. The plants at the Main Decline and Concentrator plant are traditional sewage treatment facilities. The UG2 North decline plant is a Bio-filter RBC Package Plant. There are additional three (3) proposed sewage treatment plants for TRPs new Merensky seam mining operation areas. The proposed sewage plants will be developed on the TRP existing mining right area on the farm Dwars rivier 372KT (Figure 3.13). All the plants at the Merensky operations will vendor-supplied Package units.

The six (6) separate sewage treatment plants will have a combined capacity of approximately 237m^3 per day (86 500m^3 per annum). The plants will be fenced off with a small access road for maintenance. The new treatment plants will operate as separate systems with each site managed by different teams. Once the sewage is treated the clean water is pumped back into the underground mining operations. The treatment process is the activated sludge method, which is common with many large sewage treatment works, only this will in smaller package plants. Effluent is transported by pipeline from point of origin, the clean water and then reused in the underground mine workings.

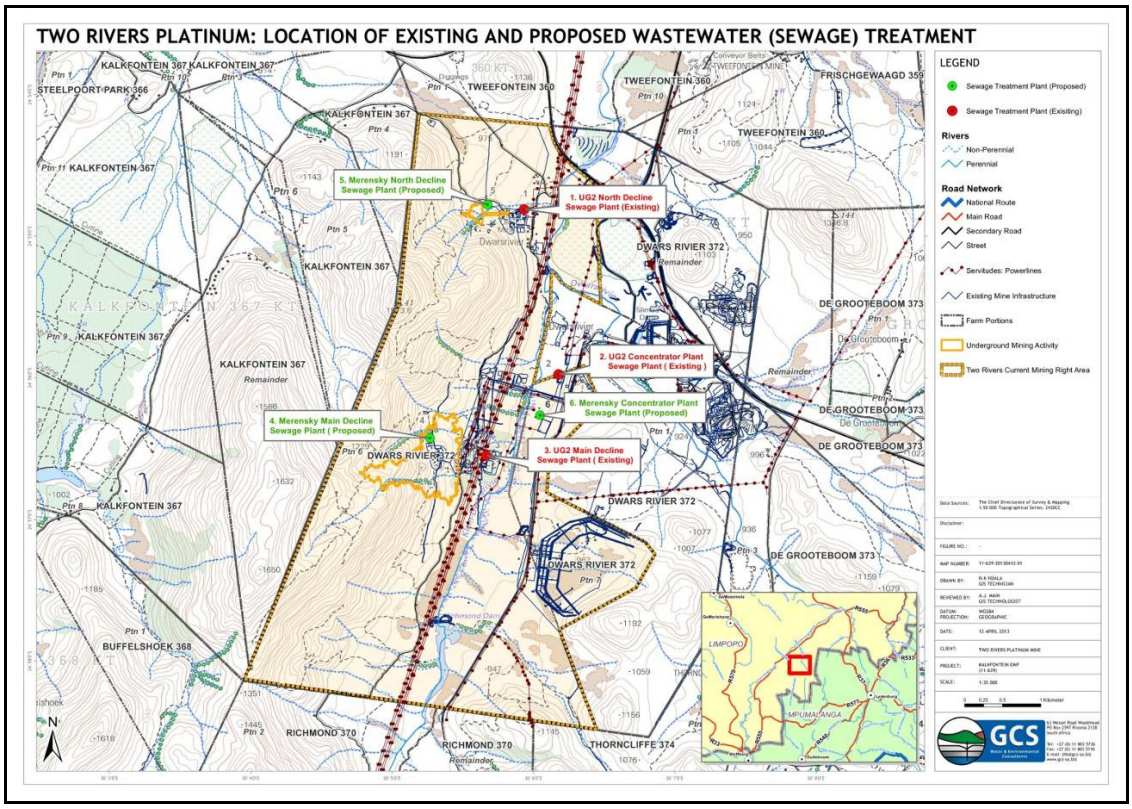
3.6.2 Licensing Process

New sewage treatment plants will be required for the UG2 and Merensky expansion, in addition to the existing sewage treatment plants already in operation at TRP. All the existing and new sewage treatment facilities will be licensed in one waste license application under the National Environmental Management: Waste Act, 1998 (Act No. 59 of 1998) (NEMWA), as agreed with the Department of Environmental Affairs (DEA) on 17

October 2012. Please refer to Appendix B which includes the amended Waste License application including both the existing and proposed new sewage plants at TRP, as well as correspondence with the DEA regarding the changes to the application.

3.6.3 Location of the Wastewater Treatment (Sewage) Plants.

The existing sewage plants are located at the UG2 Main decline, UG2 North decline and UG2 Concentrator plant and will form part of the waste license application for the three new sewage plants proposed for the Merensky North and Main Declines and the Merensky Plant. Refer to Figure 3 which indicates the locations of the existing and proposed new sewage plants. The sewage plants are small separate units located where needed on the site. This is due to the topography of the area.



(Figure not to scale- refer to map on adjacent page)

Figure 3.13 Location of the existing and proposed sewage plants at TRP.

3.6.4 Technical Specifications

Details regarding the existing and proposed sewage treatments plants are contained in Table 3.4. Refer to Photo's 3.1, 3.2 and 3.3 which show the existing sewage treatment plants at TRP.

Table 3.4 Details of the existing and proposed sewage plants at TRP

LOCATION	TYPE OF FACILITY	CAPACITY	PURIFIED WATER DISPOSAL	SLUDGE DISPOSAL
TRP Main Decline	Traditional sewage treatment plant	97 500 l per day	Re-used in the plant process, no discharge	Removed by Enviroserve contractors
TRP Concentrator Plant	Traditional sewage treatment plant	7 875 l per day	Re-used in the plant process, no discharge	Removed by Enviroserve contractors
TRP North Decline	Bio-filter RBC Package Plant (vendor-supplied unit)	45 000 l per day	Re-used in the plant process, no discharge	Removed by Enviroserve contractors
Proposed Merensky North Decline	Proposed Package Plant (vendor supplied unit)	28 888 l per day (200 people @ 140l/person/day).	Re-used in the plant process, no discharge	Removed by Enviroserve contractors
Proposed Merensky Main Decline	Proposed Package Plant (vendor supplied unit)	28 888 l per day (200 people @ 140l/person/day)	Re-used in the plant process, no discharge	Removed by Enviroserve contractors
Proposed Merensky Concentrator Plant	Proposed Package Plant (vendor supplied unit)	28 888 l per day (200 people @ 140l/person/day)	Re-used in the plant process, no discharge	Removed by Enviroserve contractors

Photo 3.1 Existing wastewater (sewage) treatment plant at the TRP North Decline

Photo 3.2 Existing wastewater (sewage) treatment plant at the TRP Main Decline

Photo 3.3 Existing wastewater (sewage) treatment plant at the TRP Plant

The proposed sewage plants at the Merensky Plant and Main and North Declines will consist of the following components:

- 1 x 6m refurbished shipping container that will act as the plant room and house all ancillary equipment.
- 1 x mild steel screenings box and manually raked incline screen.
- 1 x 10 m^3 mild steel submerged buffer tank with radial blade mixer and duty/standby submersible pumps.
- 1 x 24A70 mild steel reactor/clarifier module.
- 1 x LDPE chlorine contact tank.
- Chlorine disinfection unit c/w make-up tank, manual mixer and dosing pump with dosing pipe.

The package plants will be similar in appearance to the existing North Decline plant, as indicated in Photo 3.1.

4 PROJECT ALTERNATIVES

This section of the draft EIA report relates to Section 31 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 31 (2)	*An environmental impact assessment report must contain all the information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35, and must include -*	
	(g)	*A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.*

4.1 Activity Alternatives

4.1.1 UG2 Mine Expansion

The only alternative to the UG2 underground mine expansion is to not expand the life of the mine into (underground) Kalkfontein Portions 4, 5, and 6. By not proceeding with this option, the current LOM will be 10 years instead of 16 years. There were no other alternatives considered as there were none.

4.1.2 Merensky Mine Expansion

The Merensky expansion is seen as a growth opportunity. By not going ahead, TRP output and potential for additional employment of approximately 1500 people would not take place (positive NPV of R457 Million). There were no other alternatives considered as there were none.

4.1.3 Wastewater (Sewage) Treatment Plants

In terms of the NEMA EIA Regulations, one of the criteria to be taken into account by the competent authority when considering an application is *"any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment"*.

Alternatives are defined in the Regulations as "*different means of meeting the general purpose and requirements of the activity*". It is therefore necessary to provide a description of the need and desirability of the proposed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity. The NEMA regulations require that alternatives be considered. The consideration of these alternatives also requires that the "No Go" option be included.

Option 1: Sewage Package Plant Layout

Sewage package treatment plants create an environment which facilitates the growth of bacteria which break down sewage into cleaner and less polluted end products. The plants are operated on electricity which is used to artificially introduce air to the treatment plant; it is this oxygen transfer through the sewage which enables the growth of aerobic bacteria which are more effective in the breakdown of sewage than the bacteria present in a septic tank. This results in a higher quality effluent being produced, which the mine reuses in their process. This system is completely isolated from the surrounding environment; therefore any spills can be contained much more effectively.

Photo 4.1 Sewage Package Plant Layout

Option 2: Traditional Sewage Plant Layout

The traditional sewage layout is more of an open system (e.g. septic tank system) which uses open ground level concrete tanks. The plant operates on a modular principle which involves five phases to purify the effluent. Like with the package plant, bacteria are introduced in the sewage to break the sewage. The sewage is then digested in an an-aerobic process. From the an-aerobic tank the sewage is the digested through an aerobic process. After all the processes are complete the sewage is left to settle, separating cleaner water from the sludge. The sludge is then left to dry on drying beds. This process is effective; however in an event of overflow, the sewage is not easily contained and may require more effort to contain. The maintenance lies entirely on Two Rivers.

Photo 4.2 Sewage Package Plant Layout

4.2 Site Alternatives

4.2.1 UG2 and Merensky Expansion

Since the TRP mine is already in existence, and the UG2 and Merensky project will be an expansion of the existing operations, no alternatives to the proposed site (the existing mine property) were considered. The advantage of this expansion is that no new additional properties will be disturbed on surface, reducing potential environmental impact. The disadvantage is that there are likely to be some environmental impacts to groundwater resources.

4.2.2 Wastewater Treatment (sewage) plants:

The location which the proposed sewage treatment plants will be developed is limited by the terrain and the mining activities. At each of the new mining operation areas i.e. Merensky Main Decline, North Decline and Concentrator plant ablution facilities will be required. This requirement is the reason why the sewage plants have been planned for each of the areas. This is the reason why the mine has opted to develop small treatment areas for each area of operation on the mine instead of one large plant. This minimizes extensive pipework in the rough terrain and ensures better control of the sites because they are of a smaller capacity.

4.3 "No Go" Option

UG2 and Merensky Expansion

If the UG2 and Merensky expansion is not undertaken, the life of mine will be reduced since the additional resources will not be exploited. If the UG2 and Merensky mine does not proceed, there will be no need for additional sewage treatment plants on the site.

Sewage Treatment Plants

The "no go" option will entail not developing waste treatment facilities on the mine to deal with the mines effluent. This would mean that Two River will have to contract a company to pick up the waste and treat it of site. This is not a very reliable way to deal with high volumes of effluent as the contractor may not be able to pick up such large volumes on a daily basis to take it off site. The nearest facility will be in the nearest town and may not be able to handle this waste and this would increase traffic on roads that are already stressed by the movement of haulage trucks. The other option would be for the mine to construct a large pipeline to the nearest treatment facility. The terrain in there is very rough and would require very difficult and high level designs which are not economically viable. The maintenance of the pipe will require an addition road reserve to be constructed in this terrain which will increase negative environmental impacts which the mine is already causing with other operations.

The reuse of the waste water once treated in the mining process promotes the principles of the sustainability waste hierarchy which promotes, reducing, reusing and recycling waste before any disposal is considered.

The details above indicate that the "no go" option for developing the treatment plants would cause more detrimental impacts to the environment. It will not also encourage the mine to deal with waste issues on site and not take full accountability as the waste will be handled off site. With the development of the treatment facilities the mine will be able to

monitor how much waste is created on a daily basis and monitor the actual treatment of the water. The mine will also no require additional offsite water supply for the underground works as they will be reusing the water.

4.4 Advantages and Disadvantages

An advantage of proceeding with the UG2 and Merensky expansion (including additional sewage plants) will be extending the life of mine which has a positive economic impact on the surrounding communities in terms of employment. An additional advantage of the expansion is that no new surface infrastructure is required outside of the existing mining right area (only expansion to the existing facilities), meaning that environmental impact is minimised.

There are no advantages to the community if the expansion does not proceed; in fact it will be a disadvantage since the life of mine will not be extended. Environmentally, a disadvantage will be some impacts within the existing mining area, but since this is an existing mine, known as a 'brownfields' area, the impacts are expected to be less important than if a new site was to be disturbed.

5 DETAILED ENVIRONMENTAL DESCRIPTION

This section of the draft EIA report relates to Section 31 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 31 (2)	*An environmental impact assessment report must contain all the information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35, and must include -*	
	(d)	*A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.*

The proposed expansion includes underground mining on the farms Dwarsrivier (TRP existing mine site), Kalkfontein and Tweefontein. No surface infrastructure is proposed on the farms Kalkfontein and Tweefontein, these properties will not be disturbed above-ground.

The proposed Merensky surface infrastructure (Main and North Declines, Concentrator plant and associated infrastructure) is located within TRP's current mining right area. Various specialist studies have been undertaken for this area since 2002 when the initial EMPR was compiled and approved. The existing EMP, as well as additional specialist studies conducted since then, as well as studies commissioned specifically for this expansion, were used to compile this section and are referenced accordingly.

5.1 Geology

5.1.1 Dwarsrivier 372KT (existing site, surface & underground expansion)

The following information was extracted from a specialist hydrogeological study conducted by Golder Associates in 2010. The full study can be viewed in Appendix C. A geology map is indicated in Figure 5.1.

The geology comprises igneous rocks of the Bushveld Complex, mainly anorthosite and norite with thin localized layers of chromite and pyroxenite. The sequence dips towards the west at 7-10º. Faults with dolerite intrusive dykes dominate the structural setting creating steeply incised valleys. Economically the UG2 chromite layer is mined on site. The UG2 sub-outcrops approximately north/south along the Klein Dwarsrivier valley, and dips westwards at 7-10 degrees, following the general dip.

5.1.1.1 Dykes

Two dyke sets are evident. The most prominent set strikes NNE-SSW, and comprises a series of relatively closely spaced dyke intrusions. The second set strikes WNW ESE and is widely spaced. The dolerite dykes are fine to medium grained with an average thickness of less than 10m.

5.1.1.2 Faults

The faults striking NNE-SSW on TRP property are predominantly strike-slip in character. In contrast, the ENE-WSW and NNW-SSE fault sets show little or no strike-slip movement. Mining exploration observations have been made of the intersections between dykes and faults and the age relationships is reported to be complicated, with the majority of the more prominent NNE-aligned faults appearing to post-date the dykes.

5.1.2 Kalkfontein 387KT & Tweefontein 380JT (underground expansion only)

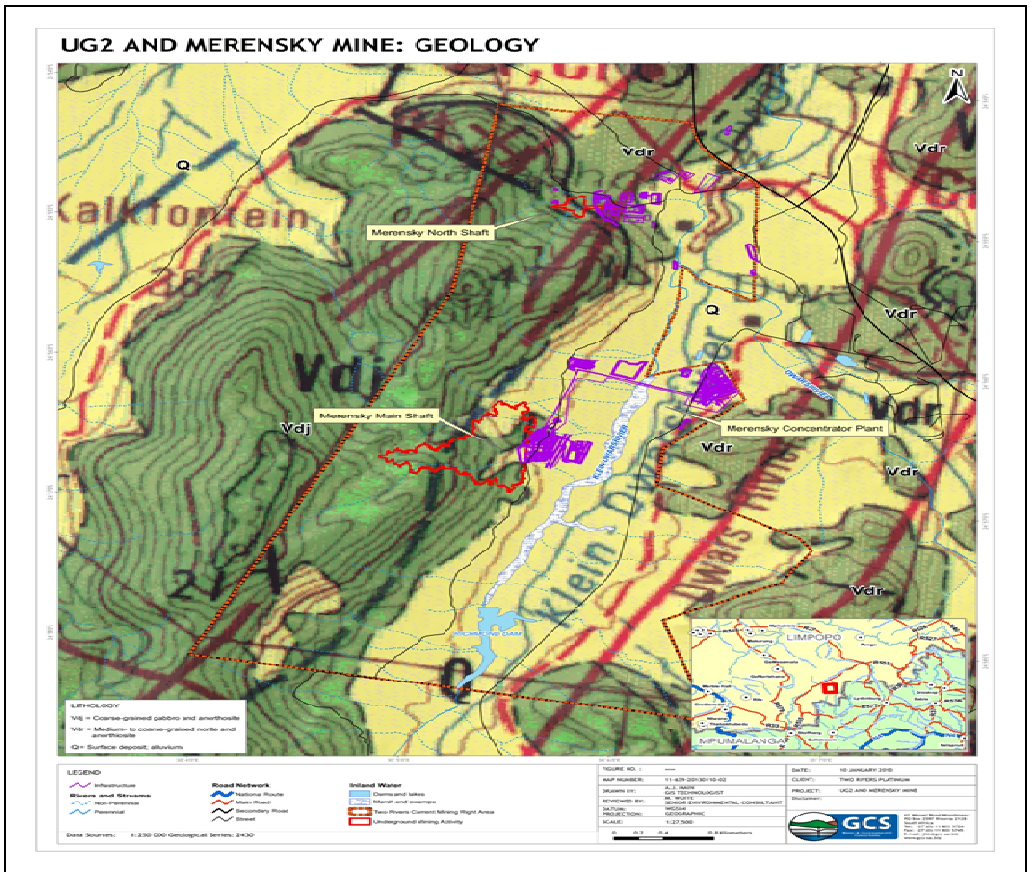
The information in this section is extracted from the hydrogeological study report, compiled by GCS in 2012 (Refer to Appendix D). Please note that the study also refers to a proposed opencast area on Tweefontein. This is the subject of a future expansion and does not form part of this application.

The Kalkfontein and Tweefontein extension site area is situated in the eastern limb of the Bushveld Igneous Complex. The farm Dwarsriver 372 KT on which Two Rivers Platinum mine is located is underlain by rocks of the Winnaarshoek and Winterveld Norite-Anorthosite Formations of the Rustenburg Layered Suite. These Formations comprise alternating layers of chromatite, pyroxenite, norite and anorthosite (SACS, 1980). The outcrop of the Winterveld Norite-Anorthosite Formation, which hosts the platiniferrous UG-2 chromatite layer and Merensky Reef is orientated north/south. The Kalkfontein/Tweefontein site is mainly underlain by norite and anorthosite as revealed by the drilling of the monitoring boreholes.

The Merensky unit is the thinnest cyclic unit and defines a transition to the main zone and is mainly overlain by a feldspathic pyroxenite that may be pegmatitic and typically consist of chromitite, pyroxenite, thin norite and anorthosite. UG2 chromitite reef, which may be up to 1.2 m thick, contains minimal sulphide, but still carries a similar PGE grade to the Merensky reef. Within the TRP UG2 seam there may also be the presence of internal pyroxenite partings, which in cases may result in split reef facies whereby the UG2 is separated into two or three seams especially in the southern-most portion of the property (Hatch, 2012).

5.1.3 Manner in which the geology may be affected by the proposed activities:

Underground mining involves the removal of rock containing ore for processing and extraction of elements, in this case platinum group metals. The geology will therefore be altered through removal of large quantities of rock from underground.



(Figure not to Scale – Refer to Map on adjacent page)

Figure 5.1 TRP UG2 and Merensky Expansion: Geology

5.2 Climate

The following information was extracted from the existing TRP EMPR realignment document (GCS, 2006), as well as the specialist Air Quality study conducted by Airshed Planning Professionals (Pty) Ltd. **Please note that the scope of the air quality study included the entire TRP mine site, as well as all proposed expansions. The New TSF and the proposed opencast mentioned in the air quality report are not the topic of this EIA report.** Refer to Appendix E for the full specialist report.

5.2.1 Regional Climate

The project area is situated on the eastern escarpment on the border of the Highveld and Northern Transvaal climatic zones. The terrain is generally sub-montane with steep slopes.

The climate can generally be defined as sub-humid, and can be locally described as normally hot and dry. The area falls within the summer rainfall zone and receives most of its annual rainfall during the period October to March.

5.2.2 Rainfall

Rainfall records for the weather stations Beetgeskraal, Maartenshoop and Lydenburg (most representatives) were obtained from the Weather Bureau. A summary of the mean monthly and mean annual rainfall at the stations is given in Table 5.1 and Table 5.2.

The mean annual rainfall is in the order of 703mm.

Table 5.1 Rainfall in Two Rivers region

Stations			
Station Name	Beetgeskraal	Maartenshoop	Lydenburg
WB Station No.	05545168	05934195	0554816A7
Length of Record	1927-1970	1909-2001	1961- 2000
Rainfall			
Average Monthly (mm)			
January	109	115	137.8
February	90	88.9	78.1
March	87.3	81.9	75
April	54.4	45	47.5
May	16.2	15	16
June	9.9	6	5.9
July	7.9	5.9	5.5

Stations			
August	6.3	7.6	10.1
September	25.1	21.8	24.6
October	57.9	60.3	66.1
November	118.9	1126.3	126.3
December	129.1	122.9	118.4
Average annual (mm)			
Annual	712	686.4	711.3

Additional rainfall statistics for the Lydenburg Weather Station are presented in Table 6.2.

Table 5.2 Rainfall in Region of Two Rivers-Lydenburg Weather Station (1961 to 1990)

Month	Mean days of rain	Maximum 24 hr rainfall		Maximum and minimum total per month / Year			
		mm	Date	Maximum	Year	Minimum	Year
January	13.3	66	1982/01/11	261	1975	42	1979
February	10.0	110	1961/02/09	246	1985	20	1983
March	9.1	57	1969/03/10	187	1987	7	1966
April	7.0	47	1967/04/05	139	1973	2	1987
May	3.2	40	1962/05/02	50	1972	0	1966
June	1.3	29	1961/06/20	52	1989	0	1990
July	1.0	29	1974/07/01	50	1984	0	1987
August	1.6	36	1987/08/26	65	1979	0	1984
September	3.1	74	1988/09/01	135	1973	0	1989
October	8.9	50	1990/10/07	141	1984	28	1965
November	14.1	66	1970/11/27	295	1983	53	1985
December	13.4	78	1983/12/17	287	1987	49	1972
Annual	86	110	1961/02/09	1117	1987	530	1966

From the MM5 data it may be seen that the region experienced summer rainfall between 250 – 500 mm per year, mainly from October to March (Figure 5.2).

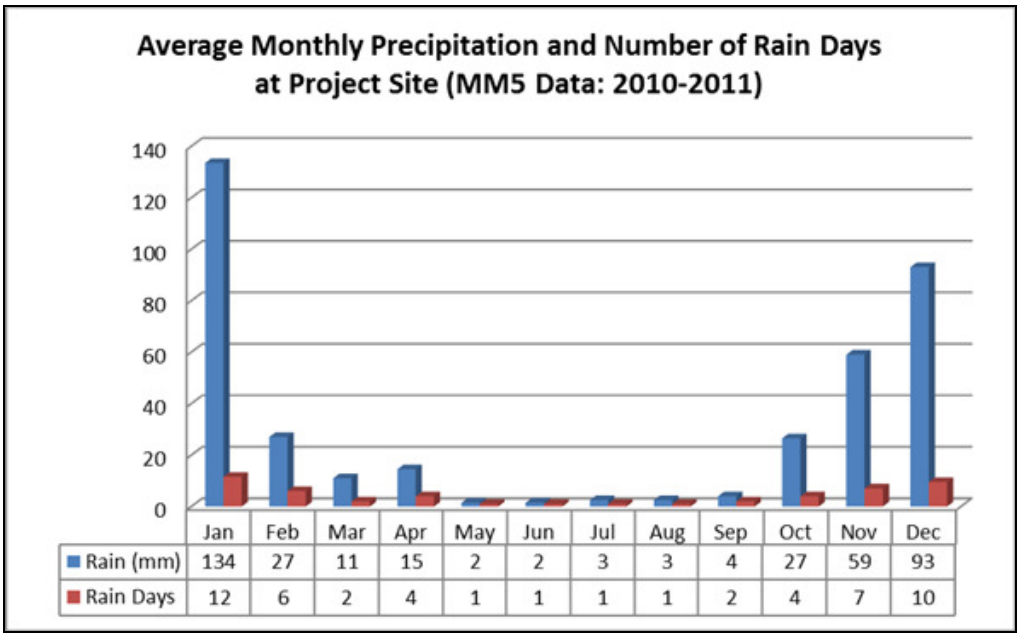


Figure 5.2 MM5 Rainfall Data (Figure extracted from the Air Quality Report in Appendix E)

5.2.3 Mean Monthly Maximum and Minimum Temperatures

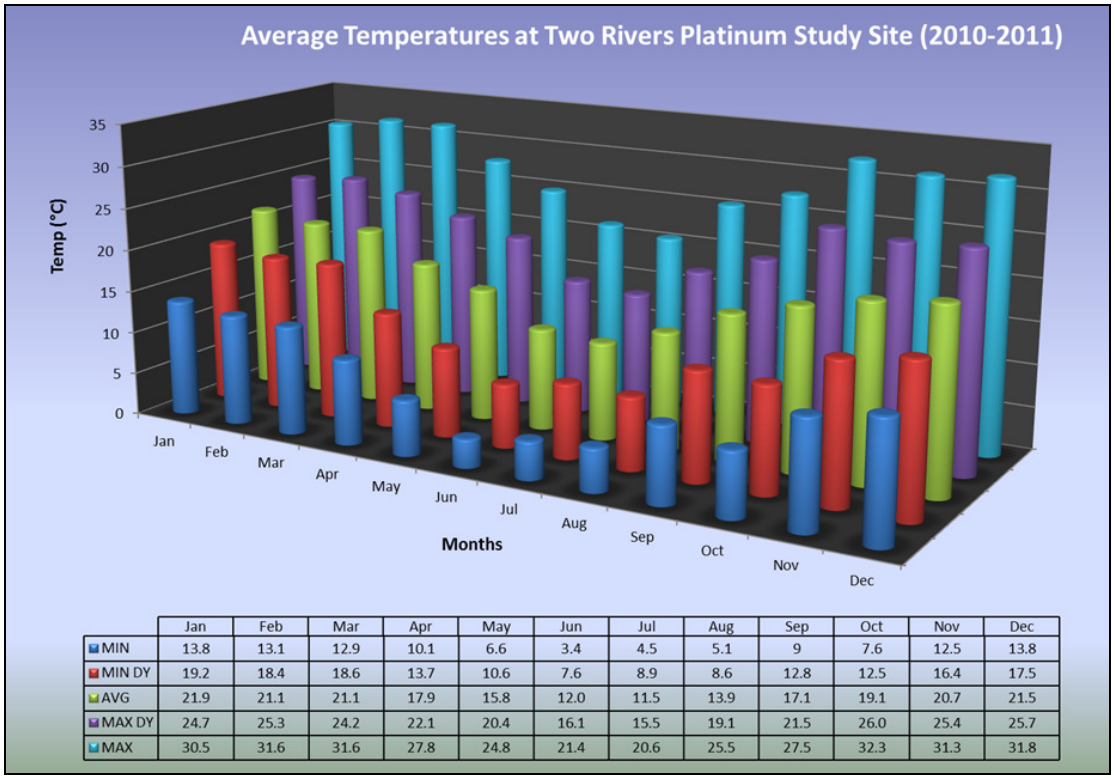
Temperature data obtained from the Lydenburg Weather Station (Table 6.3) shows that summers are warm, temperatures rarely exceed 30°C, and winters are mild. TRP is likely to be warmer than Lydenburg.

Table 5.3 Temperatures Recorded in the Two Rivers Region (Lydenburg Weather Station)

	TEMPERATURES (°C)				
	LYDENBURG WEATHER STATION (1961 TO 1990)				
Month	Mean daily			Extremes	
	Maximum	Minimum	Average	Highest	Lowest
Jan	25.9	14.7	20.3	33.5 (1983/11)	15.8 (1972/23)
Feb	25.5	14.2	19.8	34.5 (1983/27)	14.9 (1967/19)
Mar	24.8	12.9	18.8	34.0 (1984/02)	13.6 (1975/18)
Apr	22.6	10.0	16.3	31.3 (1987/04)	12.8 (1974/03)
May	20.8	6.0	13.4	28.0 (1979/08)	9.0 (1972/13)
Jun	18.3	2.8	10.6	25.3 (1962/28)	5.9 (1968/03)
Jul	18.8	2.7	10.7	26.4 (1983/15)	8.0 (1967/15)
Aug	20.9	4.8	12.8	28.5 (1979/08)	6.2 (1977/24)
Sep	23.6	8.1	15.9	33.5 91983/29)	6.4 (1974/04)
Oct	24.0	10.8	17.4	33.5 (1961/24)	9.3 (1965/19)

Nov	24.2	12.7	18.4	33.3 (1981/06)	9.0 (1968/11)
Dec	25.2	14.1	19.6	31.8 (1972/30)	15.2 (1966/17)
Annual	22.9	9.5	16.2	34.5 (1983/27)	5.9 (1968/03)

More recent data indicates the annual maximum, minimum and mean temperatures for the study site are 31.8°C, 3.4°C and 17.8°C respectively (see Figure 5.3). Average daily maximum temperatures range from 26°C in October to 15.5°C in July, with daily minima ranging from 19.2°C in January to 7.6°C in June.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MIN	13.8	13.1	12.9	10.1	6.6	3.4	4.5	5.1	9	7.6	12.5	13.8
MIN DY	19.2	18.4	18.6	13.7	10.6	7.6	8.9	8.6	12.8	12.5	16.4	17.5
AVG	21.9	21.1	21.1	17.9	15.8	12.0	11.5	13.9	17.1	19.1	20.7	21.5
MAX DY	24.7	25.3	24.2	22.1	20.4	16.1	15.5	19.1	21.5	26.0	25.4	25.7
MAX	30.5	31.6	31.6	27.8	24.8	21.4	20.6	25.5	27.5	32.3	31.3	31.8

Figure 5.3 Average temperature profile for the site (MM5 data: 2010-2011)

5.2.4 Mean Annual Evaporation

As can be seen in Figure 5.4, the mean annual evaporation for the area, as recorded at the Lydenburg Weather Station, is 1731 mm. This is the closest full weather station to the farm Dwarsrivier. No evaporation data is available for the weather stations Beetgeskraal and Maartenshoop.

Table 5.4 Average Evaporation (Lydenburg Weather Station)

MONTH	RAINFALL (1961 – 2000)	EVAPORATION FIGURES
January	137.76	176
February	78.13	154.7
March	74.98	148.9
April	47.50	114.6
May	16.00	102.5
June	5.86	88.2
July	5.48	103.2
August	10.12	137.7
September	24.63	170.6
October	66.09	184.2
November	126.34	165.9
December	118.42	182
Year	711.30	1731

From the evaporation and rainfall figures it can be seen that the project area is located in a water deficit area, where evaporation is greater than rainfall. This reduces the potential for leachate.

5.2.5 Prevailing Winds

The period and diurnal wind flow field variability is shown in Figure 5.4. From Figure 5.4 it is apparent that the dominant wind is from the southeast, with a strong component from the north-easterly sector. Calm conditions prevailed 4.3% during the 2010-2011 period with a period average wind speed of 3.3 m/s. Wind speeds exceeding 5 m/s occurred with a frequency of 10%. The north-easterly wind flow increases during day-time conditions with southeasterly wind flow increasing during the night.

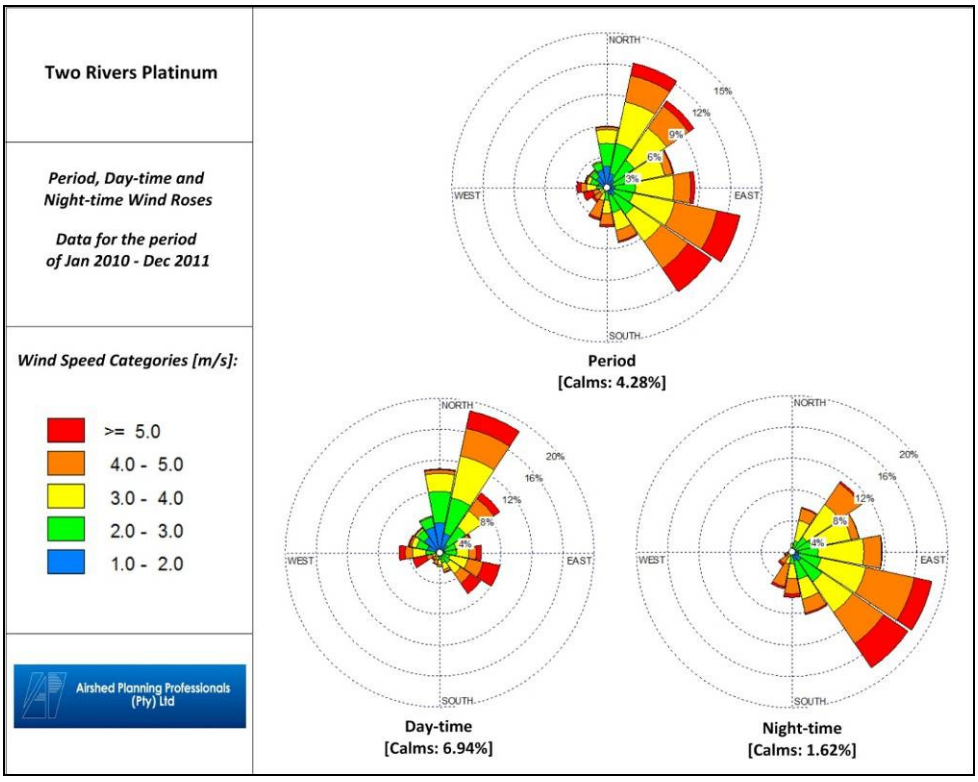


Figure 5.4 Period and diurnal wind roses (MM5 data: 2010-2011)

5.2.6 Incidence of Extreme Weather Conditions

The area is not exposed to extreme temperatures. Frost and hail are rare occurrences.

5.2.7 Manner in which climate may be affected

Since climate refers to a system occurring in a region rather than a local area, the climate of Limpopo Province and the surrounding area is not likely to be affected by the proposed activities since they are proposed on a comparatively small scale. The micro-climate of the mine site and surrounding valley may, however, be affected since the increased footprint of the mining area will result in some vegetation clearing. This may result in slightly increased temperatures and surface water run-off in the immediate vicinity.

5.3 Topography

The following information was extracted from the existing TRP EMPR realignment document (GCS, 2006)

5.3.1 Topography of the TRP site

The proposed area is traversed by the Klein Dwars River. The confluence of the Klein and Groot Dwars River is just to the north of the Two Rivers north decline on the property. The topography to the east of the Klein Dwars River is gently sloping and then rises suddenly in

the south east of the property. Refer to Figure 1.2 above which indicates the topography of the area.

5.3.2 Manner in which topography may be affected by the proposed activities

The UG2 and Merensky expansion involves underground mining, and the expansion of surface infrastructure within the existing mine property. The construction of additional ore and waste rock stockpiles can potentially alter the topography of the area.

5.4 Soils

The following information was extracted from the existing TRP EMPR realignment document (GCS, 2006).

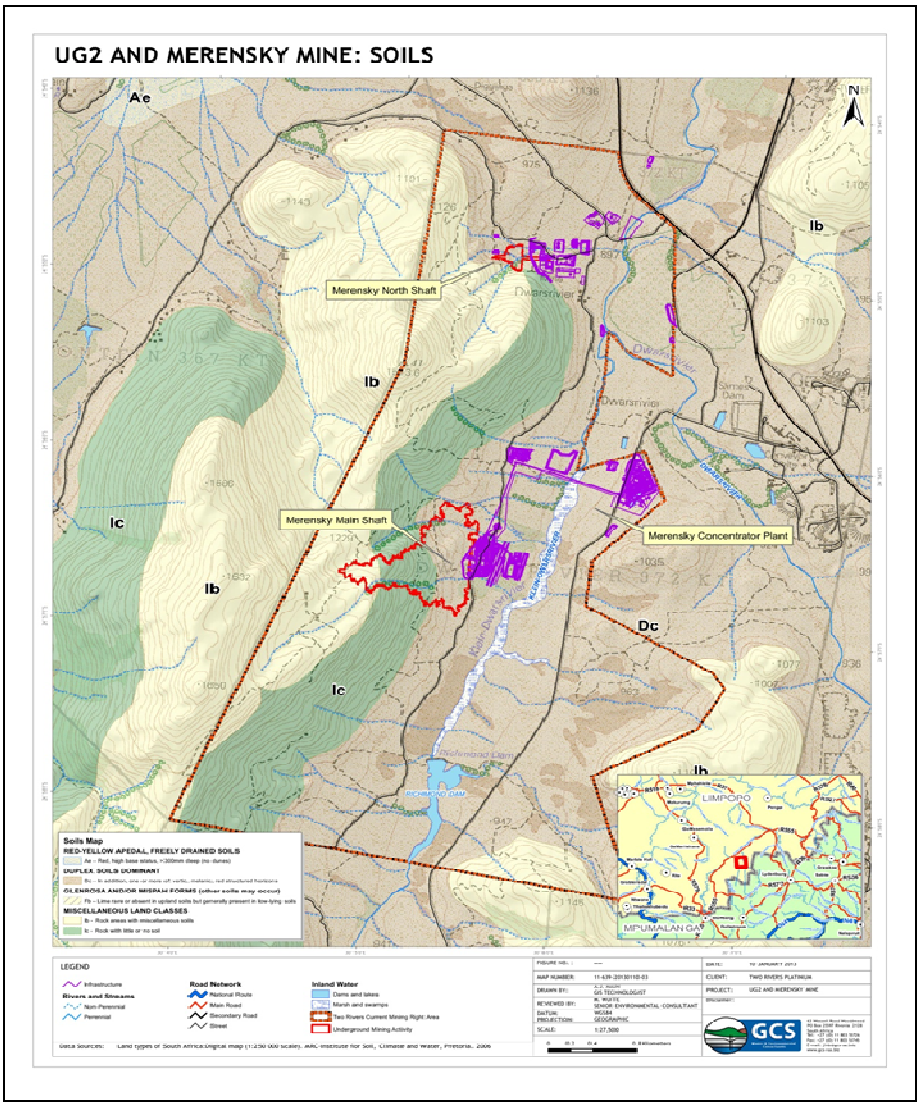
5.4.1 Broad Soil Classification and Land Types

Baseline soil data was obtained from the Institute for Soil, Climate and Water as well as the existing EMP compiled in 2002. Refer to Figure 5.2 indicating the land types.

The site falls within the Dc31 and Ib192 land types, which are dominated by basic igneous rocks (norite and gabbro) with the occurrence of high clay content and structured soils, often with free lime or distinct lime accumulations in the profiles in lower lying areas, as well as rock outcrops in higher lying areas.

The Dc31 land type encompasses the areas with relatively level slopes surrounding drainage channels and is dominated by deep soils derived from the alluvial and colluvial deposition of erosion products from the surrounding hills. The soils consist of sandier topsoils overlying more clayey subsoil. These soils comprise more than 50% of the land type. The soils are prone to erosion once disturbed.

The Ib192 land type is dominated by steep slopes and rock outcrops. In this land type soil formation is limited through the regular removal of soil material through erosion and soils are therefore very shallow.



(Figure not to Scale – Refer to Map on adjacent page)

Figure 5.2 Land-Type Map of the TRP Mining Right Area

5.4.2 Detailed Soil Studies – Dwarsrivier 372KT (Existing Site)

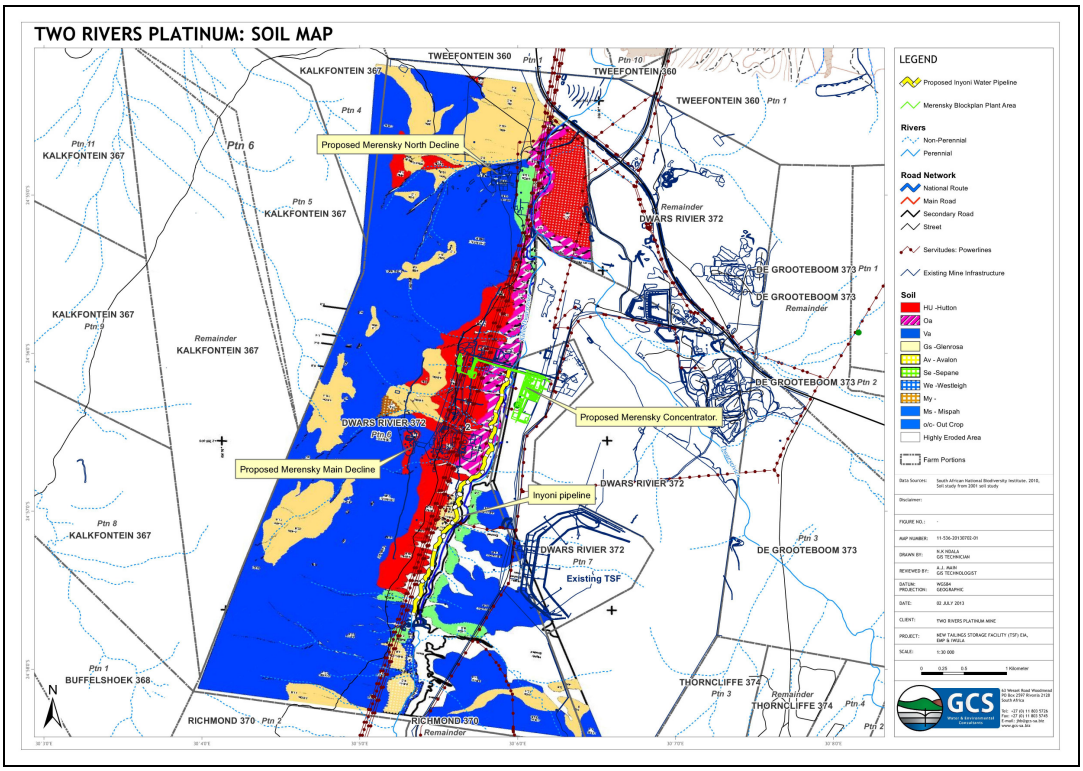
Specialist soil studies were undertaken between 2001 and 2002 on the existing mine site, the following information was extracted from the 2006 EMPR realignment document (GCS, 2006):

The initial infield study was carried out between October and November 2001, with additional detailed studies carried out on the Plant Area, Stockpile Site, and the Decline and Office Infrastructural area, in March 2002. The soil survey on the Northern Decline Area was done in August 2002.

A total of thirteen (13) soil forms were identified in the study area (existing mine infrastructure) including: Hutton (Hu), Avalon (Av), Westleigh (We), Valsrivier (Va), Swartland (Sw), Sterkspruit (Ss), Sepane (Se), Bonheim (Bo), Glenrosa (Gs), Mayo (My), Mispah (Ms), Oakleaf (Oa) and Willowbrook (Wo).

In the study carried out in August 2002 on the Northern Decline Area, a total of four (4) soil forms were identified in the study area including: Hutton (Hu), Valsrivier (Va), Glenrosa (Gs) and Mispah (Ms).

The soil forms Oakleaf, Valsrivier and Mispah dominate the existing mine infrastructure areas. Based on the soil polygon map (Figure 5.3– extracted from the TRP 2006 realignment EMPR document), it can be seen that the proposed Merensky Main and North Decline area, as well as the Merensky Concentrator plant site, will be dominated by the same soil forms.



(Figure not to scale- please refer to map on adjacent page)

Figure 5.3 Soils Map of the TRP Mining Right Area (EMPR, 2006)

5.4.3 Detailed Soil Studies – Kalkfontein and Tweefontein

No surface infrastructure is proposed on Kalkfontein and Tweefontein whatsoever, activity on these properties will be limited to underground operations only.

5.4.4 Manner in which soils may be affected

Although the proposed surface infrastructure is planned for the existing mine site only, additional clearing of vegetation and surface soils will be required for construction. Additional roads and paved areas are likely to cause compaction and degradation of soil chemical and physical properties.

5.5 Land Use

5.5.1 Pre-mining (pre-expansion) Land Use

The proposed site for the UG2 and Merensky expansion is within the boundary of the existing Two Rivers Mine property. The land use will remain unchanged.

5.5.2 Manner in which land use will be affected by the proposed activities

The existing land-use will not change, or be affected by the proposed expansion

5.6 Vegetation (Flora)

5.6.1 Baseline Vegetation Assessment

The following information was extracted from the Biodiversity Baseline Assessment report conducted by Ecorex consulting in 2008. The scope of the study was the existing TRP site, on the farm Dwarsrivier 372KT, the location for the proposed UG2 and Merensky surface infrastructure expansion. The full report is contained in Appendix F.

The Dwars River area comprises two vegetation types, namely Sekhukhune Plains Bushveld and Sekhukhune Mountain Bushveld (Mucina & Rutherford, 2006). Sekhukhune Plains Bushveld is confined to the level plains of major river valleys in northern Mpumalanga and southern Limpopo Provinces. It has a conservation status of Vulnerable and is considered poorly protected. Almost 50% of the project area is covered by transformed and untransformed portions of Sekhukhune Pains Bushveld. Sekhukhune Mountain Bushveld dominates the mountainous western half of the project area.

This vegetation type is also confined to northern Mpumalanga and southern Limpopo provinces, and has a conservation status of Least Threatened. However, it is hardly protected and Mucina and Rutherford (2006) comment that the area within the vicinity of the Dwars River is under increasing pressure from mining activities. The project area is situated within the Sekhukhuneland Centre of Plant Endemism, an area characterised by a high proportion of range-restricted endemic plants, many of which are threatened (Van Wyk & Smith, 2001).

Fourteen vegetation communities were identified within the project area on the basis of distinctive plant structure and floristic composition, as follows:

- *Kirkia – Triaspis* Closed Woodland
- *Lydenburgia – Vitex* Open Woodland
- *Protea – Tristachya* Open Woodland
- *Lydenburgia – Olea* Outcrop Thicket
- *Xerophyta - Myrothamnus* Sheetrock Shrubland
- *Acacia* Closed Woodland
- *Sclerocarya - Bolusanthus* Open Woodland
- *Euclea - Rhus* Open Shrubland
- *Lydenburgia - Euclea* Open Woodland

- Plains Thicket
- Degraded Old Lands
- *Lydenburgia - Olea* Riverine Thicket
- *Combretum erythrophyllum* Riverine Woodland
- *Phragmites - Imperata* Marsh

The distribution of these vegetation communities is indicated in Figure 5.6 below.

5.6.2 Important Flora

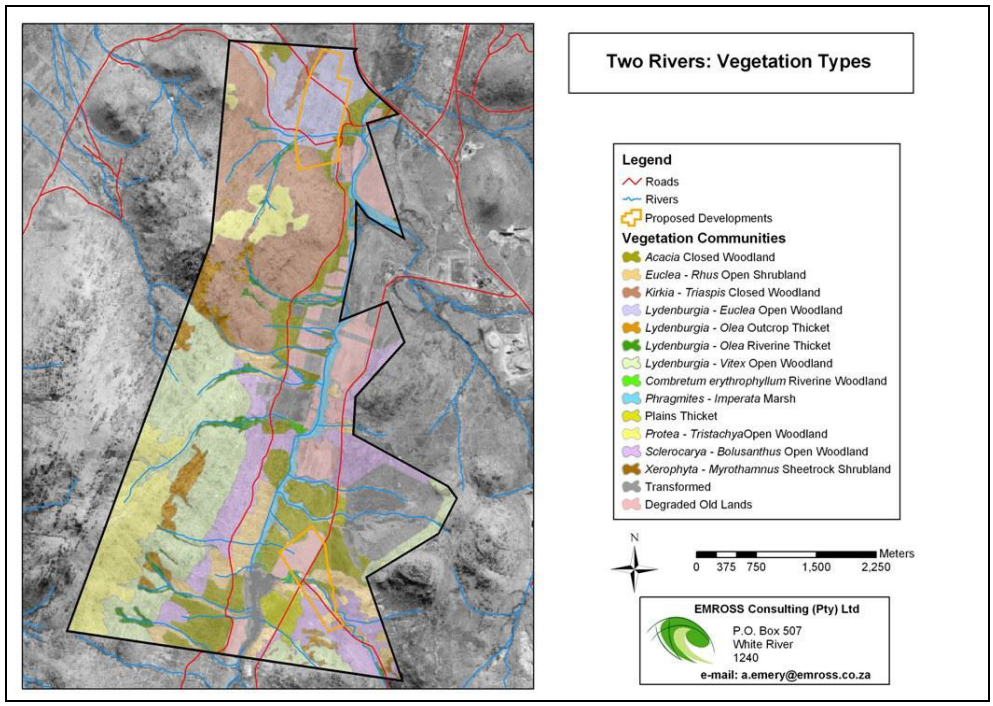
Fifteen Red Data plants were confirmed to occur during fieldwork. Three of these are significantly threatened and are in urgent need of conservation attention:

- *Gladiolus sp.nov.* – this spectacular iris has only recently been discovered in the Kennedy"s Vale area by Graham Deall in 2005. It has subsequently also been located at TRP near the North Decline (M.Lötter pers.comm.). The species is currently being described by Dr John Manning of the South African National Biodiversity Institute and is confirmed as a very range-restricted endemic of the SCPE. Mervyn Lötter of the MTPA has suggested that the preliminary Red Data status of this new species should be Critically Endangered. The species appears to favour arid woodland on rocky hillslopes and flowers at the end of summer. Within the project area it is only known from a small area on a hill slope above the North Decline.
- *Zantedeschia pentlandii* – this well-known bulb is endemic to the SCPE and is most common at higher altitudes in the upper Dwars River valley and the Roossenekal area. It has a National Red Data status of Vulnerable and is threatened by illegal collecting. Scattered specimens were located in Lydenburg – Vitex Open Woodland, Protea – Tristachya Open Woodland and Xerophyta – Myrothamnus Sheetrock Shrubland within the project area.
- *Resnova sp.aff. megaphylla* – this is a bulbous plant that appears to be very similar to Resnova megaphylla, which has a Red Data status of Vulnerable. However, this species complex has not yet been satisfactorily described and there is some measure of uncertainty over the precise identification of the Two Rivers taxon. It is confined to shady areas below large boulders on the upper east-facing slopes, only in Lydenburgia – Vitex Open Woodland and Lydenburgia – Olea Outcrop Thicket.

Thirty-one plants confirmed during fieldwork are endemic or near-endemic to the Sekhukhuneland Centre of Plant Endemism (27), the Wolkberg Centre of Plant Endemism (1) or Mpumalanga (3). The most range-restricted of these are the new *Gladiolus* sp. described above, *Zantedeschia pentlandii, Aloe fouriei* and *Resnova sp.aff. megaphylla*. Forty-three species are protected by legislation, in terms of the Mpumalanga Nature Conservation Act

(No.10 of 1998), the Limpopo Environmental Management Act, 2003 (No. 7 of 2003) and the National Forests Act (No.38 of 1998)

Twenty-four plant species with either national or provincial Red Data status potentially occur within the vicinity of the study area1 (Appendix A2). However, most of these have only a Moderate to Low chance of occurring.



(Figure not to scale- refer to Biodiversity Report, Appendix F)

Figure 5.5 Vegetation distribution on Dwarsrivier (TRP Mining Right Area) - (Biodiversity Report, Appendix F)

5.6.3 Manner in which vegetation will be affected by the proposed activities

The proposed activities will take place within the existing mine property, adjacent to the existing operations. This area is already largely disturbed. Vegetation clearing will be required for construction of the proposed infrastructure and this will result in the loss of indigenous plants and trees, including the possibility of clearing of important flora species.

5.7 Animal Life (Fauna)

5.7.1 Baseline Fauna Assessment

The following information was extracted from the Biodiversity Baseline Assessment report conducted by Ecorex consulting in 2008. The scope of the study was the existing TRP site,

on the farm Dwarsrivier, the location for the proposed UG2 and Merensky surface infrastructure expansion. The full report is contained in Appendix F.

5.7.1.1 Mammals

Twenty-eight mammal species were confirmed to occur on Dwars Rivier 372 KT during fieldwork in 2008, four of which have Red Data status and seven of which are protected. The highest species diversity was reported in Plains Woodland with 23 species, followed by Closed Woodland on Rocky Mountain Slopes with 22 species. More extensive fieldwork, including more nocturnal surveys, would have produced a slightly longer list. A total of 72 trap nights was achieved during 2008 fieldwork, with only three rodent species being caught.

5.7.1.2 Birds

Due to the presence of many habitats on the property, including man-made, as well as an elevation varying from 890m to 1513m, a high diversity of species was recorded. The quarter-degree grid 2430 CC, in which the study area falls, supported 268 bird species during the Southern African Bird Atlas Project, a total reflecting high diversity and but perhaps only moderate observer coverage. The greater Kennedy"s Vale area was rated as being of Low conservation importance for birds by the Mpumalanga Tourism & Parks Agency.

A total of 221 bird species was recorded during fieldwork, a fairly comprehensive list and a number which more extensive fieldwork would only slightly increase. The highest species diversity was reported in Plains Woodland with 145 species, followed by Closed Woodland on Rocky Mountain Slopes with 120 species.

Seven of the bird species potentially occurring at Dwars Rivier 372 KT are protected under the National Environmental Management: Biodiversity Act (No.10 of 2004), namely Southern Ground Hornbill, Martial Eagle, Cape Vulture, White-backed Vulture, Tawny Eagle, Bateleur and Lesser Kestrel.

5.7.1.3 Reptiles and Frogs

Twenty-nine reptiles and ten frogs were confirmed to occur during fieldwork. Of these, four are endemic (Van Dam"s Girdled Lizard, Transvaal Thick-toed Gecko, Sekhukhune Flat Lizard and Clicking Stream Frog) and five are protected under the National Environmental Management: Biodiversity Act (No.10 of 2004): Water and Rock Monitors, Leopard and Lobatse Hinged Tortoises and Van Dam"s Girdled Lizard. The highest species diversity for

reptiles was reported in Open Woodland on Rocky Mountain Slopes (15 species) and for frogs Riverine Wetland (8 species).

The project site is in an area classified as being of Low importance for both reptiles and frogs, but is home to a moderate diversity of species. A total of 21 conservation-important reptiles and frogs potentially occur. Of the species potentially occurring, one has Red Data status, namely Southern African Python. This large snake favours broken, hilly savannas, particularly if close to water, and therefore has a High likelihood of occurring on the property. It is listed as Vulnerable, mainly due to the traditional medicine trade and direct persecution by landowners.

5.7.1.4 Selected Invertebrates

More information regarding invertebrates can be found in the biodiversity study in Appendix F. Of particular importance is the cicada:
Pycna sylvia, South Africa's largest endemic cicada species was thought to be extinct until its recent rediscovery during an EIA survey at Der Brochen in 2001. It has been suggested (Malherbe 2002, Malherbe et al. 2004, Harrison 2005) that *Vitex obovata subsp. wilmsii* may be the main food plant for nymphs of *Pycna sylvia*, and that the adult cicadas also preferentially feed on this tree species, albeit with less fidelity. Subsequent observations by our team suggest that the presumption of a close association of *P. sylvia* with *Vitex obovata* may have been over-hasty and based on inadequate data, and surveys for this species should not be limited to areas where *V. obovata* occurs.

Some specimens were observed and photographed during January 2008 by other members of the survey team, but *Pycna sylvia* were confirmed in several of the sites during the November 2008 survey, although it was fairly early in the season for this species and calling was more discontinuous than would be expected in mid-summer; sites in which *P. sylvia* was confirmed included sites A (*Lydenburgia-Vitex* Open Woodland), C (Plains Thicket) and E (*Protea-Tristachya* Open Woodland). *P. sylvia* were also heard calling close to the edges of site D2, the proposed south open pit (*Sclerocarya-Bolusanthus* Open Woodland) and will probably occur throughout this vegetation by mid-summer. It is interesting to note that possibly the greatest abundance of *P. sylvia* at this time was encountered in the Acacia-dominated Plains Thicket to the east of the dam in the south of the property; no *Vitex obovata* occurs in this vegetation, which calls into question the supposed close association between *P. sylvia* and *Vitex obovata*. Similar observations have been made elsewhere in the Dwars River region, suggesting that further research is required to more rigorously establish the food-plant relations of this important cicada species.

5.7.2 Manner in which fauna may be affected

Although the site is already disturbed by mining activity, clearing of land for the construction of proposed additional new infrastructure on Dwarsrivier will remove additional natural habitat on the mine property, possibly affecting animal communities. Some species are particularly important such as the *Pycna Sylvia* cicada.

5.8 Hydrology (Surface Water) and Wetlands

A specialist hydrological assessment was undertaken for TRP by GCS in 2012. The scope of the study was for a proposed opencast mine which is not the subject of this EIA report or application. The study, however, contains important updated baseline information applicable to the farm Dwarsrivier 372KT (the location of the proposed UG2 Merensky expansion). The relevant information is extracted and summarised here, but the specialist report is not included as an Appendix since the proposed opencast mine is not the topic of this application.

5.8.1 Water Management Area

TRP is located within the B41G quaternary catchment of the Olifants Water Management Area (WMA), also referred to as WMA 4. The Olifants River originates near Bethal in the Highveld of Mpumalanga, initially flowing northwards before curving eastwards and reaching Mozambique via the Kruger National Park. In Mozambique, the Olifants River joins the Limpopo River before discharging into the Indian Ocean.

The main tributaries of this WMA are the Wilge, Elands and Ga-Selati Rivers on the left bank, and the Steelpoort, Blyde and Klaserie Rivers.

5.8.2 Baseline hydrological study results

A baseline survey was conducted to identify elements that could potentially influence development and planning on site. A site visit was conducted in order to get a feel for normal flow rates, river health and potential factors that could influence hydrological modelling of flows. Generally accepted methods and formulae were used to determine design floods at relevant points in the area, to estimate flood levels and to draw floodlines. Runoff from the relevant streams was analysed by using accepted techniques to downscale quaternary catchment data.

The project area consists of a main catchment within which a relevant sub-catchment was delineated. The catchment is mainly rural. In order to calculate the peak flows, the Rational, Alternative Rational, Standard Design Flood and an Empirical Method were

utilised. The flows were calculated under current conditions (natural and current mining activities) and were determined for a 24 hour rainfall event. The area is not anticipated to have a large potential stream flow reduction impact on the runoff of the immediate and general area. The results of the SDF method were chosen as the best of those calculated. For the larger of the two catchments analysed, the 1 in 100 year peak flow, using this method, was 2155.1m^3/s and the 1 in 50 year peak flow was 1693.8m^3/s. For the smaller catchment the results were 67.9m^3/s and 53.3m^3/s, respectively.

A water quality evaluation was performed on a sampling point in the site area. The water sample indicated relatively good quality water in terms of compliance to the SAWQG and SANS standards. The sample had elevated metals (iron and aluminum), which could have resulted from natural water-rock interactions. These will not have an adverse effect on health. The water quality results did not show an impact from mining on the streams. Floodlines on river sections were analyzed to evaluate risks associated with potential flooding of infrastructure and protection of natural resources. The floodline analysis showed that the relevant floodlines fall largely but not exclusively within 100m of the rivers analyzed.

5.8.3 Wetlands

The existing EMP/EMPR (GCS 2002, 2006) states that small pockets of wetland vegetation exist on the property, but this is only associated with the major rivers that run through the site (Groot and Klein Dwars Rivers). Wetlands do not exist in isolation on any other area of the property. Refer to Figure 5.6 which confirms marsh vegetation associated with the major watercourses only.

5.8.4 Manner in which surface water may be affected

The quantity and quality of the surface water may be affected by the proposed Merensky expansion, since additional water supply will be required. Extraction of ore and mineral processing requires the input of chemicals and mechanical processes which may lead to contamination. The wetland areas associated with the rivers on the site will not be affected since construction will not occur within the 100 year floodline of the rivers.

5.9 Hydrogeology (Ground Water)

5.9.1 Dwarsrivier 373KT location – existing mine site

The following information was extracted from a specialist hydrogeological study conducted by Golder Associates in 2010. The full study can be viewed in Appendix C:

The data gathered during the 2010 groundwater study was used to prepare a conceptual hydrogeological model for the mine area (Refer to Appendix C), and provides a baseline description of the groundwater conditions on Dwarsrivier farm (current TRP mine site):

- The TRP property is situated along the Klein Dwars river valley and is underlain by anorthosite, norite, chromite and pyroxenite. Numerous faults and dolerite dyke intrusions are present.
- Recharge in the area is calculated as 1% of 553mm MAP due to high evaporation rates.
- Groundwater occurrence in the shallow aquifer is controlled by proximity to the floodplain of the Klein Dwars and Groot Dwars rivers.
- Groundwater occurrence in the deep aquifer is controlled by the lateral and vertical distribution of fracture zones.
- The deep aquifer is localized and anisotropic.
- Water levels in the shallow aquifer vary from 3.79 to 15m depth below ground surface. The levels for the deep aquifer vary from 3.3 to 48.24m below ground surface.
- Groundwater gradients vary from 0.005 (1:200) south to north along the floodplain to 0.03 (1:30) for the steeper hill sides.
- Groundwater quality is mostly acceptable with some localized high TDS, EC NO3 and SO4 values obtained, associated with nearby mine infrastructure.
- Transmissivity for the shallow aquifer is high where the aquifer is coincident with faulting and are about 250m2/day. Elsewhere in the shallow aquifer values are much lower with hydraulic conductivities ranging from 0.073 to 11.923m/day.
- The transmissivity associated with fracturing in the deep aquifer is approximately 10m2/d. Elsewhere the fractured aquifer is poorly developed and hydraulic conductivity values range between 0.003 to 0.007m/day.
- Restricted hydraulic continuity exists between the deep aquifer and the shallow aquifer.
- The shallow aquifer has no barrier from surface water ingress and pollutant transportation. The deep aquifer is less vulnerable to possible pollutant mobilisation due to the restricted hydraulic continuity.

Refer to Appendix C for the full Hydrogeological study Report.

5.9.2 Kalkfontein and Tweefontein Farms – underground expansion

The information in this section is extracted from the hydrogeological study report, compiled by GCS in 2012 (Refer to Appendix D). **Please note that the study also refers to a proposed opencast area on Tweefontein. This is the subject of a future expansion and does not form part of this application, but the information provided in this section has relevance to the proposed underground expansion and the development of the sewage treatment plants.**

Groundwater in the site area (Kalkfontein and Tweefontein farms, the the north of Dwarsrivier) is controlled by shallow weathered and deep fractured aquifers. Some alluvium primary aquifers are associated with the floodplain of the Dwars River, but this does not play a role at the site proposed for the underground mining. The groundwater occurrence in the deep aquifer is controlled by the lateral and vertical distribution of fracture zones.

A hydrocensus was conducted in August 2012 within the Kalkfontein and Tweefontein properties, as well as neighboring farms within a maximum radius of 2 km from prospective mine infrastructure. A total of three (3) boreholes and one (1) fountain were visited during the hydrocensus. One (1) borehole was equipped with a submersible pump powered by a generator and the remaining two (2) boreholes were not equipped nor in use.

The water from the fountain is directed via a pipeline toward water troughs for stock watering, while the water from the borehole is used for domestic and small scale irrigational purposes. Residents in the Kalkfontein area mostly buy water or collect the water from the Dwars River that flows past the site area at a distance of approximately 6km to the west.

According to available data from the NGDB as well as the hydrocensus, the water levels in boreholes surrounding the site area vary from ~3.0 to ~60 metres below ground level (mbgl).

A total of four (4) new boreholes were drilled with borehole depths ranging between 40m and 80m. Very low yields were obtained on all the boreholes except one, which intersected an underground cavity and are not regarded as representative of the ambient hydrogeology that will control the inflow into the proposed new mine workings.

The boreholes were pumped at abstraction rates that ranged between 1.21 to 1.45 l/s. Time periods for the constant rate tests ranged between 9 to 480 minutes. The aquifer test data was interpreted using the Cooper-Jacob (1946) method for drawdown data, and the

Theis residual drawdown method for the recovery data. Very low transmissivities were obtained, with no significant water strikes related to the lineaments shown on the geological maps.

A total of four (4) groundwater samples were collected during the pumping tests on the newly drilled boreholes and were sent to Analytico (an accredited laboratory) for analyses. The chemistry data was compared to the Department of Water Affairs South Africa Water Quality Target Values (DWA SAWQTV) for drinking water, as well as the South Africa National Standard (SANS241:2011) guidelines for domestic use (see Section 10 for these results).

The following observations were made from the results:

- All boreholes showed compliance with the (SANS241:2011) standard for drinking water for all constituents;
- All boreholes exceeded the target values for drinking water but remained compliant with the SANS241:2011 standard for drinking water for the electric conductivity (EC) and calcium (Ca);
- Only TRP GWM16 were compliant with the target values for magnesium (Mg); and
- TRP GWM16 and TRP GWM17 exceeded the target values for total dissolved solids (TDS).

Refer to Appendix D for the full Hydrogeological Study Report.

5.9.3 Manner in which groundwater may be affected

The proposed underground mine expansion, as well as the construction of additional surface infrastructure within the MRA has the potential to change the groundwater quantity and quality, due to dewatering, ore extraction and mineral processing activities.

5.10 Air Quality

The following information was extracted the specialist Air Quality study conducted by Airshed Planning Professionals (Pty) Ltd. Please note that the scope of the air quality study included the entire TRP mine site, as well as all proposed expansions. The New TSF and the proposed opencast mentioned in the air quality report are not the topic of this EIA report. Refer to Appendix E for the full specialist report.

The main findings of the baseline assessment were as follows:

- Airborne particulates represent the main pollutant of concern, given the nature of the proposed operations.
- The sensitive receptors closest to the mine boundary were identified as the residential areas of Didingwe River Lodge ~4km to the southeast, Ga-Mampuru ~5km to the north, Kokwaneng ~7km to the northwest, Madimola ~7 km to the west, and two informal settlements ~2.5km to the northwest and ~11km to the northeast respectively.
- The local wind field is characterised by:
    - South-easterly and north-easterly winds with a very low frequency of winds from the western sector (due to the mountainous terrain to the west). The north-easterly wind flow increases during day-time conditions with south-easterly wind flow increasing during the night.
    - Low to moderate wind speeds with an average wind speed of 3.3m/s.
- Calm conditions occurring approximately 4.3% of the time.
- The region experiences summer rainfall (between 250 – 500 mm per year), mainly from October to March. Summers are warm and winters are mild; average daily maximum temperatures range from 26°C in October to 15.5°C in July, with daily minima ranging from 19.2°C in January to 7.6°C in June.
- The highest concentrations for ground level, or near-ground level releases from non-wind dependent sources would occur during weak wind speeds and stable (night-time) atmospheric conditions. Calculations indicate that stable, neutral and unstable conditions at the site occur 46%, 8% and 46% of the time respectively.
- Local source contributors to ambient PM10 concentrations in the vicinity of the study site are:
    - domestic fuel burning and vehicle activity in residential areas close to the mine;
    - surrounding chrome and platinum mining activities;
    - cattle ranching in the Steelpoort Valley;
    - agricultural activities and limited cultivation in fertile areas adjacent to the Steelpoort River.
- The highest measured dust fallout for the month August/September was recorded at the tailings storage facility, followed by the crushing plant and the north decline. The highest dust fallout at the tailings storage facility was recorded from an eastern direction. The results should be seen as an indicator rather than an actual comparison with the standards proposed in SANS 1929, however, since directional dust monitoring is not according to the ASTM 1739-98 standard measurement method.

- Predicted ambient PM10 concentrations due to operations at the adjacent Dwarsrivier Chrome Mine (sourced from an online available impact assessment, 2010) shows no exceedance of the PM10 annual average standard and only a marginal exceedance of the PM10 daily average standard at the western mine boundary (shared with TRP).

5.11 Noise

The existing noise levels in the vicinity of the TRP site include traffic on the R555 road and mining activities. Environments which are recognized as being noise sensitive include residential areas, offices, educational facilities and health and church buildings. None of these sensitive environments are in close proximity to the TRP mining area.

5.12 Archaeology & Heritage

5.12.1 Existing studies

Trial mining was undertaken for the UG2&Merensky Expansion in 2012. SHASA Heritage consultants were contracted directly by TRP to conduct a Heritage Impact Assessment prior to the start of trial mining. This report is dated March 2012. In 2002, Anton von Vollenhoven conducted the initial Heritage Impact Assessment for the initial mine application.

These studies provide important baseline information for the proposed UG2 and Merensky expansion project area within the MRA, based on the trial mining area already in existence. The following information is extracted from the 2012 SHASA report. **Please note, trial mining has begun at the Merensky Main Decline. Graves identified prior to the start of trial mining have already been relocated (prior to GCS undertaking this current EIA), through consultation with the community, as per recommendations in the 2012 SHASA report. No graves remain within the Merensky Mine expansion footprint area.**

5.12.2 Summary of baseline conditions relevant to the UG2 & Merensky expansion

The results of the 2012 survey indicated that humans used the area since early times, evident from the amount of Stone Age Material found during the Survey. The Iron Age is also represented in the area.

A heritage assessment looking specifically at the UG2 and Merensky expansion project area was conducted in 2012. The results showed that large areas of this proposed project area are already under mining operations. Primary focus was on the areas leading north from the current mining area where survey took place to determine if any areas would be viable for expansion.

The areas covered, from the existing mine, indicated both Iron age and historical occupation, as well as graves. These graves have since been relocated.

A historical adit exists on the TRP property. It was established in the 1920's and is thus considered a structure relating to early mining in South African history. Although its relative importance to the history of mining is minor, prevents its alteration or destruction without suitable permits, issued by the Heritage Authority- the South African Heritage Resources Agency (SAHRA). Although the adit does not fall within, or close to, the proposed expansion footprint, it is recommended in the SHASA (2012) report that further a further study be conducted on this adit, should the UG2 & Merensky Expansion be authorised.

5.12.3 Manner in which heritage resources may be affected

The heritage assessments conducted to date indicate graves in the UG2 & Merensky project area, **however, these have already been relocated prior to the start of the UG2& Merensky Expansion trial mining, and no longer exist within the expansion footprint.** A historical adit on the mine property, which is situated outside of the UG2 and Merensky project area, was identified but will not be impacted upon by the proposed development. No further heritage resources have been identified as part of the UG2 and Merensky Expansion.

5.13 Sensitive Landscapes

The guidelines for integrated environmental management (IEM Guidelines – DEA, 1992) define "sensitive landscapes" as a broad term applying to the landscapes listed in Table 5.5

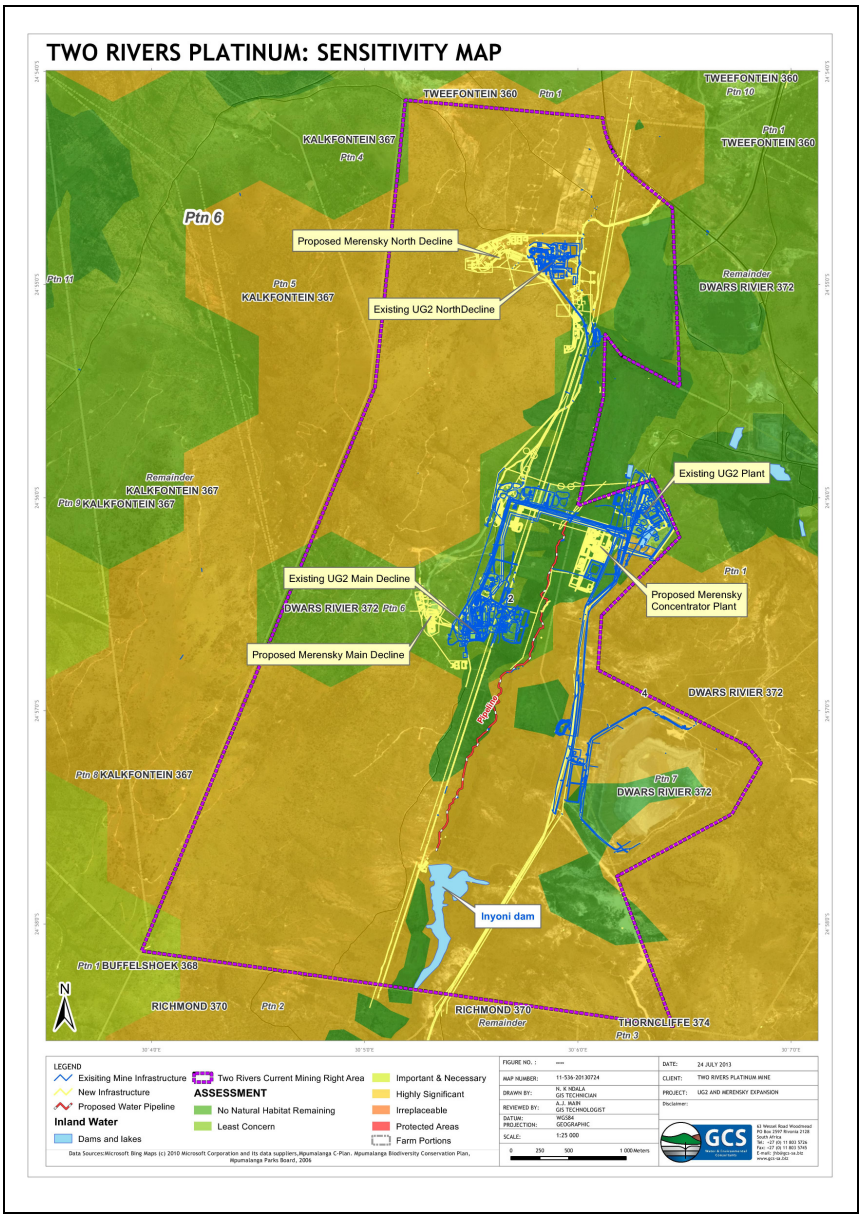
Table 5.5 Occurrence of Sensitive Landscapes in the TRP area (Dwarsrivier Farm)

Types of sensitive landscapes	Occurrence at the Two Rivers site
Nature conservation or ecologically sensitive areas - indigenous plant communities (particularly rare communities and forests), wetlands, rivers, riverbanks, lakes, islands, lagoons, estuaries, reefs, inter-tidal zones, beaches and habitats of rare animal species.	The Sekhukhune land area in general harbours a number of endemic plant species, namely Heavy Metal Accumulators. This is due to the outcropping UG-2 and LG-2 seams which are rich in minerals. Wetlands do not occur on the site, except for the riparian areas and vegetation closely associated with the major rivers (riverbanks).
Sensitive physical environments -	Loamy clay occurs within the floodplain of the Klein Dwars

such as unstable soils and geo-technically unstable areas.	River requires special attention from the geotechnical perspective – structures need special foundations to accommodate the shrink swell properties of this soil.
Important natural resources - river systems, ground water systems, high potential agricultural land.	The alluvial aquifer associated with the Klein Dwars River occurs on the site "Major Aquifer System". The new National Water Act does not distinguish specific ground water resources as requiring protection; it requires that all ground water resources be protected.
Sites of special scientific interest.	There are no sites of special scientific interest. A national geological monument occurs on the northern boundary of the farm Dwarsrivier.
Sites of social significance - including sites of archaeological, historic, cultural, spiritual or religious importance and burial sites.	Archaeological sites and gravesites have been identified on the Tweefontein and Kalkfontein properties.
Sites of outstanding natural beauty, panoramic views and scenic drives.	The mountains to the west of Two Rivers are of natural beauty and offer panoramic views of the areas below.
Green belts or public open space in municipal areas.	The site is in a rural area.

Figure 5.5 indicates the proposed UG2&Merensky expansion on a Sensitivity Map of the area, based on data received from SANBI (South African National Biodiversity Institute), 2010.

The proposed Merensky Main Decline, Concentrator Plant and Inyoni Pipeline are all located in areas 'of least concern' or 'no habitat remaining'. The proposed Merensky North Decline is located in an area classified as 'highly significant'.



(Not to scale – refer to map on adjacent page)

Figure 5.6 Sensitivity Map for the proposed UG2&Merensky Expansion

5.14 Socio-Economic Aspects

A specialist social impact assessment is currently being undertaken for TRP by GCS. The scope of this assessment covers the existing mine, incorporating a number of new expansions including the UG2 and Merensky project. The report is still in draft phase as it will only be concluded at the end of the stakeholder consultation process which must still be conducted for the EIA phase of the various applications. The draft report is included as Appendix G. **Please note – the New TSF as discussed in the draft social impact report is not relevant to this EIA report, only the data pertaining to the 'Kalkfontein and Tweefontein underground mine' is relevant.**

5.14.1 Baseline socio-economic conditions – local context

Population and household profile

The population size (persons) for the Greater Tubatse LM increased steadily over the 1995 to 2010 time period, growing by 33.04% since 1995. Households have followed the same trend over the specified time period, growing at a slightly more accelerated pace of 35.58% since 1995. The Sekhukhune DM population grew at a slightly less accelerated speed of 18.39%, with the Limpopo Province showing the lowest overall growth of 16.17% over the same time period.

Population group

The population of the Greater Tubatse LM in 2010 were composed of mostly Black African persons (99.96%) followed by 2.19% White persons.

The number of Black African person has increased by 17.56% since 1995, whereas the number of Coloured and Indian or Asian persons since 1995 has increased by 53.98% and 57.14% respectively. The LM reflects the demographics of the DM and the province, with respectively 99.78% and 97.52% of the population being Black African.

Age

The age distribution of persons is important as it helps determine both the current and future needs of an area. Figures for 2010 indicate that the GTLM had a similar child population (36.37%) as compared to the Sekhukhune DM (36.63%) and Limpopo Province (34.68%). This trend continues when comparing the working age population for each of the 3 regions, where 59.78% of the GTLM population forms part of the economically active population (EAP) of the area (16 to 64 years), as compared to 59.78% and 60.45% respectively for the Sekhukhune DM and Limpopo Province. These persons normally have more work experience and usually fall within the higher skilled and higher salary bracket.

The elderly population (65 and older) for each of the regions are comparatively small (ranging between 4.95% for the DM and 3.85% for the LM), which means that less burden is placed on the EAP to support persons that are no longer economically active.

When comparing the 2010 data with that of 1995, one will note a large increase in the total population for GTLM (33.04%), the working age population (46.44%) as well as the aged population (31.00%). The child population for the Sekhukhune DM and Limpopo Province have declined by 4.21% and 8.34% respectively, whereas the GTLM child population has increased by 11.24%.

The age dependency ratio1 for the Limpopo Province has been steadily decreasing, from a high 97.1 in 1995 to 65.4 in 2010. The Sekhukhune DM has improved significantly from a 105.5 age dependency ratio in 1995 to 71.2 in 2010. A similar trend can be seen for the Tubatse LM (109.1 in 1995 vs. 67.3 in 2010). Even though the province has improved its age dependency ratio, it still reflects poorly against that of South Africa as a whole (70.9 in 1995 vs. 56.2 in 2010).

Education

The largest percentage (11.78%) of the Greater Tubatse LM population has obtained a Grade 10 qualification (**Error! Reference source not found.**), more than the percentage for the Limpopo Province (10.11%) or the Sekhukhune DM (10.86%). However, 6.19% of the population have not received any form of schooling. Only 2.13% of the population achieved an academic level higher than Grade 12.

According to the GTLM IDP (2012/3), there are 247 schools (primary and secondary) situated in the LM. Steelpoort, Ohrigstad and Burgersfort each have one (1) government primary school. The IDP indicates that it is the norm for rural or semi-rural areas such to have a high prevalence of primary schools, since many pupils leave school at an early age in order to find employment to assist and support the family. The privileged scholars, who can afford to further their education, either attend the secondary schools in the area or secondary schools located in larger towns outside the region.

[1] The ratio of the combined child population (0-14 years) and the aged population (65 years and over) - persons in the dependent ages - to every 100 people of the intermediate age population (15-65 years) - economically active ages. Where more detailed data are lacking, the age-dependency ratio is often used as an indicator of the economic burden the productive portion of a population must carry - even though some persons defined as dependent are producers and some persons in the productive ages are economically dependent (Quantec Research (Pty) Ltd)

5.14.2 Economic profile

This section provides a delineation of the study area and a brief economic status quo pertaining to employment and labour profile.

Within the Greater Tubatse LM, the IDP reports that the northern section of the LM has the most marginalised economy of the region and has no economic base. However, with the development of mines in the LM, the area has started to benefit economically mines in many ways (2012/3). The IDP, however, also highlights that although there are several mines in the area, the existing resources remain unexploited. The LM views investment in this sector as very important as it brings with it investment in infrastructure, results in creation of job opportunities, etc.

According to the Greater Tubatse LM IDP (2012/3), the region's main economic drivers and future development thrusts are the following:

- Mining cluster development;
- Horticulture development;
- Meat cluster development;
- Tourism cluster development;
- Nodal development; and
- Informal sector development.

The main challenges facing economic development within the Greater Tubatse LM are (IDP, 2012/3):

- Brain drain;
- High level of illiteracy;
- Lack of infrastructure for agriculture and tourism development;
- Migration and immigration; and
- High level of HIV/Aids.

Employment and labour profile

The employment status of the population has a variety of important implications. Economically active and employed persons can contribute to the overall welfare of a specific community by paying their taxes, looking after the youth and aged and by stimulating the economy. However, should a community have a large number of economically inactive and/or unemployed persons, the burden on the EAP of that community are amplified.

The GTLM unemployment increased dramatically between 1995 and 2010, increasing by 31.17%. This is considerable when comparing the slight increase of 2.49% for Limpopo Province and the significant decrease of 15.31% for the Sekhukhune DM. The province has, however, seen a decrease of 21.41% in the number of employed persons, with this number increasing for both the Sekhukhune DM (15.86%) and GTLM (44.67%).

The community, social and personal services industry is currently creating the most employment opportunities within the. The mining and quarrying industry has been the strongest industry within the LM over the same period.

5.14.3 Services and infrastructure profile

Social service delivery centres on the provision of health, education and community development facilities and services. The concept of service delivery also comprises various elements such as affordability, quality, efficiency and access.

This indicator therefore examines the level of service provision in the study area. Services assessed include sanitation, water, housing and electrification. There are three priority services (water, sanitation and electricity) for the promotion of health, convenience and quality of life.

Housing

The GTLM has a similar housing profile as that of the DM. A house or brick structure on a separate stand or yard is the noted most frequently, while informal dwellings/shacks NOT in a backyard are found the most frequent out of any other type of housing, excluding a house or brick structure on a separate stand or yard.

According to the GTLM IDP (2012/3), approximately 50% of the land in GTLM area is currently under land claims. The claims are almost exclusively in rural areas that were part of the former Lebowa territory. The only land claim was lodged near an urban area, and that was in Steelpoort with none in Burgersfort and Ohrigstad. In the first quarter of 2007 the records of the Limpopo Land Claims Commissioner indicated that, out of 52 land claims that were lodged in the LM, 13 have been gazetted and 39 are in the process of being gazetted. Nearly 48 % of land claims have been submitted by the communities, 24 % by tribal authorities, and 18 % by individual persons (private claimants).

Energy use

The use of electricity for lighting in the LM has increased between 1995 and 2010 by 76.50%. With the increase in electrification, the Limpopo Province and the DM has shown a

decrease in all other methods of creating light. The use of solar/other/unspecified sources has increased by 5.70% and the use of gas has increased with 12.61% for the LM between 1995 and 2010.

Water

The GTLM has incrementally increased the level of water supply to households with the biggest improvement in piped water inside a yard. Households with access to piped water inside their dwellings have increased at a slightly slower rate. The LM has shown the best improvement within these categories, as compared to the Limpopo Province and the DM. The use of water from a dam, river, stream or spring has reduced across all three regions over the 1995 – 2010 time period.

Healthcare

HIV/AIDS in South Africa has increased rapidly over the past decade. The social and economic consequences of the disease are far reaching and affect every facet of life in South Africa. Despite South Africa creating a progressive and far-sighted policy and legislative environment for dealing with HIV/AIDS, the prevalence of HIV/AIDS continues to increase. This indicates that policies and laws have not been adequately implemented and have not impacted significantly on the ground.

The number of HIV positive persons living within the GTLM in 2010 has increased by 90.80% since 1995. The number of HIV related deaths has increased by 96.53% over the same period, with the number of other deaths increasing slightly by 27.55%. These numbers in each case are higher than that of the Limpopo Province or the DM.

According to the GTLM IDP (2012/3), there are 11 medical facilities in the LM, which mainly constitute regional clinics, and can be found in areas such as Burgersfort, Bothashoek, Praktiseer, Ga-Makofane, Motshana, Ga-Mashabela, Ga-Motodi, Ga-Rantho Ga-Riba, Leboeng, Malokela, Mampuru, Montwaneng, Mophalema, Phiring, Taung, Motlolo and Ga-Selala. Clinics previously operated by the National Health Department can be found in Steelpoort, Ohrigstad and Burgersfort. These clinics offer improved service to the previously mentioned as they are equipped with better infrastructure. Specialist treatment is exclusively available at the major hospitals outside of the municipal area.

Roads

The GTLM has three major transportation corridors along which major spatial activities are taking place, these are (IDP, 2012/3):

- Dilokong and Burgersfort (R37) Corridor;

- Stoffberg (R555) Corridor;
- Ngwaabe Corridor to Jane Furse; and
- The Hoedspuit (R36) Corridor.

The major roads allow for the development of nodes or settlements at certain appropriate points along the corridor which become an anchor of spatial development agglomeration, such as Burgersfort, Ohrigstad and Steelpoort.

6 STAKEHOLDER PARTICIPATION PROCESS

This section of the report documents the process, which was followed with respect to consultation of interested and affected parties (I&APs / stakeholders) and the Government Authorities, in accordance with Regulation 31(2)(e) of the NEMA Regulations.

Regulation 31(2)	*An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 35, and must include-*
	(e) details of the public participation process conducted…….

6.1 Purpose of Public Participation

Public Participation Process (PPP) is a requirement of the EIA/EMP process and ensures that all relevant I&APs are consulted and involved. The process ensures that all stakeholders have an opportunity to raise their comments as part of an open and transparent process, which in turn ensures for a complete comprehensive environmental study.

The purpose of PPP and the engagement process is to:

- Introduce the proposed project;
- Explain the EIA/EMP and PPP processes to be undertaken;
- Determine and record public issues and concerns;
- Provide opportunities for public input and gathering of local knowledge;
- Inform a broad range of stakeholders about the project and the environmental process to be followed;
- Establish lines of communication between stakeholders and the project team;
- Identify all the significant issues in the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent environmental impacts, associated with the project.

The draft EIA/EMP study has aimed to address the concerns raised during the PPP thus far.

6.2 Public Participation Methodology

A comprehensive PPP was initiated at an early stage in the Scoping Phase in order for the concerns of I&APs, authorities and the wider public to be recognised. The PPP is an on-going process undertaken throughout the EIA/EMP.

6.2.1 Legislative Requirements

6.2.1.1 Method of notification

Regulation 54 of the NEMA Regulations advises that notice must be given by:

- Fixing a notice board at a place noticeable to the public at the boundary or on the fence of the site where the activity is to be undertaken as well as any alternative sites being considered.
- Giving written notice to –
    - the owner or person in control of that land if the applicant is not the owner or person in control of the land;
    - the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
    - owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to an alternative site where the activity is to be undertaken;
    - the municipal councilor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
    - the municipality which has jurisdiction in the area;
    - any organ of state having jurisdiction in respect of any aspect of the activity; and
    - any other party as required by the competent authority.
- Placing an advertisement in:
    - one local newspaper.
- Placing an advertisement in at least one provincial newspaper or national newspaper if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality and an advertisement is not being placed in any official Gazette.
- Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is unable to participate in the process due to illiteracy; disability and any other disadvantage.

6.2.1.2 Content of the notice, notice board or advertisement

When notifying I&APs of an application by way of notice, notice board or an advertisement, the person conducting public participation must:

- Give details of the particular application and state:
    - that the application has been submitted to the competent authority in terms of the regulations;
    - whether a Basic Assessment or S&EIR procedures are being applied, in case of an application for Environmental Authorisation;

- the nature and location of the activity to which the application relates;
- where further information on the application or activity can be obtained; and
- the method and the person to whom representations in respect of the application may be made.

6.2.1.3 Proof of notification

The NEMA Regulations require that notices, notice boards and advertisements; notifying potentially I&APs in relation to the application; have been given, displayed or placed. In meeting this requirement, the EAP must submit the following to the competent authority:

- a copy of the newspaper advertisement (newspaper clipping) that was published, indicating the name of the newspaper and date of publication and of such quality that the wording in the advertisement is legible;
- a site map showing where the site notice was displayed, a dated photograph showing the notice displayed on site and a copy of the text contained in the notice;
- copies of written notices that have been sent to I&APs, as well as:
  - if the notice was sent by registered mail, a copy of all registered mail receipts which show the registered mail number, the name of the person the notice was sent to, the address of the person and the date on which the notice was posted; and
  - if the notice was sent by facsimile, a copy of the facsimile report;
  - if the notice was sent by electronic mail, a copy of the electronic mail; and
  - if the notice was hand delivered, proof of the hand delivered copy.

6.2.2 Identification of Stakeholders

6.2.2.1 Authorities

A comprehensive list of authorities was compiled during the early stages of the project.
The authorities as listed below have been invited to become involved in the process by inviting them to the introductory authorities meeting.

- Department of Minerals and Resources (DMR)- Regional Office- Polokwane;
- Limpopo Department of Economic Development, Environment and Tourism (LDEDET);
- Department of Water Affairs (DWA)- Regional Office Lydenburg;
- South African Heritage Resources Agency (SAHRA);
- Limpopo- Department of Agriculture;
- Sekhukune District Municipality;
- Greater Tubatse Local Municipality; and
- Ward Councilor.

6.2.2.2 I&APs

All I&APs on the existing TRP database were contacted at the start of the project in terms of Regulation 55 of NEMA as I&APs in relation to the application. During the consultation with I&APs, as well as with the mine, additional parties were identified and included within the existing database to provide an updated database. Numerous I&APs were notified by word of mouth. Parties who responded to the advertisements and notifications were included in the database.

GCS has developed will maintain an electronic database for the duration of the project where stakeholder details are captured and automatically updated as and when information is received from I&APs. Refer to Appendix H-1 for the list of registered stakeholders.

6.2.3 Notification of Stakeholders

6.2.3.1 Site notices

In accordance with Regulations 54(2)(a) and 54(4)(a) of NEMA, A2 laminated site notices were placed on and around the project area on 25 January 2013; and additional site notices were placed on 4 July 2013, as part of the parallel process being run together with other environmental applications for TRP. Refer to Appendix H2 for the site notices, and site notice locations.

6.2.3.2 Media advertisements

In accordance with Regulations 54(2)(c) and 54(3)(b) of NEMA, advertisements regarding the project background and the assessment process followed were placed in the following newspaper:

- The Steelburger: published on Friday, 11 January 2013.
- The Steelburger: published on Friday, 5 July 2013 (as part of the combined authorization process with other applications).

Refer to Appendix H3 containing proof of the advertisements placed.

6.2.3.3 Background Information Documents (BIDs)

In accordance with Regulation 54(3)(b) of NEMA, Background Information Documents (BIDs) were sent to all I&APs on the existing TRP database, and were updated as new I&APs registered for the project. All I&APs were notified by way of fax, email or letter, depending on their preferred method of contact. The BID was made available in English. The BID included details of the proposed project as well as the EIA/EMP purpose, requirements and process. It also included relevant contact details and a comment/registration sheet. I&APs/Stakeholders were invited to register and send responses by fax, telephone or e-mail to GCS (Pty) Ltd. Refer to Appendix H-4.

6.2.4 Scoping Phase project meetings

6.2.4.1 Authorities Meeting

The authorities were notified of the scoping meeting on 6 February 2013 held at the Two Rivers Main Office Boardroom via fax, email and registered mail and will be notified of any meetings that are held subsequent to the public meeting. Telephonic conversations regarding the project have also taken place with LDEDET after the NEMA Application was submitted, and accepted.

The purpose of the meeting was to:

- introduce the proposed project;
- provide opportunities for the authorities' input;
- establish lines of communication between the authorities and the project team; and
- identify significant issues in the project.

The meeting minutes are contained in Appendix H-5.

6.2.4.2 Public Meetings

The registered I&AP's were notified and invited to attend the Scoping phase meeting on 7 February 2013 at 11h00 held at the Tubatse Chrome Club via fax, email and registered mail. The registered I&AP's were also notified of the scoping meeting via the site notices, distribution of BIDs and advertisements.

A public meeting was held on the 7 February 2013 at 11h00 at the Kalkfontein Community Hall due to the initial venue's objection to the meeting, on the day before the meeting was scheduled to take place. Transport was provided from the initial venue to the new venue to ensure that no stakeholders were excluded due to the last-minute change of venue. The meeting time was also delayed with 30 minutes to 11h30, to allow stakeholders more time to reach the new venue. Refer to Appendix H-6 for the meeting minutes and attendance registers.

6.2.5 Issues and Responses – Scoping Phase

At the public meeting and through ongoing consultation, issues have been raised and were raised during the process. The PPP is an ongoing process and will therefore be updated as comments and responses from the authorities and public are made regarding specific issues about the project. All issues and comments have been formally addressed in the EIA/EMP.

Kindly refer to Table 6.3 which indicates the issues and comments made by I&APs as well as other Stakeholders as well as Table 5.4 listing issues raised via other communication methods (i.e. fax, email, etc.).

Table 6.1 Issues and concerns raised in public meeting dated 7 February 2013

ISSUE/CONCERN	RAISED BY	RESPONSE BY GCS AND TRP	REFERENCE
The public meeting was not planned well enough. The community was not notified properly and most of the information presented did not address the current issues at Kalkfontein.	Isaac Masha	GCS: GCS as the Environmental Assessment Practitioner (EAP) is required to advertise the public meeting two (2) weeks prior to the date of the public meeting. In this case, an advert was placed in the Steelburger newspaper on Friday, 11 January 2013; site notices were placed on site and at the entrance to the TRP mine, Background Information Documents (BIDs) and Scoping Reports, were placed at the Tribal Offices, including Kalkfontein. The last minute change of venue was not planned and GCS apologised in that regard. The topic of the public meeting was to specifically introduce TRP's current environmental authorisation applications. This is possibly not relevant to the current issues at Kalkfontein which should be addressed via a different forum.	The notification methodology 6.2.1 and the proof of notifications presented under Appendix H.

Table 6.2 Issues raised via email and fax during the Scoping public review period

ISSUE/CONCERN	RAISED BY	RESPONSE BY GCS AND TRP	REFERENCE
Team work, punctuality, safe work, care, respect, integrity, commitment. Would like more information on the mining sector.	Johannes Ratshotshi	GCS acknowledged receipt of the comments and added Mr. Ratshotshi's details to the database.	The required worker behavior with regards to environmental best practice and emergency response is discussed in the Environmental Awareness and Emergency Response Plan attached under Appendix The information regarding the mining sector within the Limpopo Province is discussed briefly in section 5.14 of this document.
In favour of the proposed project. The project will assist employees in obtaining clarified water and it will also address the situation of un-purified water, as has been raised before.	Intshame Sipho Ngoane	GCS acknowledged receipt of the comments and added Mr. Ngoane's details to the database.	This application relates to mining expansion and does not specifically address water purification
Lebalelo Water User Association (LWUA) does not supply water to TRP. However, the Association has a pipeline crossing the farms Tweefontein 360 and Dwars Rivier 372 with a pump station and appurtenant works on the farm Dwars Rivier 372. The servitude is not registered yet but is in the process. From the map shown, it cannot be seen that the new mining activities would have any influence on the infrastructure mentioned. Keep I&AP informed and updated of the EIA progress.	Ossie Rossouw (CEO of the Lebalelo Water User Association)	GCS noted the pipeline information and added Mr Rossouw to the database. He will be kept informed.	Comment noted. This application does not address any mining activities. The issues related to mining will be addressed in the report for the UG2/Merensky expansion

The Waste Licence Application process for the existing and proposed sewage plants is not correct. The reference number of the Waste Licence Application is Required.	Bokomoso Environmental, on behalf of an objector.	It is important to note that the Waste Management License Application is a process which is run parallel to the NEMA processes. The DEA reference number for the Waste Management License Application was provided on all public participation correspondence. Reference number – 12/9/11/L946/5 (as listed on the cover page of Bokomoso's comment letter). The existing sewage plants are covered under the Section 24G and WULA, the new sewage plants are covered under the UG2 and Merensky EIA application and the Waste Management License Application. The Waste Management License Application covers both existing and new sewage plants.	Refer to Appendix B of this report which contains a record of the Waste Licence Application, and correspondence with the DEA as to how the application should be undertaken for both the existing and new sewage plants (it was agreed that all the sewage plants will be included in one application)

6.2.6 EIA phase project meetings

Three meetings were arranged during the EIA phase to present the draft EIA reports to the registered stakeholders. A poster presentation was used to summarise the contents of the Draft EIA reports that were submitted to the relevant authorities for consideration. Details of the meeting are discussed in sections that follow.

6.2.6.1 Public meeting (Open day)

The registered I&APs were notified and invited via phone, fax and/or email to attend the EIA/EMP phase open day which was held as follows:

- Date: Wednesday, 21 August 2013
- Time: from 13h00 till 17h00
- Venue: Ga – Malekana Tribal hall

Refer to Appendix H-9 for the attendance register and minutes of this meeting. Most of the comments made at the open day were not related to the TRP environmental authorisation applications.

6.2.6.2 Focus Group meeting with landowners

A focus group meeting was held at Didingwe Lodge on 22 August 2013 to present the Two Rivers draft EIA reports to the registered stakeholders including land and business owners, and neighbouring mines. The attendance register and Minutes of this meeting can be seen

in Appendix H-10. No specific queries or issues of an environmental nature were raised at the meeting.

6.2.6.3 Authorities meeting – EIA Phase

Authorities were invited to an EIA phase Authorities meeting, which was scheduled as follows:

- Date: Thursday, 22 August 2013
- Time: from 12h30 till 14h00
- Venue: Didingwe Lodge

There were no attendees at the Authorities' meeting; as such no issues could be documented. Most of the Authorities attended the Scoping phase meeting and project site visit, and therefore refused the invitation to a second meeting.

6.2.7 Issues and Responses – EIA Phase

No specific issues or queries were raised regarding the UG2 & Merensky Application during the EIA Phase meetings. Bokomoso Environmental, on behalf of an objector, submitted letters of objection to the TRP environmental authorisation applications, but this was very much focused on the New TSF Application. Some queries regarding the Waste Licence Application were, however, raised by Bokomoso. These were the same queries that were raised in the Scoping Phase, and are included in Table 6.4 above.

6.2.8 Document Review – Authority and Public

The Scoping Report was made available for review by I&APs for a 40 day commenting period from 21 January 2013 until 1 March 2013 at the TRP security office. All registered I&APs were informed of the report's availability in writing. If I&APs required a copy on CD, it was provided. The document was also available on the website of GCS at www.gcs-sa.biz .

After comments from the public were received the document was updated to address the issues raised. Thereafter further issues and responses were documented and incorporated in the draft and final EIA/EMP reports.

The Draft EIA/EMP was made available for review by I&APs from 31 July 2013 to 16 September 2013. The final EIA/EMP report was made available for review at the TRP security office, on the GCS website, and distributed to stakeholders on CD via post or delivery. The public review period for the Final EIA reports was 5 November 2013 to 4 December 2013, a period of 30 days. This is longer than the recommended 21 days prescribed by the regulations.

7 IDENTIFICATION OF ACTIVITIES AND ENVIRONMENTAL OBJECTIVES

Before the potential environmental impacts may be assessed, the activities associated with the establishment, operation and decommissioning of the proposed mine must be identified. This includes activities and impacts associated with the proposed wastewater (sewage) treatment plants.

The proposed infrastructure for the mine is described in detail in chapter 3 of this EIA/EMP report. The activities required to establish, operate and decommission the mine are described in the sections which follow, together with the environmental objectives.

The detailed impact assessment and environmental management plan follows in Chapter 8.

7.1 Identification of Activities per Phase

7.1.1 Construction

The construction phase will involve:

1. Footprint Clearance:
    - Removal of vegetation;
    - Topsoil stripping and stockpiling;
    - Leveling the construction areas;
    - The movement of vehicles on site, and on regional roads;
2. Establishment of surface infrastructure:
    - Establishment of contractor's laydown area;
    - Fencing of construction area;
    - Construction of haul roads, powerlines and water pipelines;
    - Construction of offices, workshops and changehouse;
    - Construction of storm water management infrastructure (channels, berms and pollution control dams);
    - Management and disposal of domestic and hazardous waste generated during the construction phase;
    - Construction of the conveyor;
    - Installation of the Inyoni pipeline for additional water supply.

- Construction of the new Merensky Concentrator Plant.

3. Sinking of the decline shaft and establishment of underground infrastructure; and
4. Waste Handling.
    - Domestic and construction waste generation;
    - Waste storage;
    - Movement of vehicles on site to storage facilities; and
    - Diesel storage for construction activities.

7.1.2 Operation

The operation of the mine will include the following activities (described in detail under Chapter 3 of this report):

1. Mining (underground);
2. Product and Waste Stockpiling;
3. Transportation of ore via conveyors and trucks;
4. Processing of ore at the Merensky Concentrator plant;
5. Operation of current and extended Clean and Dirty Water systems;
6. Generation and handling of waste (mine waste rock, domestic, hazardous, and sewage); and
7. Hydrocarbon storage.

7.1.3 Closure and Decommissioning

The following activities will be conducted in the closure phase:

1. Removal of surface infrastructure and removing the gravel surface of haul roads;
2. Removal of building rubble (from demolished infrastructure) for disposal at a suitably licensed waste disposal facility;
3. Rehabilitation of disturbed areas:
    - Ripping of soils to reduce compaction;
    - Applying topsoil and gravel mixture to areas which are to be rehabilitated;
    - Re-vegetation disturbed areas; and

4. After monitoring and maintenance of rehabilitated areas (to ensure that rehabilitation is successful).

7.2 Environmental Management Objectives

7.2.1 Construction Phase

7.2.1.1 Footprint Clearance

The environmental objectives associated with footprint clearance and removal of vegetation for construction purposes are:

- To limit activities to the indicated and approved areas to ensure that no new additional land surface, vegetation and habitats outside of the project area are destroyed, disturbed and/or alienated;
- Removal of weeds and other invasive species over the mining area;
- To prevent any cumulative impact associated with the removal of vegetation and footprint clearance;
- To reduce the dust dispersion as a result of the removal of earth material as far as possible;
- To ensure an effective surface run-off control system is in order from the commissioning of the construction activities to deal with the separation of clean and dirty water;
- To remain outside of any delineated no-go zones;
- To ensure that the necessary approvals are in-place should any red-data or protected species need to be relocated or removed;
- To strictly manage the activities taking place within the lay down area by implementing clear and effective ground rules; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as far as possible and practical.

7.2.1.2 Establishment of Infrastructure

The environmental objectives associated with the establishment of infrastructure associated with this project are:

- To remain within the approved project scope and area; take care that no new land surface, vegetation and habitats outside of the project area are destroyed, disturbed and/or alienated;

- To ensure that the area over which the infrastructure will be placed is stable;
- To ensure that the placement of infrastructure will not sterilize any potential future mining reserves;
- To prevent any cumulative impact associated with the removal of vegetation and topsoil;
- To reduce the noise associated with the construction and operational activities as far as possible;
- To manage any other nuisance which may occur as a result of the establishment of new infrastructure;
- To manage the influx of people seeking work and the potential for informal establishment and associated petty crimes;
- To accommodate the use of natural material and colours where possible to reduce the potential visual impact on the surrounding area; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as far as possible and practical.

7.2.1.3 Decline shaft sinking and establishment of underground infrastructure

The environmental objectives associated with the establishment of infrastructure associated with this project are:

- To ensure that the minimum surface area is disturbed during the development of the access shafts;
- To prevent impacts associated with the removal of vegetation and topsoil; and
- To reduce the noise associated with the construction and operational activities as far as possible.

7.2.1.4 Waste handling

The objectives for waste generation and handling of domestic, diesel and chemical storage are to:

- Ensure that storage takes place in such a manner as not to cause any pollution to the environment;
- Ensure that storage facilities comply with best practice guidelines;
- Prevent any pollution of water resources by ensuring that an effective surface runoff control system is in place;

- Prevent, contain and clean up any spillages during the life of the mine; and
- Ensure that all facilities are monitored on a regular basis.

7.2.2 Operational phase

7.2.2.1 Mining (underground)

The objectives associated with mining are:

- To ensure that health and safety procedures are followed;
- To have an open channel of communication with the surrounding land owners to ensure that all the needs of parties are adhered to as far as practically possible; and
- To achieve overall legal compliance.

7.2.2.2 Product and Waste Stockpiling

The environmental objectives associated with the product and waste stockpiling and transportation is:

- To utilise existing road systems as far as practically possible to serve as service roads;
- To implement measures as part of the management programme to reduce any potential impact on rare or endangered species;
- To prevent, contain and clean up any spillages in the environment;
- To reduce the noise associated with the operational activities as far as possible;
- To reduce the dust dispersion as a result of the disposal of material as far as possible; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as far as possible and practical.

7.2.2.3 Transportation of ore via conveyors

The objectives for the transportation of ore via conveyors between the declines and the RoM stockpile are:

- To prevent, contain and clean up any spillages in the environment;
- To ensure the design of the system makes provision for safety by not allowing access; and
- To ensure that the conveyor is well maintained to prevent any spillages.

7.2.2.4 Processing of ore at the concentrator plant

The objectives for the environmental management at the concentrator plant are:

- To prevent any spillages into the environment;
- To manage and mitigate any spillage which may occur;
- To reuse water as far as practically possible by structuring the operations as a closed water circuit;
- To reduce dust creation; and
- To ensure legal compliance.

7.2.2.5 Operation of Clean and Dirty Water systems

The objectives set for the clean and dirty water system, are to:

- To maintain all dirty and/or polluted water in such a manner as to reduce any possibility of this entering the natural or clean water systems;
- To operate the mine in a closed water circuit as far as practically possible;
- To introduce measures to retain as much dirty water on site for reuse as possible;
- To ensure compliance to all best practices in terms of the operation of the dirty water systems;
- To maintain the integrity of the dirty water system, including the berms, bunds, drains;
- To ensure that all dirty water systems are cleaned and maintained on a regular basis to prevent pollution of the water resources and where pollution prevention is not possible, to minimise the impact on water sources (ground and surface);
- To achieve overall legal compliance; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as far as possible and practical.

7.2.2.6 Generation and handling of waste

The objectives for waste generation and handling of domestic, diesel and chemical storage are:

- Ensure that storage takes place in such a manner as not to cause any pollution to the environment;
- Ensure that storage facilities comply with best practice guidelines;
- Prevent any pollution of water resources by ensuring that an effective surface runoff control system is in place;
- Prevent, contain and clean up any spillages during the life of the mine; and
- Ensure that all facilities are monitored on a regular basis.

7.2.2.7 Hydrocarbon storage

The environmental management objectives for hydrocarbon storage are:

- To ensure that all hydrocarbons are stored in a manner which will prevent any harm to the environment in order to prevent spillages of hydrocarbons;
- To capture, contain and manage any spillage; and
- To ensure that any area which has been affected by a hydrocarbon spill is suitably rehabilitated and monitored until rehabilitation efforts have been successful.

7.2.3 Closure and Decommissioning

7.2.3.1 Removal of surface infrastructure

The objectives for removal of surface infrastructure are:

- To ensure that discussions are held with the relevant stakeholders to determine whether any existing infrastructure could be on a social or economic benefit before final removal commences;
- To ensure that the removal of infrastructure is done in a manner which has the smallest possible impact on the environment;
- To limit all rehabilitation activities and the movement of people to within the disturbed area footprint; and
- To ensure that no building rubble or refuse remains after the removal of infrastructure.

7.2.3.2 Rehabilitation of disturbed areas

The objectives for the rehabilitation of disturbed areas are to:

- Ensure the removal of all contaminated material;
- Ensure that all compacted areas have been ripped; and
- Ensure that all disturbed areas are topsoiled and vegetated.

7.2.3.3 After monitoring and maintenance (post-closure)

The objectives for after care monitoring and maintenance are to:

- Ensure that monitoring takes place until rehabilitation measures are considered successful; and
- Ensure that storm water management infrastructure is rehabilitated and the area is made free-draining only once rehabilitation is completed.

8 ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT PROGRAMME (EIA AND EMP)

This section of the Draft EIA report relates to Section 31 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 31 (2)	*An environmental impact assessment report must contain all the information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35, and must include -*
	(h) to (p) – All requirements in terms of EIA and EMP reporting

8.1 Environmental Impact Assessment Methodology

To ensure uniformity, the assessment of potential impacts was addressed in a standard manner so that a wide range of impacts is comparable. The ranking criteria and rating scales was applied to all specialist studies for this project.

Each impact identified was assessed in terms of probability (likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To enable a scientific approach to the determination of the environmental significance (importance), a numerical value is linked to each rating scale.

The following criteria were applied to the impact assessment for the EIA/EMP:

Occurrence

- Probability of occurrence (how likely is it that the impact may occur?); and
- Duration of occurrence (how long may impact last?).

Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?); and
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?).

In order to assess each of these factors for each impact, the following ranking scales were used:

Status of Impact +: Positive (A benefit to the receiving environment) N: Neutral (No cost or benefit to the receiving environment) -: Negative (A cost to the receiving environment)	
Probability:=P 5 – Definite/don't know 4 – Highly probable 3 – Medium probability 2 – Low probability 1 – Improbable 0 – Not applicable/none/negligible	*Duration:=D* 5 – Permanent 4 - Long-term (ceases with the operational life) 3 - Medium-term (5-15 years) 2 - Short-term (0-5 years) 1 – Immediate 0: Not applicable/none/negligible
Scale:=S 5 – International 4 – National 3 – Regional 2 – Local 1 – Site only 0 – Not applicable/none/negligible	*Magnitude:=M* 10 - Very high/don't know 8 – High 6 – Moderate 4 – Low 2 – Minor 0: Not applicable/none/negligible

Once the above factors had been ranked for each impact, the environmental significance of each was assessed using the following formula:

SP = (magnitude + duration + scale) x probability

Impacts are also negative, positive, or neutral.

Table 8.1 Impact Significance Ratings

SIGNIFICANCE	ENVIRONMENTAL SIGNIFICANCE POINTS	COLOUR CODE
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	<-60	H

The following process was followed:

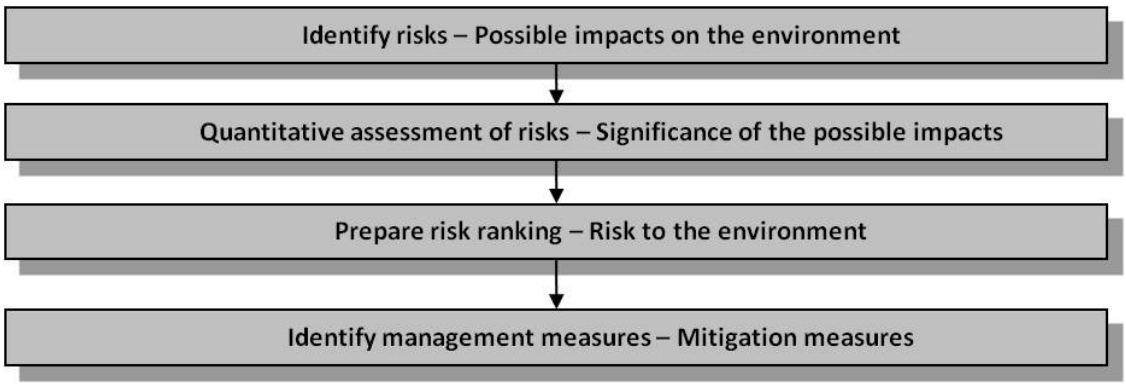


Figure 8.1: Impact Assessment Process

8.2 Potential Impacts and Mitigation Methods

The potential environmental impacts are identified under each section below, based on the existing TRP EMP and specialist study findings as discussed and listed in Section 5 of this report. Refer to Section 8.3 which lists the detailed impact assessments and action plans for each phase.

8.2.1 Geology

8.2.1.1 All project phases

During construction and operation of the new decline shafts, rock material will be removed from underground. Mitigation for this impact is not possible, except to remain within the design parameters of the project to avoid unnecessary removal of rock. At closure no mitigation is possible, resulting in permanent alteration of the geology.

8.2.2 Topography

8.2.2.1 All project phases

Land clearance and shaping of the sites required for construction will alter the topography through loss of vegetation and changing slopes. During operation additional stockpiles will be created in addition to the existing stockpiles on site. The impact is low, since the proposed expansion will form part of an existing mining operation where topography has already been altered. The impact can be mitigated through effective shaping re-vegetation of altered sites after the construction phase and during mine closure.

8.2.3 Soils, Land Use and Land Capability

8.2.3.1 Construction Phase

The main direct impacts anticipated on soil are associated with land clearing activities that will have a high impact on the fertile topsoil in undisturbed soil profiles. Although localised within the site boundary, the impact on topsoil will remain for the entire duration of the project until land remediation starts during the closure phase. This impact will definitely occur, but by stockpiling topsoil as a mitigation measure, this impact can be reduced to medium significance.

Soil compaction is medium significance impact of and will occur due to heavy vehicle movement over the soil during vegetation clearing and site levelling.

Soil erosion can be an impact where soil surfaces have been cleared of vegetation, however this can be successfully mitigated by only operating on site during the dry season when risk of erosion as a result of storm water movement over unvegetated surfaces will be minimised.

8.2.3.2 Operational Phase

Impacts on soil during the operational phase are associated with stockpiling of waste rock in designated areas as well as constant traffic of vehicles on haul roads. Both these actions will result in soil compaction as a result of the weight of the stockpiles and that of the vehicles moving over the land. Soil compaction during the operational phase can only be mitigated by restricting vehicles to haul roads but this mitigation measure has limited significance.

Vehicle movement may also result in fuel and oil spillages in the same way as during the construction phase. This impact can be managed by proper monitoring of vehicles before they enter site to makes sure there is no leaks. In an event where spillage occurs, it should be cleaned up immediately. Although oil and fuel leaks may result from workshop activities, it is highly unlikely because of being it being contained inside the workshops.

8.2.3.3 Decommissioning Phase

During the decommissioning phase, vehicles will move around to transport infrastructure or its components to disposal sites. This vehicle movement will result in more soil compaction but this can be managed during the land remediation process by deep ripping to alleviate compacted soil profiles.

Once topsoil stockpiles are being moved around for remediation and infrastructure has been removed from the soil surface, soil will be prone to erosion as a result of wind and water movement. The best measure to prevent or manage this, is to re-vegetate these areas as soon as possible.

Land Use and Land Capability will not be impacted upon since the site is already used for mining and the existing impacts will not change due to the additional activities.

8.2.4 Flora and Fauna

8.2.4.1 Construction Phase

The most significant and severe (direct) impacts to flora will occur during the construction phase when habitat and vegetation is removed and soil is stripped and prepared for the construction and operational phases. Although species of conservation importance occur in the area, the site is already disturbed so the impact is of medium significance. It can be mitigated to low by identification of endangered species within the footprint area and relocation prior to vegetation clearing.

Similarly, although the site is already disturbed by mining activity, clearing of land for the construction of proposed additional new infrastructure on Dwarsrivier will remove additional natural habitat on the mine property, possibly affecting faunal communities. Some species are particularly important such as the *Pycna Sylvia* cicada. The impact is deemed to be medium, and can be mitigated to low through survey of the footprint sites prior to clearing and identification of species for possible relocation (where practical).

8.2.4.2 Operational Phase

The operational phase is generally characterised by indirect impacts; the spread of peripheral impacts into adjacent natural habitat and contamination of surrounding areas characterise most mining environments. Since this site is already disturbed, and the proposed infrastructure forms an expansion of existing activities, the impact on both flora and fauna is deemed to be low.

8.2.4.3 Decomissioning Phase

The decommissioning and rehabilitation activities have the potential to impact of flora and fauna due to the activity and movement of people in the area, the creation of dust and the runoff of contaminated water.

These impacts can be mitigated by maintaining the management measures and procedures which were required by employees during the construction and operational phases regarding the identification and preservation of Red Data plant species and the careful handling of fauna. Other management measures such as dust suppression spraying; prohibiting activities outside of the demarcated mine area and the maintenance of storm water management infrastructure until rehabilitation is considered successful will minimize the impacts on flora and fauna.

8.2.5 Surface water

8.2.5.1 Construction Phase

The removal of vegetation during construction will have an impact in terms of soils washing into other water bodies. This results in siltation which adversely affects the water quality as well as the habitat of the living organisms. Surface water quality contamination can be negatively affected by litter on site and hydrocarbon spills.

8.2.5.2 Operational Phase

The risks to surface water during the operational phase are considered to be of low significance. The impacts are related to contaminated runoff which can be mitigated and managed by maintaining the storm water management structures which will be constructed during the construction phase, handling and storing potential pollutant in compliance with best practices, and managing spills immediately after they occur.

8.2.5.3 Decommissioning Phase

Rehabilitation activities create the risk of soil erosion and contaminated runoff. This can be mitigated by maintaining the storm water management infrastructure throughout the rehabilitation of the mine until such a time that the rehabilitation is considered successful and the runoff from the area is no longer considered contaminated. Once this has been determined, the PCD, berms and channels may be rehabilitated to make the area free draining.

8.2.5.4 Wetlands

There are no wetlands areas located within any proposed surface infrastructure or declines, therefore no wetlands will be impacted on by any of the phases of the project.

8.2.6 Ground Water

Refer to the Groundwater specialist study in Appendix D

8.2.6.1 Construction Phase

During construction of the new activities minimal additional impacts in the groundwater system is expected. The main activities that could have a potential impact on groundwater in this phase include:

- Constructing, clearing of footprint areas for construction; and
- Some dewatering of the mining area.

By grouting the shafts and decline, this will minimise inflows and consequent aquifer dewatering.

8.2.6.2 Operational Phase

Groundwater inflows into the workings will need to be dewatered for mine safety. Therefore the resultant dewatering of the mine will cause local water level decrease of the groundwater system in the immediate vicinity of the workings. The impact on the groundwater level is likely to be the main impact.

Keeping the workings dry is necessary for mining and mitigation is not possible. However, groundwater monitoring will be essential. The following conclusions were drawn from the groundwater study regarding the underground expansions into Kalkfontein:

- The effect of the Kalkfontein underground mining activities is most likely to cause a dewatering cone in a northeast and southwest direction. The dewatering effect does not extend further than 1500 metres from the mining area. The Groot Dwars River and Steelpoort River are therefore unlikely to be affected.
- The total simulated inflow volume from different sources into the underground workings is in the range of 40 to 60 m3/d.

No users are currently expected to be affected and the environmental impact significance on groundwater is expected to be low.

8.2.6.3 Decommissioning and Post-Closure

During this phase of mining it is assumed that dewatering of the underground sections will cease. The groundwater regime will return to a state of equilibrium once mining has stopped and the removal of water from the mining void has been discontinued. No additional impacts on the groundwater of the study area other than the impacts discussed above are expected during the decommissioning phase of the project.

Post-closure decant is not expected from the proposed underground area. No impact on groundwater quality emanating from the mining areas is likely to occur based on the geochemical analyses of the mineable material, provided no hydrocarbon spillages or leakage occurs. The impact on the groundwater quality is likely to be low.

8.2.7 Air Quality

Refer to the Air quality study in Appendix E.

8.2.7.1 All phases

Since TRP is already an operational mine, impacts on air quality will already exist at the site, despite the phasing in of the proposed expansion. Dust will be created when vegetation is removed and soils are rehabilitated. The limited duration of the activities means that this impact will be of low significance. This impact can be mitigated through dust suppression - spraying of disturbed areas.

- Exceedances of the PM10 daily average standard were predicted to extend slightly over the mine boundary shared with the adjacent Dwarsrivier chrome mine for Scenario 1 (i.e. future underground mining at Kalkfontein and Tweefontein, under the assumption that the existing tailings storage facility is kept wet and is not open to wind erosion).
- The main source contributor to long-term PM10 impacts was predicted to be vehicle entrainment on the unpaved haul road between the north decline and crushing plant
- The main source contributor to long-term $PM_{2.5}$ impacts was predicted to be plant sources.
- The main source contributor to long-term dust fallout impacts was predicted to be plant sources.

Due to possible high existing background levels of atmospheric particulate concentrations in the region, it is highly recommended to control major contributing sources. Mitigation of emissions from the tailings storage facilities and unpaved haul roads are essential to prevent cumulative impacts as a result of the expansion operations at TRP.

8.2.8 Archaeology and Heritage

8.2.8.1 All Phases

The construction phase has the most significance in terms of impacts to heritage resources as these may be uncovered and/or destroyed during excavations. Since trial mining has already begun for the Merensky project, graves existing prior to construction have already

been relocated. A historical adit exists on the mine property, but is not located within the footprint of the planned expansions.

8.2.9 Visual Aspects

8.2.9.1 All Phases

TRP is an existing operational mine, the proposed expansion will form an extension of the existing infrastructure. The visual impact of the new infrastructure will be low given that the site is already disturbed.

8.2.10 Socio-Economic Aspects

8.2.10.1 All phases

The following information is extracted from the Social Impact Assessment, contained in Appendix H.

Based on the impacts identified and the measures that could possibly be implemented to mitigate (or enhance) these impacts, no fatal flaws were identified.
Further to this, the following guidelines and mitigation measures are briefly listed below:

- Liaise with existing community forums (i.e. Two Rivers Community Forum, Dwars River Mine Managers Forum and Steelpoort Producers Forum) to ensure a transparent flow of information and allow for an accepted method of addressing and managing impacts;
- Labour should, as far as possible, be sourced locally during the construction and operation of the project;
- All sectors of the community must be encouraged to become involved in community policing;
- It is strongly recommended that local materials are used for construction;
- Extensive consultation with the affected landowners should take place throughout the process; and
- Health issues, such as HIV/AIDS should be addressed by implementing awareness programmes in partnership with the Department of Health (local clinics and hospitals).

8.3 Detailed Impact Assessment and Management Plan

8.3.1 Construction Phase

Refer to Table 8.2 below which indicates the construction phase activity impacts, associated mitigation measures and action plans.

Table 8.2 Impact Assessment and Management Plan: Construction Phase

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE TRP MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	PHASE	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
CONSTRUCTION PHASE ACTIVITIES: SITE PREPARATION, FOOTPRINT CLEARANCE, INFRASTRUCTURE AND DECLINE CONSTRUCTION, WASTE HANDLING																				
TRP MINING AREA: UG2&MERENSKY(MR) EXPANSION INCORPORATING SEWAGE TREATMENT PLANTS																				
GEOLOGY																				
Alteration of Geology	MR Expansion incl Sewage Plants	**Construction** - Declines	8	5	1	5	70	-	H	Mitigation not possible, geology is permanently altered	8	5	1	5	70	N	H	1. Ensure that construction remains within the mining right boundary	Construction	Engineer
TOPOGRAPHY																				
Change to natural topography	MR Expansion incl Sewage Plants	**Site Preparation** - Storm water	4	4	1	4	36	-	M	Limit clearing to the footprint, maintain as much natural vegetation as possible	2	4	1	3	21	-	L	1. Designs should take cognisance of topographical features of the site	Site preparation & footprint clearance	Engineer
		Footprint Clearance & Levelling	4	4	1	3	27	-	L	Limit clearing and levelling activities to the footprint area only	2	4	1	2	14	-	L	1. Demarcate footprint clearly as per design. 2. Limit vegetation removal to the footprint only. 3. Limit levelling to within the footprint only.	Footprint clearance	Engineer
		Construction - infrastructure & stockpiles	4	4	1	3	27	-	L	Mine design should take cognisance of the natural surroundings	2	4	1	3	21	-	L	1. Use natural colours to paint structures where possible (green or brown) 2. Revegetate exposed surfaces immediately after construction	Construction and post construction	Engineer
SOILS, LAND USE AND LAND CAPABILITY																				
Loss of fertile topsoil	MR Expansion incl Sewage Plants	**Footprint Clearance** & Levelling	8	5	1	5	70	-	H	Minimise the stripping footprint as far as possible, and stockpile the topsoil for future use.	4	3	1	4	32	-	M	1. Demarcate the footprint area clearly 2. Stockpile the topsoil for future use 3. Fertilise and re-vegetate the stockpile at the end of the construction phase	Prior to construction	Engineer
Soil Erosion		**Footprint Clearance & Construction -** exposed soil	6	5	1	4	48	-	M	Minimise Infrastructure footprint	4	3	1	3	24	-	L	1. Demarcate the footprint area clearly. 2. Manage storm water flow with temporary erosion control measures where possible (cut-off trenches or berms) 3.Schedule construction as soon as possible after site clearing.	Prior to and during construction	Engineer
Soil compaction		**Footprint Clearance & Construction -** vehicle movement	6	3	1	4	40	-	M	Correct use of vehicles to prevent compaction, avoidance of work in wet conditions.	4	3	1	4	32	-	M	1. Use tracked vehicles instead of wheeled vehicles where possible 2. Avoid clearance and earthworks in the rainy season 3. Stockpile soils loosely and to a sufficient height to prevent vehicles driving over the stockpiles 4. Drive only on constructed roads	Prior to and during construction	Engineer

Soil Contamination		**Waste Handling** - waste water and fuels	8	2	1	5	55	-	M	Prevent seepage of wastewater and spillage of fuel and oils.	2	2	1	2	10	-	L	1. Solid waste must be stored at site on an approved waste disposal area, and removed regularly by credible contractors 2.A berm should be constructed upslope of the construction footprint area, to direct clean water away from the dirty water area 3. Water from the development footprint must be captured and contained 4. Any spillages from the wastewater containment system must be managed immediately in accordance with the Emergency Response Plan 5. Chemicals and fuels to be stored in bunded areas. 6. Vehicles to be correctly maintained to prevent oil leakage	Prior to and during construction	Engineer
TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)																			
Loss of flora species of conservation importance (including habitat suitable for these species)	MR Expansion incl Sewage Plants	**All construction activities**	10	4	2	4	64	-	H	Minimise the area to be cleared. Identify important species in the footprint areas	10	4	2	3	48	-	M	1.Conduct detailed, multi-seasonal walk-through prior to construction activities 2. Compile list of protected and RD species, compile relocation programme 3. Establish off-site nursery	Prior to vegetation clearing	Project Manager Ecologist Environmental Officer
Loss of fauna species of conservation importance (including habitat suitable for these species)		**All construction activities**	10	4	2	4	64	-	H	Minimise the area to be cleared. Identify important species in the footprint areas	10	4	2	3	48	-	M	1. Conduct detailed, multi-seasonal walk-through prior to construction activities 2. Compile list of protected and RD species 3. Compile relocation programme where necessary/practical	Prior to vegetation clearing	Engineer in consultation with Environmental Officer
Loss of unique or protected habitat types (including loss and degradation)		**All construction activities**	8	4	2	5	70	-	H	Implement a biodiversity offset area	6	5	2	4	52	-	M	1. Identify suitable offset area/s, taking cognisance of existing and formal (declared) conservation programmes in the immediate region. 2. Implement Biodiversity Offset Principles	Prior to vegetation clearing	Engineer in consultation with Environmental Officer
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)		**All construction activities**	4	4	2	5	50	-	M	Operational plans that allow for animal protection. Staff training and awareness.	4	4	2	4	40	-	M	1. Identify operational protocol that will allow for protection of animals during construction & operational phases 2. Awareness programmes 4. Catch and release protocol	Construction	Engineer in consultation with Environmental Officer
Loss of ecological connectivity and ecosystem functioning;		**All construction activities**	8	4	2	5	70	-	H	Very difficult to mitigate. Contain activities to the construction footprint only. Implement a biodiversity offset area.	6	4	2	4	48	-	M	1. Identify suitable offset area/s, taking cognisance of existing and formal (declared) conservation programmes in the immediate region. 2. Implement Biodiversity Offset Principles	Construction	Engineer in consultation with Environmental Officer
SURFACE WATER																			
Siltation of surface water resources & associated soil erosion	MR Expansion incl Sewage Plants	**Footprint Clearance & Construction** - exposed soil	10	4	3	5	85	-	H	Ensure that clean and dirty water separation infrastructure is in place prior to the commencement of construction.	4	4	1	2	18	-	L	1. Installation of water management structures as a priority. 2. Compaction of the footprint area. 3. Sloping to allow free runoff to water control structures. 4. Management of runoff velocity to prevent erosion gullies. 5. Inspection and maintenance of water management infrastructure	Construction	Project Manager Contractor Environmental Officer

Reduced runoff to surface water resources & potential contamination due to incorrect dam sizing		**Construction -** diverted runoff	10	4	2	5	80	-	H	Appropriate design criteria for the 1:50 year storm event to be contained and re-used.	6	1	1	3	24	-	L	1. Maintenance of the on-site dams to contain water for re-use 2. Internal management of the site water balance	Design Construction	Engineer
Surface water contamination		**Waste Handling** - litter and building rubble	2	2	2	5	30	-	M	Builder's contracts should stipulate the appropriate storage and removal of builders' waste.	2	2	1	2	10	-	L	1. Solid waste must be stored at site on an approved waste disposal area, and removed regularly by credible contractors 2.A berm should be constructed upslope of the construction footprint area, to direct clean water away from the dirty water area 3. Water from the development footprint must be captured and contained 4. Any spillages from the wastewater containment system must be managed immediately in accordance with the Emergency Response Plan 5. Chemicals and fuels to be stored in bunded areas. 6. Vehicles to be correctly maintained to prevent oil leakage	Construction	Engineer
		Waste Handling - fuel and oil spills	6	3	3	3	36	-	M	Prevent seepage of wastewater and spillage of fuel and oils.	4	3	2	2	18	-	L		Construction	Engineer
		Waste Handling - Seepage to surface water resources from waste disposal areas.	10	4	2	5	80	-	H	Design criteria should prevent seepage (Refer the New TSF Hydrogeological study). Any seepage must be contained.	6	4	1	2	22	-	L		Construction	Engineer
RIPARIAN ZONES AND WETLANDS DOWNSTREAM OF THE SITE																				
Increased sediment transport into down slope water resources	MR Expansion incl Sewage Plants	**Footprint Clearance and Construction** - dirty water runoff	6	2	2	5	50	-	M	Reduce sediment load of surface runoff	4	2	1	5	35	-	M	1. Conduct rehabilitation within 3 months. 2.Where practically possible, the major earthworks should be undertaken during the dry season (roughly from June to September) to limit erosion due to rainfall runoff.	Pre-construction Construction	Engineer
Altered runoff characteristics of the landscape	MR Expansion incl Sewage Plants	**Construction** - New structures	6	2	2	5	50	-	M	Minimise alteration of existing flow paths	4	2	1	5	35	-	M	1.Limit activities to the construction footprint only. 2. Landscape and re-vegetate exposed areas immediately after construction. 3. A shallow berm should be constructed between the proposed TSF footprint and the downstream (off site) wetlands to prevent sediment rich runoff.	Pre-construction Construction	Engineer

Erosion within watercourses	MR Expansion incl Sewage Plants	**Construction** - Infrastructure, New TSF and river crossings	6	2	1	4	36	-	M	Prevent high velocity surface flow while surfaces are exposed during construction	4	2	1	4	28	-	L	1.Structures leading to flow concentration such as roads and ruts should be modified to ensure no concentrated, high velocity surface flows occur on site or are discharged into watercourses. 2.All storm water and clean water diversion discharge points should be protected against erosion and incorporate energy dissipators to prevent high velocity flows entering water resources. 3.Bidim walls should be installed at all discharge points to trap sediments. These bidim walls will need to be regularly inspected and repaired if required. With the establishment	Construction	Engineer Environmental Officer
Damage and contamination of riparian zones	MR Expansion incl Sewage Plants	**Footprint Clearance & Construction** - pipeline and conveyor over streams and river. **Waste handling**	8	2	1	4	44	-	M	Minimise clearing & construction activities within riparian zones as far as possible	4	2	1	4	28	-	L	1. Limit construction footprint 2. No fuels or oils may be stored within the riparian zone 3. Limit the movement of vehicles within the riparian zone. 4.With the establishment of infrastructure, especially pipelines, ensure that adequately sized culverts are incorporated into the design where required to ensure the continuing flow for water within the catchment;	Clearance Construction	Engineer
GROUNDWATER																			
Removal of underground water (Dewatering)	MR Expansion incl Sewage Plants	**Construction** - New Declines	6	4	1	3	33	-	M	Track water volumes and quality to enable early warning of potential impacts.	4	4	1	3	27	-	L	1. Implement water quantity and quality monitoring at the construction phase 2. Compile monthly water quality and quantity reports to assess potential impacts 3. Install flow meters to monitor the amount of water extracted from underground	Start of construction phase	Engineer
Impact on groundwater quality	MR Expansion incl Sewage Plants	**Footprint Clearance -** exposure of soil	2	2	1	4	20	-	L	Prevent seepage of dirty water to the aquifer	2	2	1	2	10	-	L	1, Divert clean water away from dirty water systems 2. Construct storm water management structures prior to footprint clearance.	Prior to footprint clearance Construction	Engineer
	MR Expansion incl Sewage Plants	**All activities -** containment of dirty water	2	2	1	4	20	-	L	Prevent seepage of dirty water to the aquifer	2	2	1	2	10	-	L	1. Line all dirty water dams with HDPE liner	Construction	Engineer
AIR QUALITY																			
Dust creation	MR Expansion incl Sewage Plants	**Footprint Clearance and Construction** - soil exposure	2	2	1	3	15	-	L	Reduce dispersion of dust to the atmosphere	2	2	1	2	10	-	L	1. Ensure the clearance footprint adheres to the design (minimum area) 2. Implement a programme of dust suppression if required 3. Implement dust monitoring	Construction phase	Engineer

VISUAL																			
Negative impact on aesthetics	MR Expansion incl Sewage Plants	**Footprint clearance -** removal of vegetation	5	4	1	4	40	-	M	Limit clearance to the footprint only	4	5	2	4	44	-	M	1. Clearly demarcate construction footprint.	Prior to footprint clearance	Engineer
	MR Expansion incl Sewage Plants	**Waste Handling -** improper storage of waste	6	2	1	4	36	-	M	Separate, store and remove waste regularly	4	2	1	3	21	-	L	1.Solid waste must be stored temporarily on site in waste skips 2. Waste must removed regularly by an credible contractor.	Construction	Engineer
Dust creation	MR Expansion incl Sewage Plants	**Footprint clearance -** removal of vegetation	4	4	1	3	27	-	L	Control dust creation to reduce visual and visibility impacts	2	4	1	2	14	-	L	1. Limit construction footprint. 2. Retain visual screening as far as possible	Construction	Engineer
ARCHAEOLOGY AND HERITAGE																			
Possible impacts to heritage resources	MR Expansion incl Sewage Plants	**Footprint Clearance & Construction**	0	5	1	1	6	-	L	An archaeologist must be consulted should any artefacts be uncovered.	0	5	1	1	6	-	L	1. It is not expected that any items of heritage significance will be destroyed, however, should artefacts be uncovered during excavation, activity must cease until an archaeologist has been consulted.	Prior to footprint clearance	Engineer
SOCIO-ECONOMICS																			
Waged Labour	MR Expansion incl Sewage Plants	**Construction**	6	3	3	2	24	+	L	Sourcing local labour and offering skills development	6	3	3	4	48	+	M	1. Local labour should be employed as far as possible. 2. Establish an employment information desk (part of the community forum meetings)	Prior to footprint clearance	Engineer
Impact on the social dynamics of surrounding communities	MR Expansion incl Sewage Plants	**Construction**	6	3	3	3	36	+	M	Employ local labour, but avoid the construction of labour camps	6	3	3	3	36	+	M	1. Attempt to employ labour locally. 2. House temporary workers at the closest town rather than in a labour camp.	Prior to footprint clearance	Engineer
NOISE																			
Increase in noise levels in the vicinity of the Mine	MR Expansion incl Sewage Plants	**Footprint Clearance & Construction**	4	2	2	3	24	-	L	Limit construction activities to the day time; ensure that all equipment is regularly serviced	2	2	2	2	12	-	L	1. Limit construction to day time only. 2. Ensure vehicle maintenance to minimise engine noise	Clearance Construction	Engineer

8.3.2 Operational Phase

Refer to Table 8.6 below which indicates the construction phase activity impacts, associated mitigation measures and action plans.

Table 8.3 Impact Assessment and Management Plan: Operational Phase

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE TRP MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
OPERATIONAL PHASE ACTIVITIES: UNDERGROUND MINING, PRODUCT & WASTE STOCKPILING, ORE PROCESSING (PLANT), WATER MANAGEMENT, WASTE HANDLING (DOMESTIC, HAZARDOUS & SEWAGE), HYDROCARBON STORAGE.																				
TRP MINING AREA: UG2&MERENSKY(MR) EXPANSION INCORPORATING SEWAGE TREATMENT PLANTS																				
GEOLOGY																				
Removal of additional rock	MR Expansion incl Sewage Plants	**Underground Mining** - removal of rock	8	5	1	5	70	-	H	Mitigation not possible, geology is permanently altered	8	5	1	5	70	-	H	1. Ensure that construction remains within the mining right boundary	Operational Phase	Engineer
TOPOGRAPHY																				
Alteration of topography	MR Expansion incl Sewage Plants	**N/A**	0	0	0	0	0	N	N		0	0	0	0	0	N	N	N/A	N/A	N/A
SOILS, LAND USE AND LAND CAPABILITY																				
Soil compaction	MR Expansion incl Sewage Plants	**Product & Waste Stockpiling**	6	3	1	4	40	-	M	Minimise stockpile footprint areas	4	3	1	4	32	-	M	1. Adhere to mine design plans 2. Drive only on constructed roads	Operational Phase	Engineer
Soil Contamination	MR Expansion incl Sewage Plants	**Water Management & Waste Handling** - waste and dirty water management	10	4	2	4	64	-	H	Ensure vehicles are in good condition, dirty water is contained	4	3	1	4	32	-	M	1. Adhere to TRP's recommended vehicle maintenance schedule and environmental policies 2. Provide spill kits and follow spill procedures on site for collection of contaminated soil 4. Ensure correct functioning of storm water management and PCD's 5. Ensure correct bunding of hydrocarbon and chemical storage areas	Operational Phase	Engineer
TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)																				
Indirect impacts on surrounding habitats	MR Expansion incl Sewage Plants	**All operation activities**	6	4	2	3	36	-	M	Prevent the spread of impacts to adjacent habitat	6	4	2	2	24	-	L	1. Contain activities to the mine site only	Closure Phase	Engineer
Human-animal conflicts & interactions		**All operation activities**	6	4	1	3	33	-	M	Operational plans that allow for animal protection. Staff training and awareness.	6	4	1	2	22	-	L	1. Awareness programmes (environmental induction for new contractors) 2. Catch and release protocol	Closure Phase	Engineer in consultation with Environmental Officer
SURFACE WATER																				
Deterioration of surface water quality	MR Expansion incl Sewage Plants	**Stockpiling, Water management** - contaminated runoff	4	4	2	3	30	-	M	Consider runoff from stockpiles and infrastructure as dirty water. Maintain all water control infrastructure.	4	2	2	2	16	-	L	1. Ensure ongoing maintenance of water dams. 2. Ensure maintenance and unblocking of storm water structures. 3. Contain and remediate hazardous spills immediately 4. Implement and maintain the water monitoring programme 5. Investigate poor water quality results and implement appropriate mitigation where possible 6. Implement correct maintenance of the	Operational Phase	Engineer

																		sewage treatment plants as per manufacturer's instructions 7. Implement sewage outflow monitoring as per the water use and waste licences 9. Maintain bunded areas for hydrocarbon and chemical storage		
	MR Expansion incl Sewage Plants	**Waste Handling** - sewage overflow, waste spills , **Hydrocarbon storage**	6	4	2	4	48	-	M	Design pollution control structures to contain the 1:50 year flood event	4	4	2	3	30	-	M		Design Operational Phase	Engineer
Siltation of water resources	MR Expansion incl Sewage Plants	**All operation activities** - exposure of soil surfaces and ineffective rehabilitation	8	4	3	4	60	-	M	Maintain storm water infrastructure, ensure effective rehabilitation	4	4	3	2	22	-	L	1. Maintain berms and cut-off trenches 2. Collection of eroded topsoil for use in rehabilitation 3. Monitor post-construction rehabilitation and implement further rehabilitative measures where it has not been effective	Operational Phase	Engineer in consultation with Environmental Officer
RIPARIAN ZONES on and off site, AND WETANDS DOWNSTREAM OF THE SITE																				
Erosion within watercourses	MR Expansion incl Sewage Plants	**All operation activities**	6	4	2	4	48	-	M	Ensure maintenance of storm water structures	4	4	1	3	27	-	L	1. Maintain the clean and dirty water separation structures 2. Ensure drains and storm water structures are maintained and free from obstruction	Operational Phase	Engineer
Water quality deterioration	MR Expansion incl Sewage Plants	**All operation activities**	6	4	2	5	60	-	M	Ensure correct waste handling	4	4	2	3	30	-	M	1. Refer to the action plan for surface water quality above	Operational Phase	Engineer
GROUNDWATER																				
Decrease in aquifer water quantity	MR Expansion incl Sewage Plants	**Underground Mining** - dewatering	5	2	2	2	18	-	L	No mitigation is possible for dewatering as the mine must be kept dry. Maintenance of water and waste management procedures to avoid contaminant seepage to groundwater	5	2	2	2	18	-	L	1. Implement water quantity and quality monitoring programme in compliance with the water use and waste licences 2. Compile monthly water quality and quantity reports to assess potential impacts. Implement mitigation measures if required. 3. Install flow meters to monitor the amount of water extracted from underground 5. Maintain separation and containment of waste and removal of hazardous waste by contractors	Operational Phase	Engineer
Impact on groundwater quality	MR Expansion incl Sewage Plants	**Water Management** - Seepage from containment dams	6	3	2	4	44	-	M	Prevent and contain seepage	4	3	2	4	36	-	M	1.Maintain the clean and dirty water separation systems, including containment dams and storm water structures	Operational Phase	Engineer
AIR QUALITY																				
Dust creation	MR Expansion incl Sewage Plants	**Ore processing** - plant, crusher and vehicle movement on roads	6	2	2	4	40	-	M	Minimise exposed surfaces and dust generation	4	2	2	2	16	-	L	1. Ensure the mine footprint adheres to the design (minimum area) 2. Rehabilitate cleared areas immediately 3. Implement dust monitoring to determine where dust suppression is required 4.Prioritise dust suppression according to dust monitoring results	Operational Phase	Engineer
VISUAL																				
Light pollution	MR Expansion incl Sewage Plants	**All operational activities**	7	4	3	3	42	-	M	Reduce lighting to the minimum required	6	4	2	3	36	-	M	1. Do not install more lighting than is required for safe work in dark conditions.	Operational Phase	Engineer
ARCHAEOLOGY AND HERITAGE																				
No additional impacts after construction	MR Expansion incl Sewage Plants	**All operational activities**	0	0	0	0	0	N	N	N/A	0	0	0	0	0	N	N	N/A	N/A	N/A
SOCIO-ECONOMICS																				
Actual health and fertility	MR Expansion incl Sewage Plants	**All operational activities**	6	4	2	4	48	+	M	A health and safety management programme, and AIDS awareness.	4	4	2	3	30	+	M	1. Implement an AIDS awareness programme	Operational Phase	Engineer and Corporate and Social Affairs

Feelings in relation to the project and aspirations for the future	MR Expansion incl Sewage Plants	**All operational activities**	6	3	2	2	22	+	L	Effective community liaison	6	2	2	2	20	+	L	1. Continuous consultation with the affected communities should take place to maintain an open and trusting relationship	Operational Phase	Engineer and Corporate and Social Affairs
Physical quality of the living environment (actual and perceived	MR Expansion incl Sewage Plants	**All operational activities**	8	4	1	4	52	+	M	Minimise potential impacts as far as possible	6	4	1	3	33	+	M	1. Implement the operational phase environmental action plans. 2. Maintain community communication channels	Operational Phase	Engineer and Corporate and Social Affairs
Aesthetic quality of the living environment	MR Expansion incl Sewage Plants	**All operational activities**	6	4	2	4	48	+	M	Minimise visual impacts	4	4	2	4	40	+	M	1. Implement the operational phase visual impact action plan.	Operational Phase	Engineer
Crime and violence	MR Expansion incl Sewage Plants	**All operational activities**	4	3	2	2	18	+	L	Effective community liaison	4	2	1	2	14	+	L	1.Local, unemployed labour should be employed as far as possible	Operational Phase	Engineer and Corporate and Social Affairs
NOISE																				
Creation of noise	MR Expansion incl Sewage Plants	**Ore processing** - plants	4	4	1	3	27	-	L	Reduce noise levels as far as possible.	2	4	2	2	16	-	L	1. Ensure adherence to noise limits as per the health and safety requirements	Operational Phase	Health and Safety Officer

8.3.3 Decommissioning and Closure Phase

Refer to Table 8.4 below which indicates the decommissioning and closure phase activity impacts, associated mitigation measures and action plans.

Table 8.4 Impact Assessment and Management Plan: Decommissioning and Closure

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE TRP MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
DECOMISSIONING and CLOSURE ACTIVITIES: REMOVAL OF INFRASTRUCTURE AND RUBBLE, REHABILITATION OF DISTURBED AREAS																				
TRP MINING AREA: UG2&MERENSKY(MR) EXPANSION INCORPORATING SEWAGE TREATMENT PLANTS																				
GEOLOGY																				
No additional impacts after operation	MR Expansion incl Sewage Plants	**N/A**	0	0	0	0	0	N	N	Mitigation not possible, geology is permanently altered	0	0	0	0	0	N	N	N/A	N/A	N/A
TOPOGRAPHY																				
Altered topography	MR Expansion incl Sewage Plants	**Removal of infrastructure & rubble, rehabilitation**	6	5	1	3	36	+	M	None, the impact will be positive	6	5	1	3	36	+	M	1. Reshape and rehabilitate to free-draining, taking into cognisance the topography of the surrounding area.	Decommissioning	Engineer
	MR Expansion incl Sewage Plants	**Rehabilitation** - subsidence of underground workings	10	5	1	5	80	-	H	It is not known if subsidence will occur. Conduct a geotechnical investigation at closure	4	5	1	2	20	-	L	1. Retain all support structures in the underground workings 2. Implement the recommendations of a geotechnical investigation	Closure Phase	Engineer
SOILS, LAND USE AND LAND CAPABILITY																				
Soil compaction	MR Expansion incl Sewage Plants	**Removal of infrastructure & rubble, rehabilitation** - vehicle movement	6	3	1	4	40	-	M	Minimise vehicle movement in undisturbed areas.	4	3	1	4	32	-	M	1. Adhere to mine design plans 2. Drive only on constructed roads 3. Use tracked rather than wheeled vehicles where possible	Decommissioning	Engineer
Soil Contamination by fuel and dirty water	MR Expansion incl Sewage Plants	**Removal of infrastructure & rubble, rehabilitation** - vehicle movement	10	4	2	4	64	-	H	Ensure vehicles are in good condition, dirty water is contained	4	3	1	4	32	-	M	1. Adhere to TRP's vehicle maintenance schedule 2. Provide spill kits on site for collection of contaminated soil 3. Ensure correct functioning of storm water management and PCD's 4. Ensure correct bunding of hydrocarbon and chemical storage areas	Decommissioning	Engineer
Soil physical and chemical properties	MR Expansion incl Sewage Plants	**Rehabilitation -** improvement of soil conditions	8	5	1	4	56	+	M	None, the impact will be positive	8	5	1	4	56	+	M	1. Topsoil stockpiles will be sampled and tested for fertiliser requirements. 2. Organic and chemical ameliorants will be added to the soil to improve conditions for plant growth, as per the fertilizer recommendations. 3. Areas of soil compaction will be ripped.	Closure Phase	Engineer
TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)																				
Indirect impacts to surrounding plant and animal communities (fragmentation)	MR Expansion incl Sewage Plants	**Removal of infrastructure & Rehabilitation**	8	5	2	3	45	-	M	Limit activities to the infrastructure footprint.	6	5	2	2	26	-	L	1. Conduct environmental induction for workers. 2. Limit vehicle movement to roads and infrastructure areas only	Decommissioning	Engineer

SURFACE WATER																			
Pollution of water resources	MR Expansion incl Sewage Plants	**Removal of infrastructure -** improper waste handling and fuel/oil spills	4	5	2	3	33	-	M	Manage waste effectively to prevent pollution of water resources	4	5	2	1	11	-	L	1. Waste that is not removed from site should be spread, covered and suitably rehabilitated 2. Comply to the TRP vehicle maintenance schedule to prevent oil/fuel leaks 3. Provide spill kits on site to remediate oil spills	Decommissioning	Engineer
Siltation of water courses	MR Expansion incl Sewage Plants	**Removal of infrastructure** - including water and TSF pipelines	6	2	2	4	40	-	M	Rehabilitate as soon as possible, maintain erosion control for the duration of rehabilitation	4	2	2	3	24	-	L	1. Rehabilitate as soon after infrastructure removal as possible.	Decommissioning Closure	Engineer
RIPARIAN ZONES on and off site, AND WETLANDS DOWNSTREAM OF THE SITE																			
Increased sediment transport into down slope water resources	MR Expansion incl Sewage Plants	**All Activities**	6	2	2	5	50	-	M	Ensure effective rehabilitation, and monitoring of rehabilitation until established	4	2	2	4	32	-	M	1.All disturbed areas should be landscaped to approximate the natural landscape profile 2. Where steep slopes are unavoidable, geotextiles should be used to stabilise slopes before & during re-vegetation. 3.Compacted soils should be ripped and scarified. 4. The rehabilitated areas should be re-vegetated as soon as possible following completion of the earthworks to minimise erosion. 5.Regular long-term follow up of rehabilitated areas will be required to ensure the successful establishment of vegetation and to survey for any erosion damage on site. 6. Erosion damage should be repaired immediately.	Closure	Engineer
Altered runoff characteristics of the landscape	MR Expansion incl Sewage Plants	**Removal of infrastructure, Rehabilitation**	4	5	2	5	55	-	M	Manage runoff and exposed surfaces to minimise runoff	2	5	2	5	45	-	M	1. Implement measures to avoid concentration of flows and high velocity flows. 2. Ensure revegetation of all disturbed areas.	Decommissioning Closure	Engineer
Erosion within watercourses	MR Expansion incl Sewage Plants	**Removal of infrastructure, Rehabilitation**	6	5	2	4	52	-	M	Monitor rehabilitated areas for erosion.	4	5	1	3	30	-	M	1. Implement an erosion monitoring plan during closure 2. All rehabilitated areas should be monitored twice annually (start and middle of wet season), with any observed erosion damage repaired immediately.	Decommissioning Closure	Engineer
Water quality deterioration	MR Expansion incl Sewage Plants	**Removal of infrastructure, Rehabilitation**	8	5	3	4	64	-	H	Prevent contamination of streams and rivers	4	5	2	3	33	-	M	1. As per the surface water action plans	Decommissioning Closure	Engineer
Increase in alien vegetation	MR Expansion incl Sewage Plants	**Removal of infrastructure**	6	5	1	4	48	-	M	Prevent proliferation and remove alien species	2	2	1	3	15	-	L	1. As per the terrestrial biodiversity action plan	Closure	Engineer
GROUNDWATER																			
Impact on groundwater quality	MR Expansion incl Sewage Plants	**Removal of infrastructure, Rehabilitation** - Containment of dirty water and seepage	6	3	2	4	44	-	M	Maintain water control structures until rehabilitation is effective and the site is free-draining	2	3	1	2	12	-	L	1. Maintain storm water structures to keep clean water away from the Return Water Dam to minimise water volumes and risk of spilling from the site (until effective rehabilitation)	Decommissioning Closure	Engineer

AIR QUALITY																			
Creation of dust	MR Expansion incl Sewage Plants	**Removal of infrastructure, Rehabilitation** - exposed areas	4	2	2	4	32	-	M	Control the creation of dust as far as possible	2	2	2	3	18	-	L	1. Implement dust suppression spraying where necessary 2. Rehabilitation must take place as soon after infrastructure removal as possible	Closure	Engineer
VISUAL																			
Improvement to aesthetics	MR Expansion incl Sewage Plants	**Removal of Infrastructure**	6	2	2	3	30	-	M	Implement revegetation as soon as possible after infrastructure removal	4	2	2	3	24	-	L	1. Rehabilitation must take place as soon after infrastructure removal as possible	Closure	Engineer
ARCHAEOLOGY AND HERITAGE																			
No additional impacts			0	0	0	0	0	N	N	N/A	0	0	0	0	0	N	N	N/A	N/A	N/A
SOCIO-ECONOMICS																			
Physical quality of the living environment (actual and perceived)	MR Expansion incl Sewage Plants	**All Activities**	8	4	1	4	52	-	M	Minimise potential impacts as far as possible	6	4	1	3	33	-	M	1. Implement the operational phase environmental action plans. 2. Maintain community communication channels	Operational Phase	Engineer and Corporate and Social Affairs
Personal safety and hazard exposure	MR Expansion incl Sewage Plants	**All Activities**	4	4	1	4	36	-	M	Maintain essential mine facilities to ensure health and safety of personnel on site during closure and rehabilitation	4	3	1	3	24	-	L	1. Ensure the entire site remains fence for the duration of rehabilitation 2. Retain security access control to the site 3. Health and safety measures must be maintained	Decommissioning Closure	Engineer and Corporate and Social Affairs
NOISE																			
Creation of noise	MR Expansion incl Sewage Plants	**Removal of Infrastructure**	4	2	2	3	24	-	L	Reduce noise levels as much as possible	2	2	2	2	12	-	L	1. Limit construction activities to the day time 2. Ensure that all equipment is regularly serviced	Decommissioning Closure	Engineer

8.3.4 Post-Closure Phase

Refer to Table 8.5 below which indicates the post- closure phase activity impacts, associated mitigation measures and action plans.

Table 0.5 Impact Assessment and Management Plan: Post-Closure

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE TRP MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
POST-CLOSURE ACTIVITIES: MONITORING AND MAINTENANCE																				
TRP MINING AREA: UG2&MERENSKY(MR) EXPANSION INCORPORATING SEWAGE TREATMENT PLANTS																				
GEOLOGY																				
No additional impacts	MR Expansion incl Sewage Plants		0	0	0	0	0	N	N	N/A	0	0	0	0	0	N	N	N/A	N/A	N/A
TOPOGRAPHY																				
No additional impacts	MR Expansion incl Sewage Plants		0	0	0	0	0	N	N	N/A	0	0	0	0	0	N	N	N/A	N/A	N/A
SOILS, LAND USE AND LAND CAPABILITY																				
Soil physical and chemical properties - improvement in conditions	MR Expansion incl Sewage Plants	**Monitoring & Maintenance -** improvement of soil conditions	8	5	1	4	56	+	M	None, the impact will be positive	8	5	1	4	56	+	M	1. Conduct soil testing and amelioration (fertilization) should vegetation establishment not be successful post rehabilitation.	Post-closure	Environmental Personnel
TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)																				
Increase in alien vegetation	MR Expansion incl Sewage Plants	**Monitoring & Maintenance -** growth of new vegetation on rehabilitated areas	6	5	1	4	48	-	M	Remove and control the spread of alien invasive species	2	2	1	3	15	-	L	1. Alien invasive species should be removed from the site as far as practically possible. 2. Monitor surrounding properties and riparian zones for the spread of alien vegetation and remove where practically possible	Post-closure	Environmental Personnel
Improvement in vegetation	MR Expansion incl Sewage Plants	**Monitoring & Maintenance -** growth of new vegetation on rehabilitated areas	6	5	3	4	56	+	M	Prevent proliferation of invasive species, promote restoration of indigenous vegetation	6	5	3	4	56	+	M	1. Conduct soil testing and amelioration (fertilization) should vegetation establishment not be successful post rehabilitation.	Post-closure	Environmental Personnel
SURFACE WATER																				
Reduction in pollution of water resources	MR Expansion incl Sewage Plants	**Monitoring & Maintenance -** site will revert back to free-draining state	4	5	2	1	11	-	L	Continue water monitoring to determine possible impacts	6	5	2	4	52	+	M	1. Continue with the TRP water monitoring programme for 5 years or as per legislative requirements at the time	Post-closure	Environmental Personnel

RIPARIAN ZONES on and off site, AND WETLANDS DOWNSTREAM OF THE SITE																					
Improvement to riparian zones	MR Expansion incl Sewage Plants	**Monitoring and Maintenance** - return to free-draining state	4	5	2	2	22	-	L	Return to natural vegetation, removal of alien species.	6	5	2	2	26	+	L	1. Continue with the TRP water monitoring programme for 5 years or as per legislative requirements at the time	Post-closure	Environmental Personnel
GROUNDWATER																					
Groundwater Contamination	MR Expansion incl Sewage Plants		0	0	0	0	0	N	N	N/A	0	0	0	0	0	N	N	N/A	N/A	N/A
AIR QUALITY																					
Improvement in air quality	MR Expansion incl Sewage Plants	**Monitoring and Maintenance** - All mining activities related to dust creation will have ceased	4	4	2	4	40	-	M	None required	6	5	2	2	26	+	L	None required	Post-closure	Environmental Personnel
VISUAL																					
Improvement of landscape appearance	MR Expansion incl Sewage Plants	**Rehabilitation** - disturbed areas	4	5	2	2	22	+	L	Ensure effective re-vegetation	4	5	2	3	33	+	M	1. Monitor rehabilitated areas to ensure that rehabilitation has been effective 2. Implement further rehabilitation measures where rehabilitation has not been effective	Post-closure	Environmental Personnel
ARCHAEOLOGY AND HERITAGE																					
No additional impacts			0	0	0	0	0	N	N	N/A	0	0	0	0	0	N	N	N/A	N/A	N/A
SOCIO-ECONOMICS																					
Loss of Waged Labour	MR Expansion incl Sewage Plants	**All Activities**	10	5	2	5	85	-	H	Mine closure will mean loss of employment	8	4	2	4	56	-	M	1. Possible re-deployment to similar mining operations or a new mine.	Post-closure	TRP Management
NOISE																					
Creation of noise	MR Expansion incl Sewage Plants	**Monitoring & Maintenance**	4	2	2	3	24	-	L	None, mining activities will have ceased, reducing noise levels	2	2	2	1	6	+	L	1. Ensure vehicle maintenance to avoid excess noise during monitoring exercises.	Post-closure	Environmental Personnel

8.3.5 Cumulative Impacts

Refer to Table 8.6 below which indicates the cumulative impacts, associated mitigation measures and action plans.

Table 0.6 Impact Assessment and Management Plan: Cumulative Impacts

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE TRP MINE AREA	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							ACTION PLAN	FREQUENCY	RESPONSIBLE PERSON
			M	D	S	P	TOTAL	STATUS	SP		M	D	S	P	TOTAL	STATUS	SP			
CUMULATIVE IMPACTS: IMPACTS CONSIDERED ON A REGIONAL SCALE																				
TRP MINING AREA: UG2&MERENSKY(MR) EXPANSION INCORPORATING SEWAGE TREATMENT PLANTS																				
GEOLOGY																				
Alteration of Geology	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** removal of rock	2	5	1	5	40	-	M	Mitigation not possible, geology is permanently altered	2	5	1	5	40	-	M	1. As per construction and operational phases	Construction, Operation	Engineer
TOPOGRAPHY																				
Change to topography	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** construction and operation	2	4	1	3	21	-	L	Mine design should utilise existing facilities as far as possible, to reduce further impact	2	4	1	2	14	-	L	1. Construct new infrastructure close to existing where practical. 2. Adhere to approved designs.	Prior to and during construction	Engineer
SOILS, LAND USE AND LAND CAPABILITY																				
Soil erosion, compaction and contamination	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** disturbance of additional areas	2	4	1	4	28	-	L	Minimise construction footprints and adhere to the action plan above to minimise additional impacts	2	4	1	4	28	-	L	1.Implement soils action plan for all phases	All Phases	Engineer, in consultation with Environmental Officer
Loss of land capability	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** disturbance of additional areas	4	5	2	3	33	-	M	Keep as much original land cover as possible	4	5	2	3	33	-	M	1. Implement soils action plan for all phases	All Phases	Engineer, in consultation with Environmental Officer
TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)																				
Loss of fauna and flora of conservation importance	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Vegetation removal	4	5	1	3	30	-	M	Ensure all species of importance are identified and relocated prior to clearing	2	5	1	3	24	-	L	1. Implement action plans for construction phase	Prior to vegetation clearing	Engineer, in consultation with Environmental Officer
Further fragmentation of vegetation communites and habitats	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Development of pipelines	6	4	2	3	36	-	M	Very difficult to mitigate. Contain activities to the construction footprint only. Implement a biodiversity offset area.	4	4	2	2	20	-	L	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
Harm to animals and plants and introduction of invasive plant species	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Development of new infrastructure'	4	5	1	3	30	-	M	Prevent the proliferation of invasive plant species and harm to animals over the entire mine	2	5	1	3	24	-	L	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
SURFACE WATER																				
Surface water quantity and quality	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Development of new infrastructure'	4	4	2	3	30	-	M	Adhere to approved Water Use Licence and conditions	4	2	2	2	16	-	L	Implement action plans for all phases	During construction	Engineer, in consultation with Environmental Officer
	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Inefficient storm water management	6	4	2	3	36	-	M	Maintain separation of sclean and dirty water	4	4	2	2	20	-	L	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
RIPARIAN ZONES on and off site, AND WETLANDS DOWNSTREAM OF THE SITE																				
Increased sedimentation	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Inefficient storm water management	6	4	2	3	36	-	M	Maintain separation of sclean and dirty water	4	4	2	2	20	-	L	1. Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
GROUNDWATER																				
Groundwater Quantity and Quality	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of	6	4	2	3	36	-	M	Implement action plans and monitoring at all phases to minimise impacts.	4	4	2	2	20	-	L	1. Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental

		operations																		Officer
AIR QUALITY																				
Dust Creation	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of operations	6	2	2	4	40	-	M	Minimise dust generation and maintain dust supression over the entire site	4	2	2	2	16	-	L	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
NOISE																				
Additional Noise	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of operations	2	4	2	3	24	-	L	Limit construction activities to the day time; ensure that all equipment is regularly serviced	2	4	2	2	16	-	L	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
VISUAL																				
Addition to visual change to landscape	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of operations	4	5	2	4	44	-	M	Design infrastructure to take cognisance of the environment where possible.	4	5	2	4	44	-	M	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
ARCHAEOLOGY AND HERITAGE																				
Loss of Heritage resources	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of operations	4	5	2	2	22	-	L	Based on specialist studies, heritage resources are not at risk as part of the TRP expansion. Should any resources be uncovered at any stage, an Archaeologist is to be consulted.	4	5	2	2	22	-	L	1. Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
SOCIO-ECONOMICS																				
Aesthetic quality of the living environment	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of operations	6	4	2	4	48	-	M	Implement the visual impact and dust/air quality action plans to minimise cumulative impacts.	4	4	2	4	40	-	M	1. Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
Loss of natural and cultural heritage	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of operations	4	5	1	1	10	-	L	Based on specialist studies, heritage resources are not at risk as part of the TRP expansion. Should any resources be uncovered at any stage, an Archaeologist is to be consulted.	4	2	1	1	7	-	L	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer
Cumulative Impacts - waged labour and social dynamics of the area	MR Expansion incl Sewage Plants	**TRP as part of regional mining -** Expansion of operations	6	3	3	3	36	+	M	Employ local labour, but avoid the construction of labour camps	6	3	3	3	36	+	M	1.Implement action plans for all phases	All Phases	Engineer, in consultation with Environmental Officer

9 MONITORING MANAGEMENT PROGRAMME

This chapter fulfils the report requirements set out in Regulation 33 of the NEMA Regulations.

Regulation 33	A draft environmental management programme must comply with section 24N of the Act and include-
	(e) Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;

Monitoring provides qualitative and quantitative information pertaining to the possible impacts of the development on the environment, and enables the measurement of the effectiveness of environmental management measures.

The implementation of a monitoring plan is necessary to ensure compliance with the NEMA,NEM:WA, MPRDA and NWA environmental authorisations which must be obtained before any of the proposed activities may commence.

TRP currently undertakes monitoring at its operations which must be updated include the proposed activities. The current and proposed monitoring programme is described in detail in the Monitoring and Management Programme under Appendix I.

9.1 Groundwater Monitoring

The groundwater monitoring program should be conducted to assess the following:

- The impact of mine dewatering on the surrounding aquifers: This will be achieved through monitoring of groundwater levels in the monitoring boreholes. If private boreholes are identified within the zone of impact on groundwater levels, these will be included in the monitoring programme;
- Groundwater inflow into the mine workings. This will be achieved through monitoring of groundwater levels in the monitoring boreholes as well as measuring water volumes pumped from mining areas;
- Groundwater quality trends. This will be achieved through sampling of the groundwater in the boreholes at the prescribed frequency; and
- The rate of groundwater level recovery after mining ceases.

It is envisaged that the frequency of monitoring remain on a bi-annual basis for quality, while water level monitoring should be conducted on a monthly basis. Two (2) boreholes

(KFN2, KFNF1) should be monitored for water quality and water level, while water levels in an additional 5 boreholes (KFNF1, KFN2, KFN3, TRP New1, TRP New2) should be monitored.

9.2 Surface water monitoring

The proposed Merensky infrastructure will be constructed within the existing TRP mining right area for which there is an existing monitoring programme. The monitoring points (TRSW1, TRSW2, TRSW3, TRSW4, TRSW5, TRSW6, and TRSW7) are monitored on a monthly basis.

9.3 Soil Monitoring

Soil monitoring will involve the inspection of soil which has been disturbed, compacted, contaminated or eroded. Soil monitoring will assist in determining where soils have not been sufficiently rehabilitated.

Where soils have contaminated by the spillage of hydrocarbon, monitoring must take place on a weekly basis for at least four (4) weeks or until the soil is considered sufficiently rehabilitated. Soils samples should be taken and submitted to a laboratory to test for contaminant content if it is considered necessary.

Soil monitoring should be undertaken during the following periods:

- Areas which have rehabilitated following construction;
- After remediation soils which have been contaminated by spillages during the operational phase; and
- After the closure and decommissioning phase.

9.4 Reporting

It is recommended that monitoring reports (for surface water, groundwater, biomonitoring and air quality) is produced at the end of the construction period. Thereafter, monthly monitoring data collected should be consolidated into an annual report for submission to the relevant authorities (DWA, LDEDET and DMR).

It is important for each annual report to build on the results of the previous report in order to clearly present water quality trends.

9.5 Data Management

Monitoring results must be stored on the existing TRP monitoring database. This database is used to update the groundwater model and water balance and to determine the groundwater and surface water quality trends over time.

Trend analysis assists in determining if additional management measures are required.

It is important that the database is kept updated and that access to the database is properly controlled to maintain the integrity of the data.

9.6 Auditing

It is recommended that TRP conducts an annual internal audit at the mine and TSF site.

Furthermore annual audits of the approved Environmental Management Programme (EMP), environmental authorization and WUL must continue to determine if TRP is compliant with their authorization requirements/commitments.

10 ENVIRONMENTAL AWARENESS PLAN AND ENVIRONMENTAL EMERGENCY RESPONSE PLAN

This chapter fulfils the report requirements set out in Regulation 31 of the NEMA Regulations.

Regulation 33	A draft environmental management programme must comply with section 24N of the Act and include-
	(j) An environmental awareness plan describing the manner in which- (i) The applicant intend to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution of the degradation of the environment.

The TRP environmental awareness and emergency response plan which will be applicable to the UG2 and Merensky Expansion, as well as the New TSF, is attached as Appendix J of this report.

The environmental emergency plan should not be confused with the TRP emergency preparedness plan (TRP Doc TRP-COP-MAN-013), and should be used in conjunction with this plan.

Environmental Emergency situations at the TRP mining operations may include the following:

- Pollution Control Dam Overflow;
- Pollution Control Dam Breach;
- Tailings Dam Storage Facility Breach;
- Berm Breach/Drain Overflow;
- Hydrocarbon Spill (diesel, oil, grease, etc); and
- Veld Fires.

The necessary actions required, as well as the responsible person for ensuring that the actions are followed through and the reporting requirements are adhered to, to ensure effective and efficient response to each of the environmental emergency situations listed above are set out in this procedure (Refer to Appendix J).

11 GAP ANALYSIS

The proposed UG2 and Merensky Expansion will form an extension of the existing mining operations at TRP. All surface infrastructures will be contained within the existing mining right area, and will make use of existing facilities as far as possible. No gaps in information regarding the infrastructure, layout or mine plan are evident at the time of writing this report.

Specialist studies were conducted for the TRP mining right area prior to authorisation of the initial mining activities in 2002 (Heritage, Groundwater, Soils, Vegetation, Bio monitoring, Surface water), and TRP has since conducted additional specialist investigations:

- Heritage study (SHASA 2012)
- Biodiversity study for the entire site (2008)
- Numerical Ground Water Model conducted in 2010

Kalkfontein and Tweefontein fall outside of the existing mining area, and as such are not covered by the existing specialist studies. Since activity will be limited to underground mining only, only a groundwater impact assessment was commissioned on these two properties as part of the EIA phase. An opencast area was initially proposed as part of the mining activities, but was since withdrawn so the groundwater study has relevance to the planned underground mine expansion into Kalkfontein and Tweefontein only.

The existing, and additional groundwater studies, are therefore relevant to the UG2 and Merensky Expansion and there are no major gaps in specialist information. However, the following recommendations apply:

- It is recommended that an ecologist survey the infrastructure footprint areas prior to vegetation clearance, in order to identify any protected species (fauna and flora) present. The species should be relocated if practically possible.
- The historical adit should be studied further and protected from any impacts due to mining activities, under the recommendations of a Heritage Specialist.

12 UNDERTAKING BY CLIENT

UNDERTAKING

I, _____ , the undersigned and duly authorised thereto by Two Rivers Platinum (Pty) Ltd, have studied and understand the contents of this Environmental Impact Assessment/Environmental Management Programme (EIA/EMP) and duly undertake to adhere to the conditions as set out therein, unless specifically or otherwise agreed to.

Signed at _____ on this _____ day of

_____ 2013.

_____

Signature of Applicant

I, _____ the undersigned and duly authorised thereto by the LIMPOPO DEPARTMEN OF ECONOMIC DEVELOPMENT, ENVIRONMENT AND TOURISM, have studied and approved the contents of this Environmental Impact Assessment/Environmental Management Programme (EIA/EMP).

Signed at _____on this _____ day of

_____ 2013.

_____

Signature of Director

13 CONCLUSION & ENVIRONMENTAL IMPACT STATEMENT

This section of the Draft EIA report relates to Section 31 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 31 (2)	*An environmental impact assessment report must contain all the information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35, and must include -*
	(o) An environmental impact statement which contains - *(i) A summary of the key findings of the environmental impact assessment* *(ii) A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.*

Key Findings of the Environmental Impact Assessment:

After mitigation, high impacts were identified to geological resources only. Expansion of the underground mine at TRP will lead to removal of additional rock. This is a permanent impact that cannot be mitigated so remains high.

Medium impacts (after mitigation) were identified to soil resources, visual aspects, terrestrial biodiversity (fauna and flora) and riparian zones. The medium impacts will occur during the life of the mine, and will be rehabilitated at closure.

Low impacts are likely to occur to surface water, ground water, heritage resources, air quality, topography and noise, largely since the additional activities will form part of the existing mine.

Positive impacts are likely on socio-economic aspects, since expansion of the existing mine will increase the life of mine, thereby retaining employment and economic stability of the population in the area.

Cumulative impacts were assessed as being low to medium, since the proposed activities will form part of an existing mine.

Positive and Negative Implications of the proposed UG2 and Merensky Expansion

The most important positive implication of the proposed project will be to extend the life of the existing mine, thereby retaining employment and economic benefit for a longer period.

Expansion of the existing mine will result in additional negative environmental impacts, as new infrastructure will extend beyond the current mine footprint.

The only alternative for this proposed project is the 'no-go' option, since the resources to be mined are located at the current mining operation. The 'no-go' option would result in completion of mining of the UG2 mineral resources, without the option to continue to exploit the Merensky Reef from the same mine.

Environmental Impact Statement

The overall environmental impact of the UG2 and Merensky Expansion is deemed to be low for the following reasons:

- TRP is already in the operational phase, the proposed project will form an expansion to existing infrastructure (ie major disturbance to the area has already occurred).
- The medium impacts identified are not permanent and will be rehabilitated at mine closure.
- No surface infrastructure is planned beyond the existing mining right area.

It is recommended that the UG2 and Merensky Expansion be authorised to proceed, provided the following recommendations are taken into account:

- The more sensitive North decline areas be surveyed for protected species prior to vegetation clearing.
- The historical adit be studied further and protected from mining activities, as per recommendation of a Heritage Specialist.

14 REFERENCES

GCS (Pty) Ltd. 2006. Two Rivers Platinum Mine Pty Ltd. Environmental Programme Realignment.

Two Rivers Platinum Mine (Pty) Ltd: 2004. EIA/EMP Submitted in Terms of Section 39 of the MPRDA, 2002 (Act 28 of 2002).

APPENDIX A – AMENDED EIA APPLICATION FORM

APPENDIX B – WASTE LICENCE APPLICATION AND CORRESPONDENCE WITH DEA

APPENDIX C – HYDROGEOLOGICAL STUDY REPORT – GOLDER 2010

APPENDIX D – HYDROGEOLOGICAL STUDY REPORT – GCS 2013

APPENDIX E – AIR QUALITY STUDY – AIRSHED 2013

APPENDIX F – BIODIVERSITY BASELINE ASSESSMENT – ECOREX 2008

APPENDIX G – FINAL SOCIAL IMPACT ASSESSMENT – GCS 2013

APPENDIX H – STAKEHOLDER ENGAGEMENT PROCESS

APPENDIX I – MONITORING PROGRAMME

APPENDIX J – ENVIRONMENTAL AWARENESS AND EMERGENCY PLAN